



**THE HINTON FOREST
1955-2000
- A CASE STUDY IN ADAPTIVE FOREST
MANAGEMENT**



Foothills Model Forest History Series

by

Robert Udell and Peter J. Murphy

with

Robert Bott and Robert E. Stevenson



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Foothills Model Forest History Series

By Robert Udell and Peter J. Murphy

with

Robert Bott, and
Robert Stevenson

2002

(With Foreword to 2014)



The Forest History Program of the Foothills Research Institute – By Understanding our past, we shape our future.

The Forest History Program at Foothills Research Institute began in 1996 with a project to record the natural and management history of the Hinton Forest and has continued to grow and expand its mandate.

The major goal of the program is to provide insight into how events of the past have shaped the landscape, ecology, culture and forest practices of today and how this insight can help inform future policy and practice.

Publications in Print

The Trans Canada Ecotours Northern Rockies Highway Guide – 2012

by: Fred Pollett with Robert Udell, Pete Murphy and Tom Peterson

A comprehensive examination of the landscapes, ecology, geology, forestry and human history of the Northern Rockies region, divided into three chapters, each developed along a major transportation corridor.

Mountain Trails – 2008

By Jack Glen

The life and times of an early Alberta forest ranger, told in his own words. Drawn to the foothills of Alberta, he lived a life full of adventure and exemplified the spirit of adventure and commitment to forest stewardship that was the hallmark of the Alberta Forest Service rangers in the 20th century.

A Hard Road to Travel – 2007

by Peter Murphy with Robert Udell, Robert Stevenson and Tom Peterson

An in-depth look at the remarkable human and ecological history of west central Alberta from prehistoric times to the arrival of large-scale industrial forest management in 1955. The authors trace the changing relationships between people and forests as humans first traveled through west-central Alberta, then stayed on to struggle, survive and eventually flourish – first despite the forest, then in harmony with it. 150 photos, 27 maps

The Resilient Forest – Looking Beyond the Stumps – a 35 Year Retrospective on a 1970s Environmental Campaign - 2007

By Bob Stevenson, Steve Ferdinand and Bob Udell

In 1971, the environmental organization Save Tomorrow – Oppose Pollution –i.e. STOP – examined North Western Pulp and Power’s Hinton forestry operations. It’s highly critical and controversial report made headlines in Alberta. 35 years later, the authors examine the assertions and predictions of the 1972 STOP report.

Learning from the Forest – 2003

By Robert Bott, Peter Murphy and Robert Udell

This book examines the antecedents, scientific basis for and the evolution of the forest management program on the West Fraser Hinton Forest. “This is an important account of a large forest area... It is a first in Canada and is a major illustration of what can be accomplished by professional forest managers when provided with continuous support for their endeavours...” Ken Armson, former Chief Forester, Province of Ontario.

Other Publications – visit www.foothillsresearchinstitute.ca

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FOREWORD

This book, and the Forest History Program at the Foothills Research Institute, can be traced back to one day in Grande Prairie: On May 5, 1995 I presented a speech at the Northern Alberta Forestry Show in Grande Prairie, Alberta. At the time, we were mid-way between the completion of the 1991 forest management plan for the Hinton Forest on the Weldwood forest management agreement area, and preparations were already underway for the next plan, to be produced in 1999. In my speech (*Building Allowable Annual Cut on a Tenured Forest Management Area*), I was attempting to show how security of tenure on a defined landbase not only encouraged industry to invest in plants and equipment to generate wealth from a forest landbase, but also encouraged investments in research, growth and yield, silviculture and tree improvement, all within the context of sustainable forest management.

At the conclusion of the speech, Professor F.L.C. (Les) Reed of the University of British Columbia, challenged me as to why the remarkable story of the Hinton operation had never been recorded. Professor Reed was well qualified to make the observation, as a professor of economics and policy but also as a former Assistant Deputy Minister of Forestry Canada and the author of the 1978 FLC Reed report on the state of forestry in Canada. In that report, as in Donald MacKay's remarkable 1985 book "Heritage Lost – The Crisis in Canada's Forests" (MacMillan of Canada), the Hinton operation was held up as an exemplary showcase of how forest management should be practiced in Canada.

There were, at the time, many unique features of the Hinton operation that were not usually seen elsewhere in the country, not the least of which was an unbroken line of management plan authors, each of whom had the benefit of counsel and advice from the authors of the preceding plans. Indeed, the recently retired Chief Forester at Hinton, Jack Wright, was himself the author of the first two detailed forest management plans for the Hinton Forest.

In 1995, the Hinton pulp mill was already planning a celebration for the 40th anniversary (1997) of the first pulp production from the mill, and Professor Reed's challenge was a fortuitous coincidence with those plans and really the catalyst that set the whole Adaptive Forest Management and History Program at the Foothills Model Forest (now Foothills Research Institute) into motion. I asked Dr. Peter Murphy and Bob Stevenson to join me in working on this project, and we also enlisted the services of Bob Bott, a Calgary writer and editor, to help with the writing and structure of the first report on the Hinton Forest. This remarkable team has been a pleasure to work with and I have learned much from each of them, for which I am grateful. Dr. Murphy in particular has strong links to the history of forestry in the Hinton area, having served here as the first director of the Forest Technology School (now Hinton Training Centre), which he brought to Hinton from the Kananaskis area in 1960. He is the primary author of most of the chapters in this book, and continues to work with the Forest History Program at the Institute.

In gathering the background for the book, Pete Murphy, Bob Bott and Bob Stevenson interviewed many people who played a role, whether direct or indirect, in the initiation and development of the story of this remarkable forest history. From these interviews as well as other files and reports, a timeline was developed for the history of the enterprise and this timeline informs the story presented herein. See Appendix 1.

Initially, we prepared the Hinton story in a series of reports dealing with various aspects of the operation and each was presented as a stand-alone chapter. These chapters described the evolution of the program at Hinton from its early beginnings up to the year 2000. From these individual chapters the

team produced a comprehensive summary in the form of a book "Learning from the Forest" authored by Robert Bott, Peter Murphy and Robert Udell. Published jointly by the Foothills Model Forest and Fifth House Publishing in 2003, it was critically acclaimed within the forest community, but was not destined to sell well in the public arena.

This report brings the original more-detailed chapters and extracts from the Bott *et al.* book together into one publication, illustrated with additional images and other material to enhance the story. There is some overlap between chapters, as each one originally placed its subject matter within its historical context, so often described similar events.

I have not attempted to update this compendium to the current date, leaving it as it was intended – a history from 1955 to 2000. There are many reasons for this, not the least of which is a change in ownership, and perhaps direction, of the Company and subsequent management plans that were not included in the original series of reports.

In 2014, the Forest History Program at the Foothills Research Institute is winding down but can look back on a very productive 18-year record of reports and books that will continue to be referenced long after the program itself fades away. Some of these books are no longer available and inevitably they will all become out-of-print. Most of our major publications are now being converted to an ebook format to ensure they will continue to be available to people with an interest in forest history in Alberta generally and the Hinton area in particular.

Bob Udell

January 2014



"LEARNING FROM THE FOREST" AUTHORS, 2003.

L-R BOB UDELL, BOB STEVENSON, PETE MURPHY, BOB BOTT

R.E. STEVENSON PHOTO

CHAPTER ONE- INTRODUCTION AND BACKGROUND

1.1 OVERVIEW OF CHAPTER ONE

Alberta took over control of its natural resources from the federal government on the first day of October 1930 through the Transfer of Resources Act. Before then the land that was to become Alberta was a part of the Hudson's Bay Company's Rupert's Land for 200 years from 1670 to 1870, then part of Canada's 'North West Territories' until 1905 when Alberta was made a province of the Dominion of Canada. However, the federal government kept control of the natural resources, including the forests, for twenty-five years until 1930.

When Alberta took over its forests the forest industry was modest in size -- in 1931 producing only 51 million board feet (fbm). By the end of the Second World War, lumber production had increased to about 300 million fbm, and inquiries about possible construction of a pulp mill in Alberta were noted as early as 1946.

Permission to export fire-killed timber for pulp wood to be manufactured outside Alberta was approved by order-in-council in 1944-45, and quantities were shipped to Ontario and the United States the next year. Since the export of green pulpwood was prohibited under the Alberta *Forests Act*, this recognition that Alberta had suitable pulpwood species may have stimulated interest from potential investors outside the province.

The government of Alberta was interested in encouraging a pulp industry both to utilize the extensive stands of smaller diameter trees and to contribute to the economy. Forestry officials then, notably Director of Forestry Eric Huestis and Deputy Minister John Harvie, were resolved that if pulp mills were established in Alberta, forest management would be done differently than it had been in eastern Canada. In their revised *Forests Act* of 1949 they included an enabling clause to permit pulpwood leases with a commitment to harvest the forest on a "perpetual sustained yield" basis.

The first application for an Agreement followed in the same year that this clause was approved, but the applicant was not able to raise the capital to proceed. The evolution of the first successful Agreement, for North Western Pulp and Power, began in 1951 when Frank Ruben, an Alberta oil and coal businessman, signed an agreement and began to search for a partner. He obtained extended agreements in 1951 and 1952, and formed a partnership with the St. Regis Paper Co. Ltd. in June 1954. Their revised Agreement of 14 September 1954 is the one that launched this enterprise. This one epitomized the cooperative government-industry search for an equitable and collaborative means by which their respective needs -- for forest management and revenues for the government and timber harvesting rights for the industry -- could be met while ensuring that the forests were managed to sustain "perpetually successive crops" for sustained yield.

Through the ensuing area-based Agreements Weldwood of Canada and its predecessor companies have been managing this large forest management area in Alberta for over 40 years. The enabling Agreement of 1954 with North Western Pulp and Power Ltd. in the Hinton area was the first of its kind in Alberta. This was a pioneering venture from the outset. In addition to constructing the first pulp mill in Alberta, it was the first pulp mill to utilize lodgepole pine as a major component, the first major forest industry to commit to sustained yield forest management, and the first cooperative agreement in which the industry assumed such a large share of the forest management responsibility. In return for this commitment, the Crown granted the Company long term security of timber harvesting rights, or 'tenure', upon which to base investments in manufacturing plants, roads, forest management and regeneration.

This model of shared government-industry responsibility and commitment was precedent setting, and its principles provided an example that was emulated in some form by most other provinces. This story is told in "The Evolution of Forest Management Agreements – A Policy Review and Analysis", a companion volume in the Foothills Model Forest history series.

In this Chapter we provide an introduction and background to the Hinton Forest story. The historical context is important for perspective. A brief review of these highlights is presented, followed by summaries of the major events since.

One of the hallmarks of this case study was the commitment by both the Company and government to achievement of sustained yield forest management, a long-held dream of early foresters. The story about the major participants and how their resolution was translated into policy is described next.

Forest management planning involves a complex array of considerations designed to meet ecological, economic and social objectives. An overview of this process is provided to serve as a 'road map' for the chapters which follow.

And finally, "In the beginning" -- the start-up of the forestry operations in 1955 is described. In essence the entire management system had to be developed from scratch, and it seemed that everything had to be done at once. Chapter One ends with Crossley's own retrospective review of how he and his team went about their task.

1.2 HISTORICAL BACKDROP TO 1954

Forest policies in Alberta reflect a heritage from a long history of Canadian precedents, beginning with Crown reserves of forests for strategic military purposes by the British and French as early as the 1600s.

When the federal government acquired Rupert's Land from the Hudson's Bay Company in 1870, the lands, of which Alberta was a part, were incorporated as the North West Territories, administered by the federal Department of the Interior.

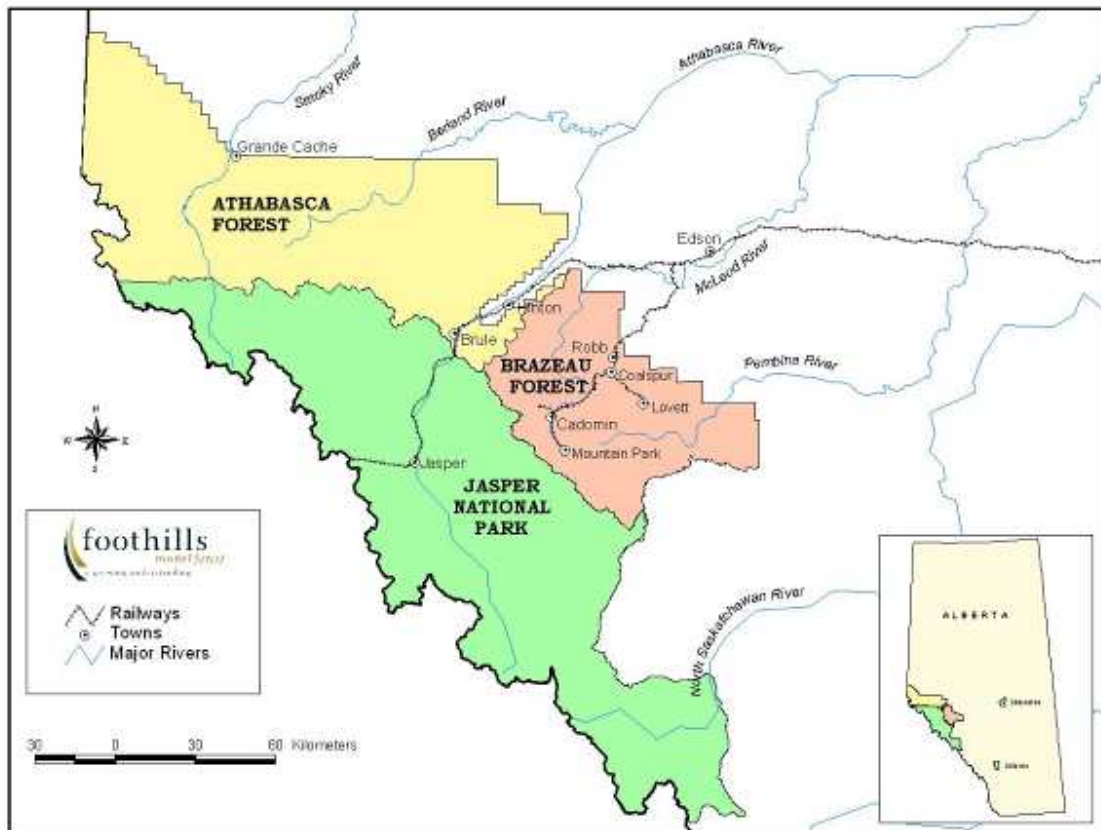
ESTABLISHING THE FOREST RESERVES

The responsibility for protecting and managing the Dominion Forests was eventually assigned to the Dominion Forestry Branch (DFB) when it was established in 1899. The extent of the forests and magnitude of the task required their efforts to be focussed on the forests of greatest importance. In Alberta and the prairies these were generally judged to be the treed areas on higher elevations -- typically watersheds on which many of the important streams and rivers originated. They were established as Forest Reserves and received the greatest attention for forest protection and management. The rest of the forested lands were managed as Fire Ranging Districts in which staffing levels were much lower. The first forest reserves were made by orders-in council and first confirmed in a 1906 Act. However, the major system of forest reserves was greatly extended under the *Dominion Forest Reserves and Parks Act* of 1911.

The major arguments for setting up Forest Reserves were to protect watersheds and to provide a supply of wood for settlers on the prairies. As Frank Oliver, Minister of the Interior, in 1911 explained¹:

The primary object is to conserve the sources of water supply by the protection and production, or reproduction, of timber or wood around the sources of the water supply --- to reproduce the timber growth for the benefit of the dwellers on the prairies surrounding these areas.

However, on the Rocky Mountains Forest Reserve, in which much of the Weldwood FMA is located, extensive areas of timber berths had already been issued in the 1880's to supply the sawmills cutting timber for railways and communities in southern Alberta. As Rau commented in 1908²: " These berths cover all the available timber and considerable country, besides, which is today not covered by merchantable timber". The two former Forest Reserves in the Hinton area, the Brazeau and Athabasca, are illustrated in Map 1.



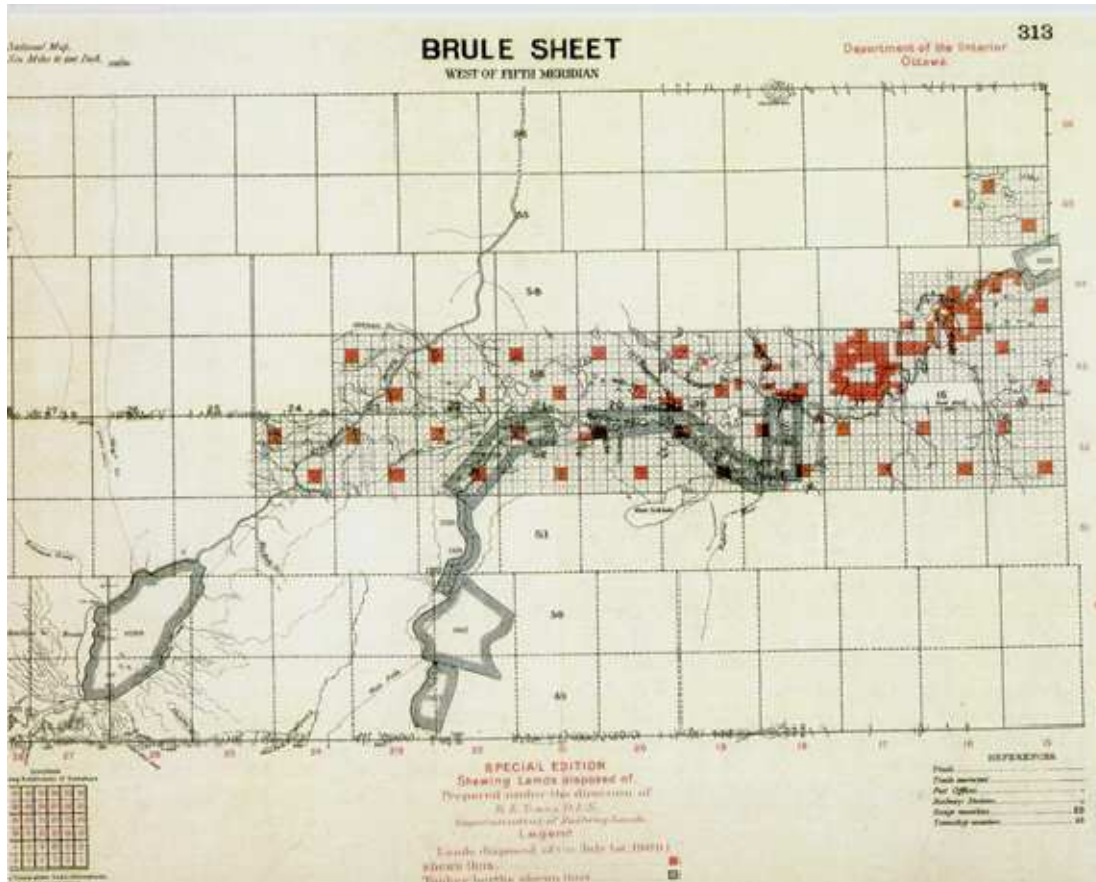
Map 1-1 Location of Brazeau and Athabasca Forests in Alberta 1925

The locations of the actual and proposed Forest Reserves in Alberta in the late 1920s are shown in Map 2.



Map 1-2 Actual and Proposed Forest Reserves in Alberta, 1929

Licensed Timber Berths (LTBs) were blocks of forested land on which cutting rights were granted to the highest bidder, usually by sealed tender. They were typically issued for twenty years, often renewable. See Map 3.



Map 1-3 Timber Berths at Brule Lake and Along the McLeod River as of July 1909.

Timber dues varied from five to ten per cent of the selling price of rough lumber. Harvesting was limited to larger trees under a diameter limit system--commonly minimum stump diameters of 14 inches for spruce and 12 inches for pine, measured 12 inches above ground. Marking the specific trees to be cut was preferred on the smaller Forest Reserves on the prairies but a shortage of staff precluded that on large berths. The philosophy of the partial cut was to remove older trees (bigger ones), leaving smaller trees to grow faster, maintain cover on the watersheds, and to provide seed trees to establish natural regeneration. Too often the cuts resulted in high-grading operations. It was assumed that nature would regenerate the forests, but the resulting site conditions often worked against it. In some cases the trees left behind grew well in response to the greater light available, but many were left scarred and broken.

The LTB approach to timber sales was intended to ensure that revenues from the wood cut would flow to the government to help pay for the costs of government services. LTBs were sold by competitive bid, as mentioned, to try to get the highest price possible. However, there was no security of tenure beyond the term of the license and the rights only applied to the LTB area. The only significant requirements were that the timber had to be harvested, but only those trees above the specified minimum stump diameter limit. After 1930 timber dues were paid on the basis of the amount of lumber sold, deemed a

simpler basis on which to base calculations. The result was that the industry generally comprised small, less efficient portable mills that could be written off during the term of the berth. These mills resulted in less recovery of lumber and, combined with the dues being paid on the basis of lumber manufactured, there was little incentive to increase utilization, either in the forest or from the log. The conditions contained no responsibilities for regeneration or silvicultural practices. Since the primary need was for saw timber and ties, only the better quality timber was sought, leaving extensive forested areas of trees that were unsuitable for those products.



WASTE AND HIGHGRADING IN AN EARLY ALBERTA TIMBER BERTH, 1921

ALBERTA FOREST PROTECTION COLLECTION

The bidding process also led to some hoarding and monopoly holding by financially stronger companies. These results stimulated a lot of discussion about how to do things better.

The concept of multiple-use, or multi-purpose use, of forest lands was clearly recognized by the Dominion Forestry Branch, although not simply stated in that way. There was a belief that “protected” or well-managed forests would support wildlife and provide many other benefits to many people. It was an article of faith. Besides the initial concern about watersheds, recreational use and grazing were also encouraged, although in large measure with fire protection in mind.³ As Abraham Knechtel, a Dominion Forester, stated in 1910:

... our legislators... are well aware that forests feed springs, prevent floods, hinder erosion, shelter from storms, give health and recreation, protect game and fish, and give the country aesthetic features. However, the Dominion Forest Reserve policy has for its motto, “Seek ye first the production of wood and its right use -- and all these other things will be added into it.”⁴

It is interesting that although Alberta became a Province in 1905, it did not receive the rights to its natural resources until the Transfer of Resources Act in 1930. During those 25 years the Dominion Forestry Branch protected and administered the forests in Alberta, and collected dues from timber sales.

TRANSFER OF RESOURCES ACT

The Transfer of Resources to Alberta was effective 1 October 1930. That fall the Province formed the Alberta Forest Service (AFS) to assume responsibility for forests, and resolved to do as good a job as the DFB. Alberta's first forest laws and regulations remained essentially the same as those of the DFB. Unfortunately, the hard times of the 1930s depression and drought years forced Alberta to cut back drastically on government services, including Forest Service staff. Alberta was then a "have-not" province with very limited revenues. As Ted Blefgen, Director of Forestry, reflected in 1946⁵: "... during the depression years we were definitely informed that no money could be made available and during the war years the necessary labour could not be secured." As a result the AFS focussed on forest protection and inspection of timber cutting areas. There was no opportunity yet to practice sustained yield forest management.

The forests were (and still are) primarily in public ownership. The local forest industries were then comprised primarily of sawmill and tie operations. Although they were important locally, there were concerns about their sustainability in light of utilization technology at the time, and the lack of markets for the extensive post-fire forests of smaller size not suitable for sawlogs and ties. With a focus on protection from fires, increased logging was anticipated to become the primary disturbing element in the forest to ensure renewal of vigorous young forests. The Province was aware of problems with industry forest management in other parts of Canada as a result of permissive leasing arrangements that did not ensure regenerated forests, and resolved to do better in Alberta. Although oil revenues were starting to increase after Leduc No. 1 'came in' on 13 February 1947, Alberta remained financially weak for another decade. It was seen as important that forest-based revenues be generated to help to cover the costs of forest protection and management.

Timber production in Alberta increased greatly between 1939 and 1945 in support of the war effort, and also afterwards to meet post-war building demands. As Huestis⁶ later noted, in the first year of provincial control of resources in 1931-32 the cut amounted to 51 million board feet (fbm)ⁱ. In 1940-41 it was 186 million fbm, and by 1945-46 was almost 300 million fbm.

The *Forests Act* stated that all forest products must be manufactured within the Province. This was to try to ensure that at least the primary manufacturing jobs stayed in Alberta. However, in response to wartime needs, an order-in-council was passed in 1944-45 granting permission to ship fire-killed pulpwood for manufacturing paper⁷. In 1945, Huestis⁸ stated that the opportunity was: " --- now being taken advantage of. Large quantities of this class of material are being shipped to Ontario and pulp mills in the United States." The restriction to fire-killed wood was intended to try to encourage future investments in Alberta-based mills, which would be based on green timber,ⁱⁱ while in the meantime utilizing the dead timber.

ⁱ feet board measure (fbm). One board foot represents a piece of lumber 1 foot by 1 foot by 1 inch thick.

ⁱⁱ Jack Wright noted that much of Alberta's fire-killed spruce went to the St. Regis pulp mill at Rhinelander, Wisconsin where they made glassine papers and meat wrap. Thus there was an earlier connection with St. Regis.

In 1946⁹ the Alberta Post War Reconstruction Committee made five recommendations about forestry: conduct a forest inventory, expand fire prevention, start a long-term program of reforestation, inaugurate training programs for men already in the forestry service and people wishing to join it, and establish additional tree nurseries. These points were remarkably similar to those made by J.H. Morgan¹⁰ in 1884, sixty years beforeⁱⁱⁱ!

In British Columbia, Chief Justice Gordon Sloan had also reviewed forest policy in that province. His 1945 report¹¹ led, in part, to changes in their *Forest Act* in 1947. One of those changes enabled new long-term leases called Tree Farm Licenses to be managed on a sustained yield basis. In Alberta there had been little response to pleas from foresters for additional funding from the cash-strapped Alberta government for the Alberta Forest Service until after 1947 when the Leduc No. 1 oil well came in and petroleum revenues began to flow into the provincial treasury. The Alberta forest area was large, still mostly inaccessible and resources few.

THE GREEN ZONE AND EASTERN ROCKIES FOREST CONSERVATION BOARD

The years 1948 and 1949 were eventful ones for forestry in Alberta, marking the start of a growing commitment to achieve sustained yield forest management. First, to rationalize settlement and provide a focus for forest protection and management, an Order-in-Council was passed on 9 January 1948 delineating lands available for settlement from lands to be retained as forests – referred to as the Green Zone (Map 4). Second, a federal-provincial agreement provided a federal capital grant and provided shared cost management for 14 years on the three southern foothills forests, Crownsnest, Bow River and Clearwater, through the Eastern Rockies Forest Conservation Board, which was comprised of federal and provincial representatives. These two events marked the beginning of modernization of the Alberta Forest Service and clearer definition of its mandate.

ⁱⁱⁱ Morgan was appointed as a one-man commission in 1884 to report on the forests in the former Rupert's Land, then the North West Territories.



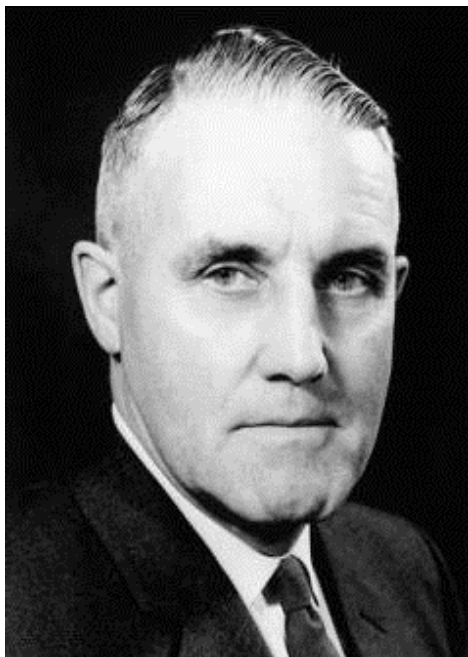
Map 1-4. Green and White Zones as declared in 1948

FORESTS ACT REVISION 1949

In 1949, Eric S. Huestis became Director of Forestry upon the ill health of Ted Blefgen. Huestis and Blefgen had worked closely to try to strengthen the Forest Service and to advance forestry practice. Besides Huestis' promotion, four significant events took place that year: a revised *Forests Act*, a contract for aerial photography, mapping and forest inventory, hiring of Reginald D. Loomis, a respected forester and expert in forest inventory methods from eastern Canada, and recruitment of eight graduating foresters from the University of British Columbia.

The 1949 *Forests Act* (assented to 29 March 1949) included a new clause enabling long-term leases that stated (Section 96) that the government may:

...enter into an agreement, to be described as a forest management license ... for the management of public lands ... reserved for the sole use of the licensee for the purpose of growing continuously and perpetually^{iv} successive crops of forest products to be harvested in approximately equal annual or periodic cuts adjusted to the sustained yield capacity of the lands ...¹²



ERIC HUESTIS
ALBERTA FOREST PROTECTION COLLECTION

There were several points of background to this. One of the significant aspects was the use of the term “sustained yield” -- the first time it had been used in Alberta legislation. Huestis¹³ had noted in his report for 1948 that the annual lumber cut had increased to 390 million board feet in 1947-48, and commented that it was “... quite evident that we are now over-cutting.” He was making this statement largely in respect to the lumber and tie industry. However, he had also observed that as a result of extensive forest fires in the past, there was much timber of a size too small for sawlogs and ties – then commonly 14” dbh and over for sawlogs and 12” for ties – but that it would be suitable for pulpmills¹⁴. He also noted in his report that he had been approached by pulp and paper industries. In fact, his first reference to possibilities of a pulp or paper mill was noted as early as 1946.¹⁵

Another part of the background was the concern about net cost to the government for forestry. For example, as early as 1920 R. H. Campbell¹⁶, the Dominion Forester, reported that revenues received from the forests were as yet small compared to the amount required for forest protection and management, but felt the expenditures were justified and that in time the forests would make financial returns similar to those of European forests. Industry-generated revenues were clearly seen as important.

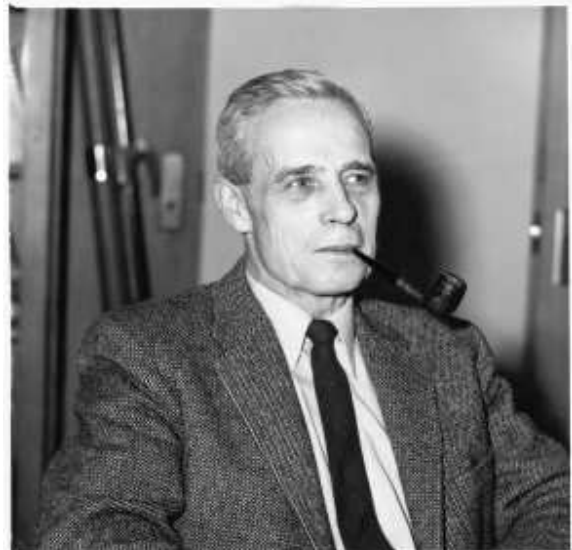
^{iv} The word ‘perpetual’ first appeared in this 1949 legislation. The word was included in a court challenge by a group of environmental organizations in the early 1990s, discussed later.

Until 1949 there had been no forest inventory, and therefore no basis on which to develop forest management plans. Huestis' concerns about over-cutting reflected both the limited areas of timber with the size and quality requirements for lumber and ties, and lack of knowledge about the kind and extent of the forest as a whole. Huestis¹⁷ was personally pleased that he was able to get approval to contract with Photographic Surveys Corporation (PSC) on 2 November 1949¹⁸ to remedy that shortfall. He explained that the rationale he presented in support of the proposal was based on post-1947 petroleum exploration needs. There was neither a complete set of aerial photographs for the Province nor a set of base maps, both of which had come into strong demand by oil companies. The major part of the contract dealt with photography and maps, but Huestis was able to include a forest inventory for the southern part of the Province, which was added as a third part of the contract. This area covered the forest south of latitude 54 but excluded the three southern forest reserves, which were covered by the Eastern Rockies agreement. As Huestis described it in a press release for the signing:

The forest inventory, which, although primarily taken from photographs, will be carefully checked on the ground as work proceeds, and give a general inventory of the forest resources of the Province and will allow prospective operators to determine the amount and type of timber within reach of their field of operations. It will give the Government a picture of the amount of timber available so that the amount of cut can be controlled within the limits of increased growth, coupled with the amount cut and burned in forest fires each year.

This contract was funded entirely through the Department of Lands and Forests before the federal-provincial agreements for forest inventories were established. It was a reflection of Huestis' commitment to do proper forest management in Alberta. Huestis then needed an expert forester with experience in photo interpretation and forest inventory to oversee the project. He was fortunate, that same year, to have been able to recruit Reginald D. Loomis who was well qualified. Loomis served as the trouble-shooter for the PSC contract, ensuring a creditable standard of performance.

REG LOOMIS, 1961
ALBERTA FOREST PROTECTION COLLECTION



Huestis also spoke to the 1949 graduating class of foresters at the University of British Columbia about forestry opportunities in Alberta, eventually employing eight of them – four to work on the inventory with PSC, the other four assigned to forests. Three of these became directly involved with the NWPP story as will be noted later.

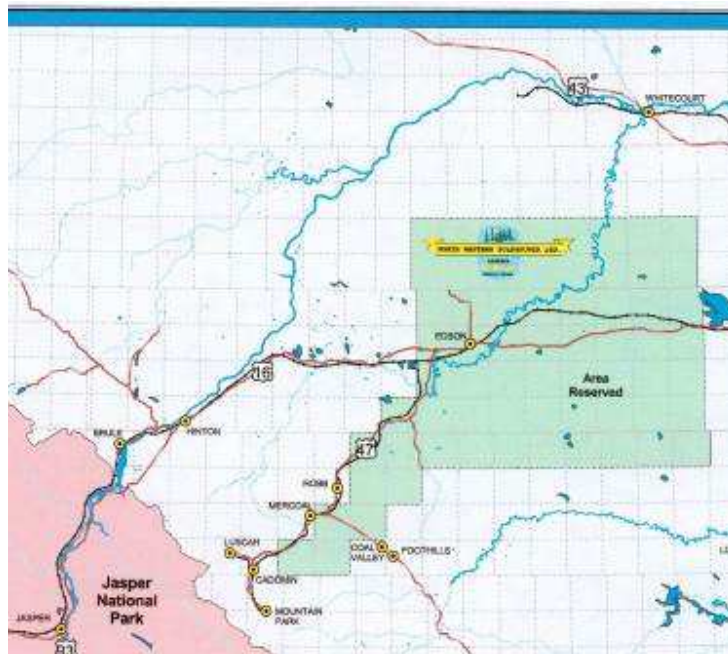
Loomis later stated about the forest inventory:¹⁹

The inventory has shown that [spruce] has been over-exploited and there is a serious shortage to sustain indefinitely the present production. But on the other hand, the inventory has shown that there is a reasonably plentiful supply of both pines and poplars, the other two major species groups ... in Alberta. The reason for this unbalanced condition in utilization has been ... lack of extensive markets for the other species and sizes ... the preponderance of new softwood tree growth is more suited by size for pulpwood harvesting than for lumber.

It was against this backdrop of the beginnings of technical sustained yield forest management in Alberta that the wood pulp industry was developed.

THE ROOTS OF LARGE SCALE FOREST INDUSTRY IN ALBERTA

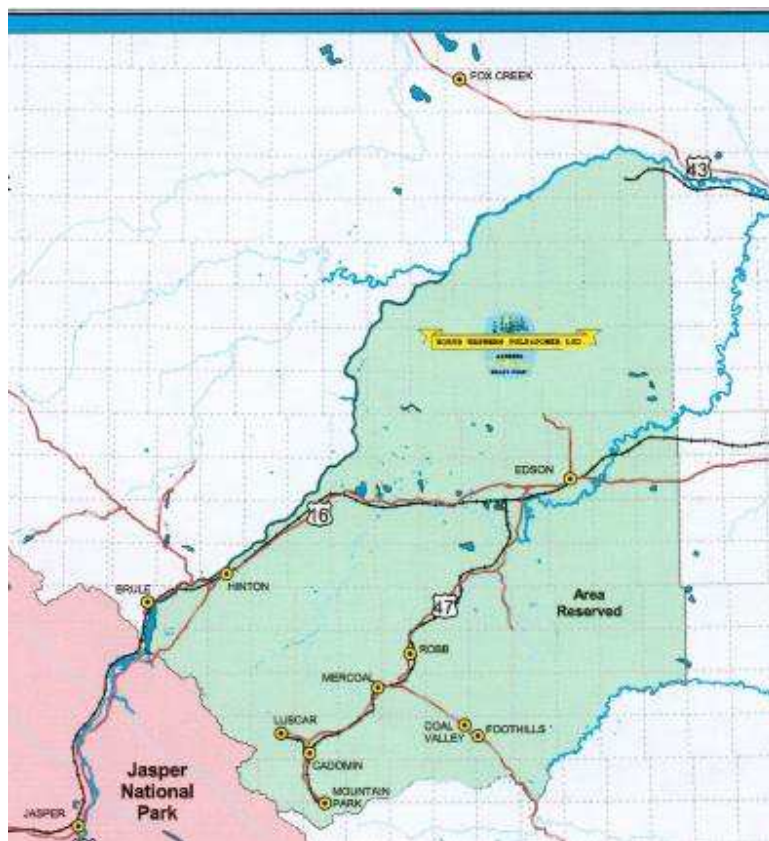
The story about the first successful large scale forest industry proposal started in 1949 when Frank E. Ruben first visited his newly-purchased coal mine near Robb, southwest of Edson. Mr. Ruben had come to Alberta in 1936 from California where he was active in the construction industry and wild-cattling for oil. In 1947, right after the discovery at Leduc, he formed North Canadian Oils Limited. He came up with the idea of building a pulp mill when he visited his newly-purchased but closed coal mine at Robb. Inspired by the surrounding forests, he wondered if he could use his coal for power to run a pulp mill. Determining that the government was willing to support the idea, he incorporated North Western Pulp and Power Ltd. -- and two weeks later, on 8 June 1951 he signed an Agreement with the Alberta government for a pulpwood lease to support a mill at Edson. The first lease area rather pragmatically defined a rectangular block in which Edson lay at the centre (Map 5).



Map 1-5 North Western Pulp & Power Limited first Pulpwood Lease Area centred at Edson

Edson was a logical first choice for Frank Ruben to select for the mill location. It lay at the junction of two railway lines -- the Coal Branch would serve to deliver his coal for energy from his mine at Robb, while the CNR main line would provide other services and a link to markets.

With his 1951 Agreement in hand, Mr. Ruben and his partner Clive Reid invested in studies and surveys to assess the timber. Among those with whom he discussed the project was Reg Loomis, head of the Forest Surveys Branch for the Alberta Forest Service. Maps and inventory data for that area had not yet been produced, but Loomis was skilled in the use of aerial photographs and Ruben asked if he could prepare an estimate of the timber volume. Loomis got permission to do the work on his own time, but noted that the first area chosen was located too far east. In fact, it was very much in a predominantly poplar area so he suggested moving it west adjacent to Jasper National Park to better access coniferous pulpwood. Ruben extended his Agreement with the new area on 12 July 1952. (Map 6). Ruben had been unsuccessful in finding a joint venture partner but his search eventually led him to New York to a meeting with Roy K. Ferguson, president of the St. Regis Paper Company. Ferguson was impressed and sent a cruising party to Edson in May 1954. George Abel, a St. Regis forester, reported in June 1954, concluding: "The timber resources of this reserve offer a splendid opportunity for a sustained yield operation considerably expanded over that now contemplated."

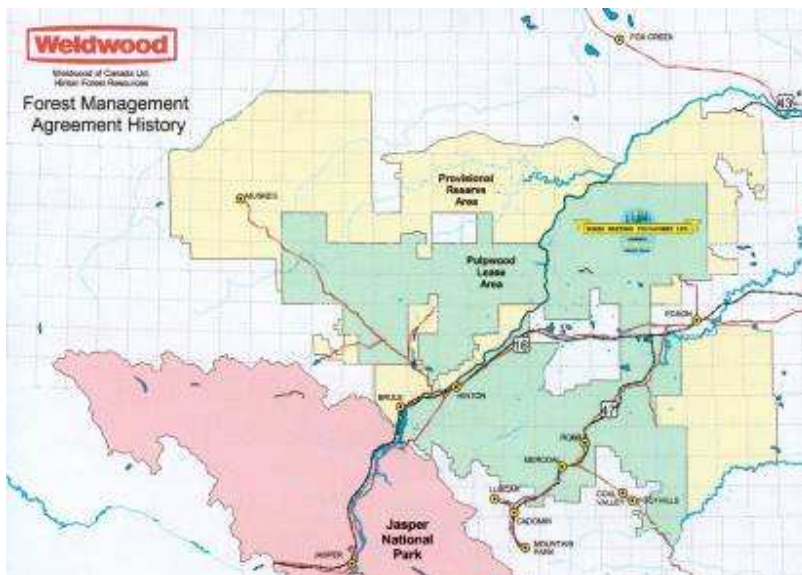


Map 1-6 North Western Pulp & Power: Revised Area in 1952 in Agreement with Frank Ruben, and in 1954 by North Canadian Oils and the St. Regis Paper Company

The result was a joint announcement 17 June 1954 by St. Regis and North Canadian Oils that stated plans had been finalized for financing and construction of a bleached kraft sulphate mill in Alberta. A third revised Forest Management Agreement (O.C. 1250/54), the one on which the construction commitment was based, was signed on 14 September 1954. The map area was the same as shown in the 1952 agreement (Map 6) -- designed for a mill to be built in Edson.

Detailed planning for the project got underway in June 1954. Soil tests at the Edson site that fall showed that the ground was too unstable for the footings to support a mill of that size. Further, water supply in the McLeod River was judged to be inadequate for the mill -- the McLeod River at Edson would not yield 30 million gallons of water a day. This complication immediately stalled all plans. Then Ruben remembered a small settlement further west where the road, Athabasca River and railway came together. He and his team checked it out on 25 January 1955 and determined that Hinton was the spot and decided to build the mill there instead.

Once the mill location was changed, it was essential to redesign the lease area. Again, Reg Loomis was asked to do this. In this reconfigured lease centred on Hinton, Loomis dropped some southern areas and included major areas to the north so the mill at Hinton would be more centrally located within the forest lease area. The lease area was also increased to ensure a wood supply for the planned minimum 400 tons-per day (tpd) (or 360 tonnes-per-day) mill. After a quick re-survey the Company confirmed the area as suitable, forming the basis for the new forest management area described in the next revised Agreement (O.C. 882/55, dated 13 July 1955 -- Map 7). It showed both a Pulpwood Lease Area (PLA) and a Provisional Reserve Area (PRA) for future expansion, approximately 3000 square miles (7800 km²) each, totalling some 6000 square miles (15,600 km²). This new area was approved with the understanding that the Company could refine the new boundary in response to a more structured reconnaissance of the boundary areas. For the first time it also outlined on a map the boundary of a reserve area that would be held until 1968 in case the Company chose to expand mill capacity.



Map 1-7 North Western Pulp & Power – area first designated for mill to be located at Hinton – amended Agreement 1955

1.3 HISTORICAL BACKDROP 1954-1968

ALBERTA

The Alberta Forest Service had started its forest inventory program in 1949. The first province-wide field surveys and interpretation of aerial photographs had been essentially completed by 1956. About this time, increasing attention was being directed to reforestation and silviculture, leading to creation of a silviculture section in 1960, and programs of seed collection, scarification and planting were begun. In the meantime, negotiations with the Alberta Forest Products Association attempted to rationalize the distribution of forest harvesting operations and extend achievement of sustained yield forest management over the entire province. Buoyed by the success of the Hinton Forest Management Agreement^v (Agreement) and its commitment to reforestation, the government suggested a similar sharing of rights and responsibilities with the non-pulpwood sector. The result was the 1966 "Quota System", a volume-based form of tenure in which companies received a share of the allowable annual cut (AAC) in a forest management unit and accepted responsibility for reforestation. The Company and Alberta were therefore both clearly committed to achieving sustained yield forest management -- the Company on its forest management area (FMA) and AFS in the rest of Alberta.

Albertawest Forest Products became the second potential Agreement, with rights in the Whitecourt area granted to former NWPP woodlands manager Gordon McNab in 1958. He sold to MacMillan Bloedel in 1965, but they abandoned the project six years later. North Canadian Forest Industries (now Canfor) in Grande Prairie obtained an Agreement in 1969 in support of an expanded sawmill complex. The Forest Technology School was opened in Hinton in 1960 to serve as the AFS training centre for rangers and fire control. It was expanded in 1965 to accommodate the second year of the two-year forest technology course, a cooperative training program with the Northern Alberta Institute of Technology. The first class graduated in 1966. During the fourteen years of this period 1954 to 1968 timber harvest in Alberta increased from about 2.2 to 3.0 million cubic meters.

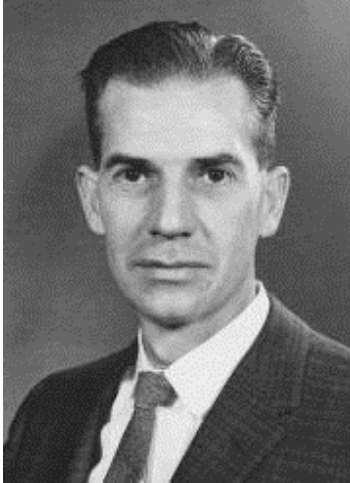
In Alberta, the forest increased in value with increased forest industry investments. Major fire seasons during this period dramatically illustrated the magnitude of the forest fire problem; in 1956, 1958, 1961 and especially in the spring of 1968. The fire control capabilities of the AFS were greatly increased in increments as a result of these experiences, reflected in increased staffing, prevention, detection, communications, aircraft, training and organizational efficiencies. By 1960 the oil industry had also clearly begun to impact the forest through exploration and development activities. Its impact was destined to become a major one; a new Land Use section was formed within the Forest Management Branch in 1963 to try to manage the demands.

During this time Eric Huestis was promoted to Deputy Minister, retiring in 1968. Robert Steele (one of Huestis' 1949 hires from UBC) became Director of Forestry in 1963.

Two important land reservations in the region were made during this period. The first was to provide a Provincial Park around the Jarvis – Gregg Lakes area comprising a chain of attractive clear lakes and a grassy meadow area long used by Aboriginals as a camping and Sundance site. Early Dominion Forestry Branch and Alberta Forest Service rangers had used the meadows as a wintering area for their patrol horses. The concept for a park reservation seems to have been in place at least from 1955 when the boundaries of the revised FMA for a mill at Hinton excluded much of the area. In 1958 Entrance

^v The term "Forest Management Agreement" was first used in the 1968 Agreement, but applied retroactively to 1954.

Provincial Park was created, renamed in 1974 after William A. Switzer, a popular WW II fighter pilot, businessman, former mayor of Hinton and who died in office as MLA.



ROBERT STEELE

ALBERTA FOREST PROTECTION COLLECTION

The second was establishment of the Wilderness Provincial Park in 1959. Lying north of Jasper National Park, it included most of the balance of the former Athabasca Forest Reserve. It was re-named Willmore Wilderness in 1965 in memory of Hon. Norman Willmore who had been instrumental in its initial designation.

On the national forestry scene, in 1966 a federally-sponsored National Forestry Conference was held in Montebello, Quebec. This was the first national convention since 1906. There was a lot to discuss. Among the invited participants from government, industry and associations were Des Crossley and Reg Loomis from Alberta. Intense deliberations led to a number of recommendations to further the state of Canadian forest management, especially centred on concerns about lack of forest renewal. Unfortunately there was little follow-through at the national level.

HINTON 1954-1968

This period was also a busy time for the Company. The Agreement was signed in September 1954, the mill location changed to Hinton in January 1955, forestry staff began to arrive that spring, construction of the mill and new town also got under way in 1955, and logging began during the winter of 1955-56.

Des Crossley was hired as Chief Forester in 1955 and began the process of recruiting staff and establishing the forest management program.

**DES CROSSLEY, CFS RESEARCHER 1952
ALBERTA FOREST PROTECTION COLLECTION**



Forestry staff focused on the forest inventory, so basic to planning for logging and the forest management plan (FMP). Cruising had already been underway to locate initial logging areas. Aerial photographs of the FMA were taken in August 1955 and new maps prepared. By 1958 a preliminary Forest Management Plan (FMP) had been written. Three major fires burning on the FMA in 1956 created an intense review which led to strengthening of the AFS firefighting resources. Despite that

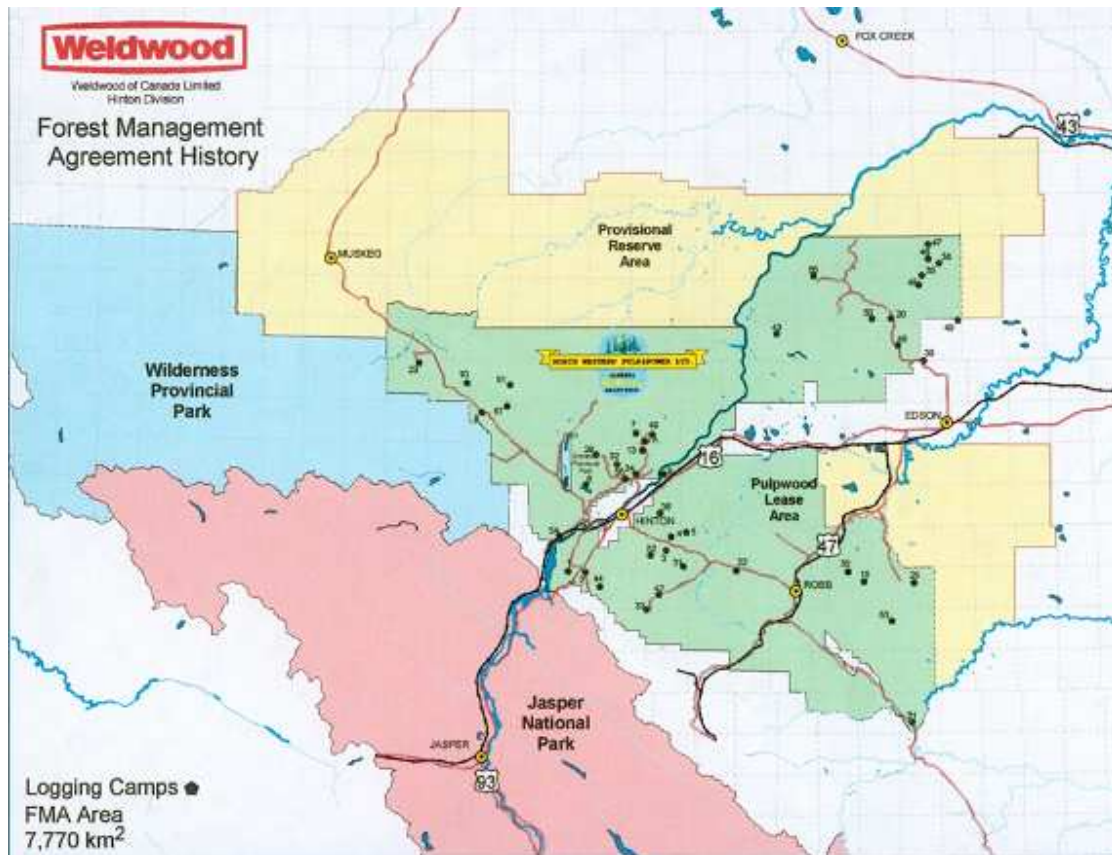
interruption, a permanent sample plot-based continuous forest inventory (CFI) program was launched and experimental scarification to promote natural regeneration began that year. The first production-level planting started in 1960, and the first detailed FMP was submitted in 1961 after the CFI volume and growth results were completed. A revised Agreement was signed in 1961 to further refine the boundaries of the PLA and PRA (Map 8). Computer processing of data was initiated as early as 1963. The first industry greenhouse and nursery in Alberta was built at Hinton in 1965 to provide their own quality-control planting stock, and the first full revision of the FMP was completed in 1966.



THE FIRST MANAGEMENT TEAM AT NORTH WESTERN PULP & POWER, 1956 - CLOCKWISE AROUND TABLE FROM LEFT:

**A.T. EASELY, RESIDENT MANAGER; MRS. M. ROWS, SECRETARY; G.D. MCNAB, WOODLANDS MANAGER;
H.S. WELCH, CHIEF ENGINEER, W. H. SAWYER, INDUSTRIAL RELATIONS MANAGER; D. SMITH, PULP MILL SUPT.;
B.C. ROY, CHIEF CHEMIST; A.C. MCCORRY, GENERAL SUPT.; G.L. MOORHOUSE, TRAFFIC MANAGER;
STANTON G.V. HART, ASST. WOODLANDS MANAGER; L.A. VEATS, PURCHASING AGENT; W.C. ALLEN, OFFICE MANAGER;
D.I. CROSSLEY, CHIEF FORESTER**

NORTH WESTERN PULP & POWER COLLECTION, PHOTO BY ROWED O'NEILL



Map 1-8 North Western Pulp & Power Ltd. – Redefined FMA for mill located at Hinton – Amended Agreement 1961

Logging was initially done by hand falling and skidding with horses. Up to 700 men worked out of bush camps during the winter. These woodlands operations also experienced rapid technological changes. A wheeled skidder was tested in 1963 and tree-length hauling tried in 1966. By 1967, difficulty in obtaining men and horses convinced the Company to purchase 55 Timberjack skidders; horses were phased out within two years.

The first production of kraft pulp began to flow from the new 91,000 tonne pulpmill in the fall of 1957, creating a sustained demand for wood deliveries to the mill. During this period Desmond I. Crossley was chief forester. Gordon McNab was succeeded as woodlands manager in 1957 by Adrien Provencher, then by Stanton Hart in 1962. Harry Collinge, the capable trouble-shooting mill manager and later Vice President and Resident Manager, died in December 1966, succeeded by Ivan Sutherland in January 1967.



EARLY WOODS OPERATIONS 1950S: HAND FALLING, HORSE SKIDDING, HANDPILING 8' LOGS, HAULING WITH "BOBTAIL" TRUCKS



NORTH WESTERN PULP & POWER COLLECTION



ADRIEN PROVENCHER, WOODS MGR 1957-62



STANTON G.V. HART, WOODS MGR 1962-68



HARRY COLLINGE, CA 1960.

A WELL-RESPECTED MANAGER WHO ENCOURAGED AND SUPPORTED COMMUNITY INVOLVEMENT BY THE MILL AND ITS EMPLOYEES. COLLINGE ROAD AND HARRY COLLINGE HIGH SCHOOL IN HINTON ARE NAMED IN HIS HONOUR

NORTH WESTERN PULP & POWER COLLECTION

1.4 HISTORICAL BACKDROP 1968-1977

ALBERTA

This was a period of growth in the forestry sector in Alberta. The Quota System was well established which assisted the solid wood sector in consolidating and expanding. These activities also led to a great increase in silviculture, especially in scarification and planting. A growing coniferous forest industry focused on plywood and lumber. The second pulpmill in Alberta was confirmed for Procter and Gamble Cellulose at Grand Prairie with construction starting in 1970, production in 1973. In the meantime, the MacMillan Bloedel Agreement in Whitecourt was declared by the government to be in default in 1970 and was cancelled. Volume of timber harvested in Alberta increased from about 3.0 to 4.4 million cubic meters.

Extensive forest fires in central Alberta in the spring of 1968 (including one on the Hinton forest management area) were a great shock, leading to further major improvements in forest protection by the Forest Service. These included a build-up of preparedness and initial attack capability, construction of access roads and landing strips, and purchase of a DC3 to move fire fighting crews.

In 1971 the Peter Lougheed Progressive Conservative government took over from Social Credit with a new cabinet, new philosophies and programs. With the cancellation of the MacMillan Bloedel Agreement a new Whitecourt-Fox Creek Timber Development Area was advertised with calls for proposals. Awards were made to Simpson Timber and Fox Creek Lumber in 1974.

However, during this time environmental concerns began to intensify. In 1971 one of the early environmental activist groups, *Save Tomorrow, Oppose Pollution (STOP)*, publicized a set of photographs taken on the Hinton FMA which purported to show destructive practices and absence of regeneration. By taking repeat photographs at the same photo points the AFS and Company were able to refute the allegations, but the issue led the government to hire C.D. Shultz and Company, a consulting forestry group, to review the environmental impacts of forestry practices in Alberta. Their report (Shulco

Report) issued in 1973 was both supportive and critical of prevailing practices, and led to some positive changes. In 1974 a review of land use policies on the Eastern Slopes was launched. This resulted in an East Slopes policy document in 1977 which attempted to minimize land use conflicts through a system of zoning. The Alberta Forest Research Development Trust, of which Jack Wright was a member, was also set up in 1974 to both support and coordinate forest research. In 1976 land use planning elements were consolidated in a new Resource Evaluation and Planning Branch (REAP), which gave a higher profile to broader land use issues. In 1970 the University of Alberta approved a forestry degree program with the first class starting that fall, graduating in 1974.

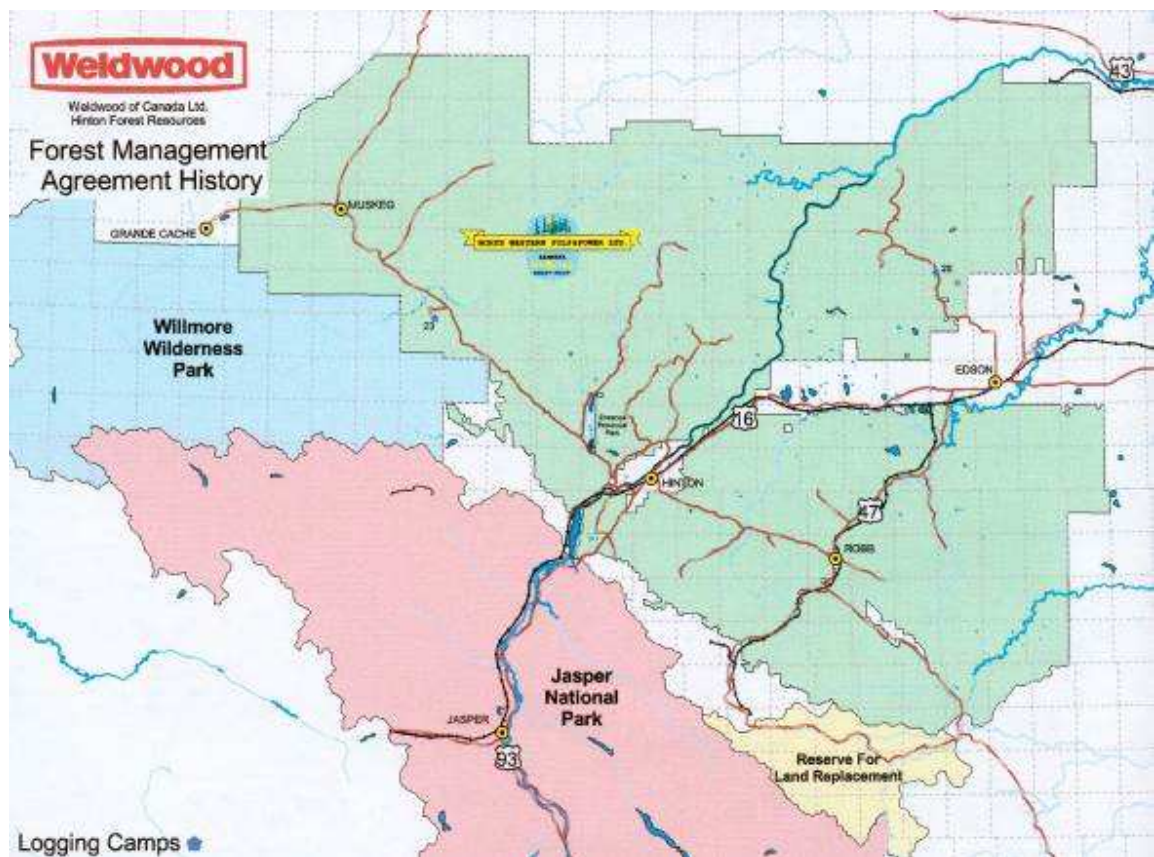
In 1974 a new Department of Energy and Natural Resources was created in which the Alberta Forest Service became part of the Natural Resources sector. At this time Robert Steele was promoted to Deputy Minister for Renewable Resources and Fred McDougall became Director of Forestry. In 1977 Don Getty was named Minister, through whom the forestry sector was to be given a much higher profile.

There was increasing concern nationally about an increase in the areas of previously-forested land that was not satisfactorily restocked with trees after accumulated disturbances such as logging and fire. The Canadian Forestry Association and Canadian Institute of Forestry/Institut forestier du Canada co-sponsored a National Forest Regeneration Conference in Quebec City in 1977. Again, action was called for to address the 'regeneration backlog', and again, there was little immediate response -- but this event led to more determined action.^{vi 20}

HINTON 1968-1977

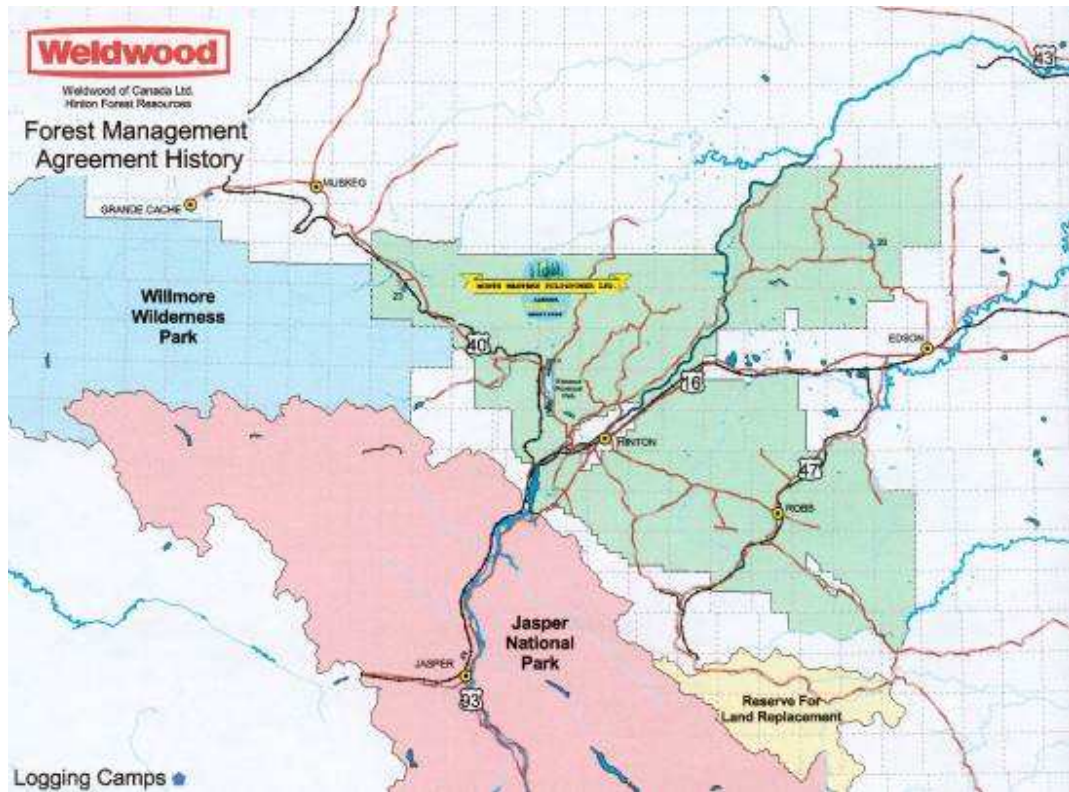
At Hinton, the pulp mill had established itself as a successful operation, capitalizing on its quality wood supply to produce a consistently superior product. As a result, the Company chose to commit itself to expansion of the pulp mill, as provided in its 1954 Agreement. A new Agreement was signed in August 1968 in which the Company agreed to expand the mill and thereby assume management of the provisional reserve area to supply it (Map 9). As part of that commitment, in 1971 it began construction of a 50 million fbm stud mill, officially opened in 1972. However, the Agreement had stipulated that the Company was required to begin construction of an expanded pulp mill on or before the first day of January 1971, which it did not. Although the intervening events are complex, the result was cancellation of the expansion Agreement by the new government in February 1972. The FMA was reduced to that of the pre-1968 Agreement (Map 10) and the Provision Reserve Area was taken away.

^{vi} Jack Wright noted that he had been invited to participate in this Conference but declined knowing, as he put it, that most of the eastern provinces and companies were not taking the matter seriously and, in his view anyhow, it was doomed to be an exercise in futility.



Map 1-9 North Western Pulp & Power – FMA expanded to support mill expansion – New Agreement 1968

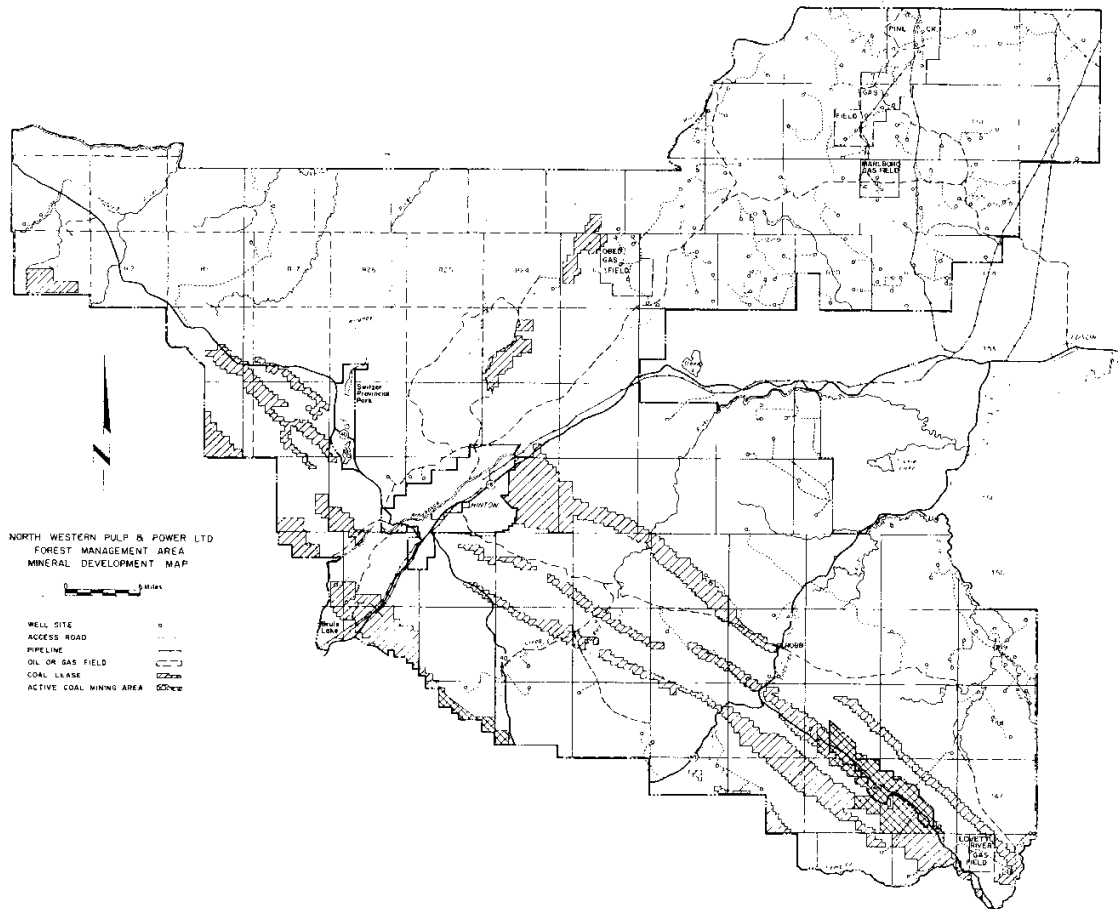
Meanwhile, St. Regis purchased the 49 per cent share of the Company from its partner North Canadian Oils in January 1969, becoming sole owner of North Western Pulp and Power, Ltd. However the original name was retained for about ten years before becoming St. Regis (Alberta) in 1978.



Map 1-10 North Western Pulp & Power. FMA reduced to former size in 1972 after expansion area cancelled.

Despite the setback, the Company continued to effect improvements in its approach to management and regeneration. Among the emerging issues were concerns about land use. A new set of aerial photographs in 1969 clearly illustrated the impact of oil and gas activities. This dramatic increase in activity, combined with growing concerns over the rebirth of the coal industry (Map 11), convinced the Company to set up its own Land Use section in 1970 under the direction of Ray Ranger.

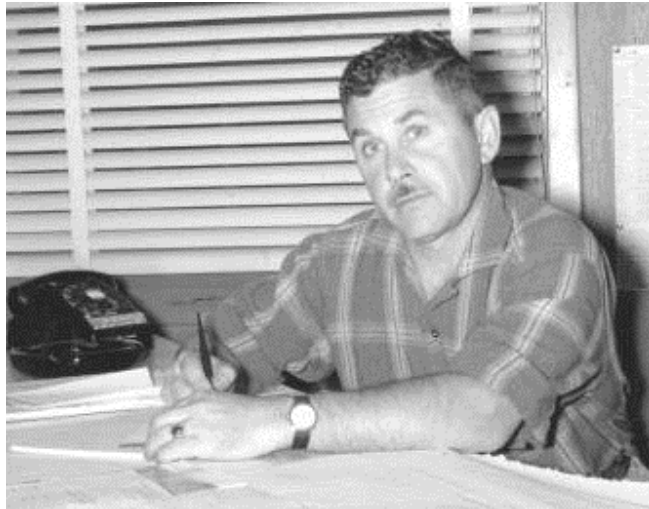
They also negotiated a means by which compensation for damages from oil and other industrial activity could be recovered.



Map 1-11 North Western Pulp & Power: Coal Leases on the FMA, 1977

Innovations in reforestation led to the development of improved container seedlings, launching a new technique which became widely adopted. Their 1965 greenhouse pioneered nursery production of container seedlings. Steve Ferdinand developed the 'Roottrainer' system in the early 1970s, replacing the old Ontario tubes. The first of the Company recreation projects at Emerson lakes began in 1970, and the first hiking trails, the Wild Sculpture Trail was begun in 1973, extending their commitment to multiple use. Earlier, in 1971, the Company worked with the local Junior Forest Warden club to reclaim a 20 km section of the Bighorn Trail. Their revised Forest Management Plan was submitted in 1977 as scheduled.

Stan Hart, Woodlands Manager, transferred to the eastern St. Regis operations in 1968, succeeded the same year by James D. Clark who presided through this period. Des Crossley retired at the end of October 1975, Jack Wright succeeded him as Chief Forester at the start of the next month. In 1976 Jim Bowersock replaced Ivan Sutherland as Resident Manager; Kenneth W. Hall succeeded him in 1977 when Bowersock moved to St. Regis in New York.



JAMES D CLARK, WOODS MANAGER, CA 1968

WELDWOOD PHOTO COLLECTION

1.5 HISTORICAL BACKDROP 1977-1988

CANADA

Nationally, a recently-formed (1985) Canadian Council of Forest Ministers (CCFM) sponsored another multi-interest national workshop in St. John, New Brunswick to develop a Forest Sector Strategy for Canada. This was a landmark document with 34 recommendations. It was strong on forest management but weak in wildlife and the emerging concept of sustainability as described in the Brundtland Report *Our Common Future* published later that year. However, the Strategy was an important start of a consultative process that continues to the present.

ALBERTA

This period was characterized by great expansion in forest harvesting and policy initiatives directed both to forest industry development and forest land management. Wood harvest almost doubled from 4.4 to 8.3 million cubic meters as a result of expansion of existing mills and construction of new mills, including Procter and Gamble coming on stream in 1973.

The first *Policy for Resource Management of the Eastern Slopes* was released in 1977. It was a first step in trying to manage land uses to reduce environmental impacts and conflicts among forest users. All of the Hinton FMA was included, although their FMA was largely included in the 'multiple use' zone in which forest harvesting was a permitted activity. However many of the riparian areas were zoned as 'critical wildlife' which the Company had recognized. In 1978 the *Forests Act* was amended to enable designation of 'Forest Land Use Zones', primarily to restrict travel by motorized vehicles and, in some instances, horses to reduce disturbance of wildlife at critical times, and to reduce conflicts with back-country visitors using non-powered means of travel. No FLUZ areas were designated on the Weldwood FMA until 1999.

The Environment Conservation Authority commission on environmental effects of forestry operations in Alberta, of which Des Crossley was one of four members, submitted its report in 1979. One of the results was a revision of the East Slopes policy in 1984 which elaborated on the forest land use zoning policy as a further attempt to reduce conflicts. Another recommendation with major impact was to no longer grant FMAs of sufficient size to provide the full fibre needs of proposed mills.

Two new Timber Development Areas, Berland-Fox Creek and Brazeau, were opened to proposals and new sawmills were established as a result of their awards. As well, Pelican Mills built Alberta's first oriented strand board (OSB) mill at Edson in 1983, signalling major expansion in hardwood utilization. A major impetus was provided in the government's 1984 White Paper on economic development in which the forest sector was identified as one of four economic pillars. A federal-provincial Forest Resource Development Agreement (FRDA) supported research in aspen utilization. In support of these initiatives, a new Forest Industry Development Division was created in 1984 to promote and negotiate new forest industry agreements.

Land use and environmental concerns also continued to feature prominently. A program to expand Natural Areas was instituted, and the AFS and the Department extended integrated resource management planning, including recreation, watershed management, management of oil and gas development activities, and reclamation. These were all taking place in addition to an expanding program of forest regeneration and silviculture. The new Pine Ridge Forest Nursery was opened in 1981 to augment seedling supply, also housing a genetics and tree improvement program. A seven-year Maintaining Our Forests program was launched in 1979, supported by the Heritage Savings Trust Fund and provided an augmented program of silviculture. An increased focus of forest research was signalled in 1980 with creation of a Forest Research Branch. The profession of forestry was recognized in 1985 when the legislature passed the Profession of Forestry Act. Three major fire years in 1980, 1981 and 1982 resulted in another major reassessment, reorganization and more resources for forest fire management.

Robert Steele retired as Deputy Minister in 1978, succeeded by Fred McDougall. Al Brennan was recruited from the Newfoundland government forest service to replace McDougall as Assistant Deputy Minister in charge of the AFS. In 1984, when the Forest Industry Development Division was established, Brennan became its Director, and Cliff Smith replaced him as Assistant Deputy Minister in charge of the AFS.

HINTON

In Hinton, new resident manager Ken Hall saw great potential for an expanded operation, and resolved to make it happen. Although he was not successful in his bid for the Berland Timber Development Area (Map 12) in 1979, he launched direct negotiations in 1986 which resulted in a new forest management agreement including an expanded FMA (Map 13) in 1988. The new Agreement increased their area from 800,000 to 1,012,000 ha, enabling expansion of the pulpmill and construction of a new sawmill.

KEN HALL, 1982
WELDWOOD PHOTO COLLECTION

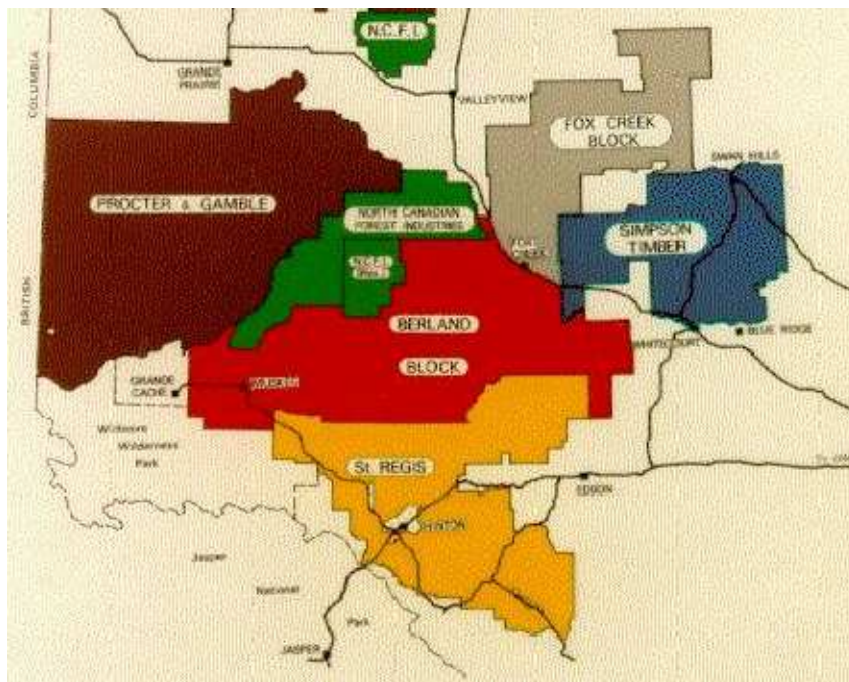


The Company had been renamed St. Regis (Alberta), Ltd. in 1978, although it had been fully owned by St. Regis since January 1969. During the initiatives for expansion, St. Regis was absorbed by Champion Forest Products through a friendly takeover in 1984 in response to outside "green mail" threats. It was renamed Champion Forest Products (Alberta) in 1985; then purchased by Weldwood in 1988, becoming Weldwood of Canada Limited – Hinton Division. Despite the turnover among owners, staff and policies

remained essentially the same. In the meantime, the 50 million FBM stud mill which had opened in 1972 was expanded to 70 million in 1981.

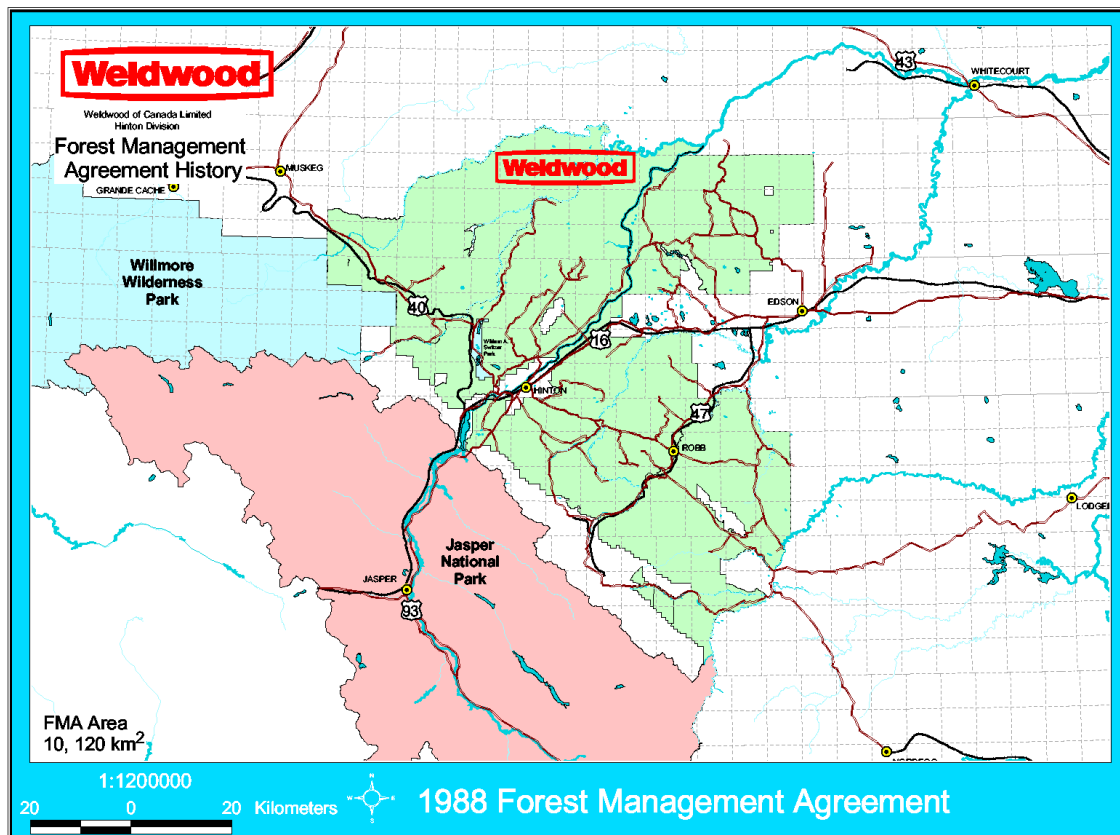
This was a time of great advances in silviculture and forest management as well. Reforestation and scarification trials combined with employment of the first tree-improvement forester and start of programs in tree improvement and stand management raised the level of silvicultural practice even further. A new Company forest nursery and greenhouse in 1981 provided a base for tree improvement work and enabled increased quality of planting stock. Major growth and yield advances were based on the historical Company data base combined with innovative research and analysis. The results enabled an increase in AAC in the 1986 Forest Management Plan which had been substantially rewritten to reflect the increased complexities of forest management.

Through a Company initiative, a wildlife task force was established in 1982 comprising Company and government representatives. The idea arose from a wildlife-forestry conference in Jasper in 1981 where Jim Clark made an offer to use the Hinton FMA as a pilot study area for the integration of wildlife and forest management. The 1987 committee report set the stage for a new wildlife program within the Company.



Map 1-12 St. Regis (Alberta) Ltd. – area proposed for Berland Timber Development Area 1979

Jim Clark retired in 1985, Jack Wright in 1987. Before their retirement they jointly prepared a proposal to merge forestry and woodlands for greater coordination and efficiency. Don Laishley was brought in as head of a new Department of Forest Resources in January 1986, Bob Udell was named head of Strategic Planning, replacing Jack Wright, and Ray Ranger continued as head of Land Use.



Map 1-13 Weldwood (Hinton) FMA as negotiated in new Agreement in 1988 to support expansion of the pulpmill, construction of new Hi-Atha sawmill

1.6 HISTORICAL BACKDROP 1988-2000

CANADA

The global Brundtland Report of 1987 *Our Common Future* was a catalytic event. It reviewed these forces from a worldwide perspective, emphasized the need to find a balance between environment and economy, and used the concept of “sustainability” as a philosophical objective.

In Canadian forestry, the concept of sustainable forest management (SFM) was described through public forums leading to the National Forest Strategy and Canada Forest Accord of 1992 (reviewed and renewed in 1998) and the Forest Round Table on Sustainable Development of 1994. SFM was further defined by the nationally-developed Criteria and Indicators of the Canadian Council of Forest Ministers in 1995. This was followed by creation of third-party programs to certify forests that were being managed to achieve sustainability -- ones such as the Canadian Standards Association nationally the Forest Stewardship Council internationally, and Alberta ForestCare provincially.

This period also saw growth and strengthening of environmental organizations – international ones such as Greenpeace and World Wildlife Fund for Nature (WWF) with local chapters, along with national, provincial and local groups. Working individually and collectively, these groups became strongly influential. In forestry, their objectives range from attempts to improve forestry practice to creation of protected areas or elimination of logging altogether.

These developments placed enormous challenges on forest managers to develop ways to sustain or increase wood supply while managing forested lands for a broader range of values, including environmental, ecological, social and economic. The planning process was also to entail participation of interested citizens.

ALBERTA

Events during this period reflected the convergence of two major forces. The first was the continuing provincial economic policy to encourage investment in the forestry sector. The second was coalescence of environmental concerns which had begun to manifest themselves in the early 1970s in response to more visible logging and petroleum developments. Alberta passed a number of environmentally-focused acts in the mid 1970s but concerns continued to grow as population and pace of development grew. In Alberta, the impact of the economic aspect is reflected in the volume of wood harvested -- doubling again from 8.3 to 16.6 million cubic meters. The effects of the Forest Industry Development Division were reflected in their comment that the Millar Western pulpmill at Whitecourt in 1988 was the first new pulpmill since the Procter and Gamble mill of 1973; then reported five other new or expanded pulp mills along with numerous other solid wood plants utilizing both coniferous and hardwood stock.

The most recent of the major approved pulp mill proposals was for Alberta-Pacific Forest Industries, announced as the largest single-line pulp mill in the world. This was also a catalytic moment for environmental movements, resulting in vigorous demonstrations and sustained criticism. The government responded by forming two commissions: one to review water and air concerns, the other impacts on forests and forestry. The Expert Panel on Forestry was formed in 1989, reporting in 1990. The four-member panel comprised Bruce Dancik as Chair, Lorne Brace, John Stelfox and Bob Udell of Weldwood's Forest Resources. One of their recommendations led to the Alberta Forest Conservation Strategy exercise, a multi-stakeholder consultation group established in 1994 and whose 1997 report was published as the *Alberta Forest Conservation Strategy*. The government's response took the form of an action framework released in February 1998 as the *Alberta Forest Legacy: an implementation framework for sustainable forest management*. A Forest Management Science Council was established in March 1996 to advise how science could be applied to achievement of SFM. It reported in the form of a management protocol in January 1998, and its recommendations were incorporated into the *Forest Legacy* document.

In 1999 three Forest Land Use Zones (FLUZ) were established in or near the FMA on the Coal Branch, Athabasca Ranch and Brule Lake. These were to protect sensitive sites and minimize disturbance of elk. The *Special Places 2000* program affected several areas on the FMA and a number of proposed sites was submitted by the Company.

The importance of forest research also came to the fore -- in 1989 the industry-government Alberta Forest Research Advisory Council was formed, replacing the previous 1974 Forest Development Research Trust Fund. New sawlog stumpage rates were negotiated with the industry in 1994. These included provision for a portion of the stumpage paid to be set aside in a dedicated fund to be used to support approved forest management activities -- such as research - over and above the regulatory obligations of the industry. This fund, the Forest Resource Improvement Program (FRIP) was subsequently (1997) transferred to the Forest Resource Improvement Association of Alberta (FRIAA), an arms-length designated administrative organization (DAO) established to administer the fund. Also following was increasing involvement of the Alberta Research Council in forestry and wildlife research. Then a University of Alberta-led consortium successfully applied to establish a National Centre of Excellence in Forestry at the U of A through a program of the Natural Sciences and Engineering Research Council of Canada (NSERC). More recently a Centre for Enhanced Forest Management supported by Weldwood, Weyerhaeuser and NSERC was also established at the university. Research in the Hinton

area was boosted by its designation as the Foothills Model Forest in 1992 under Environment Canada's national Green Plan. This program was administered by Natural Resources Canada until 1997 when it was assigned entire responsibility for funding and direction.



FIRST MODEL FOREST BOARD, 1993. STANDING L-R: BILL FAIRLESS (EDSON FOREST SUPT), DENNIS QUINTILIO (DIRECTOR, FOREST TECHNOLOGY SCHOOL, FRANK CARDINAL (REGIONAL DIRECTOR, F&W DIVISION), ROSS RISVOLD, MAYOR OF HINTON), COLIN EDEY (CDN ASS'N OF PETROLEUM PRODUCERS), GABY FORTIN (SUPT JASPER NATIONAL PARK), JIM BECK (U OF A) RON STAPLES (VP/GM WELDWOOD HINTON DIVISION), BOB NEWSTEAD (CFS REGIONAL COORDINATOR, MODEL FOREST PROGRAM) SEATED: BOB UDELL AND DON LAISHLEY (WELDWOOD FOREST RESOURCES)

FOOTHILLS MODEL FOREST COLLECTION

A three-member sub-committee of the Standing Policy Committee on Natural Resources and Sustainable Development was chaired by Wayne Jacques, MLA from Grande Prairie-Wapiti to review government policy with respect to Agreements. Their June 1996 report confirmed policies which had evolved through negotiations with Weldwood and others. However, it also resulted in recommendations for profound changes in terms for renewal of Agreements with increased emphasis on investment and economic contributions. It certainly influenced Weldwood's 1998 amendments.

Within the AFS, Free-to-Grow legislation was passed in 1991, with terms negotiated with forest Industry designed to ensure sustained yield. Silvicultural practices were enhanced through increased ecological considerations. Management planning increasingly emphasized integrated resource management, and greater attention was being paid to Aboriginal and Métis rights and entitlements. Major forest fires in 1998 and 1999 were a reminder of the persistent inherent risk from wildfire; it also highlighted the increased vulnerability of Alberta's forest industry to threats to a wood supply which had been increasingly allocated. The AFS continued under the Department of Forestry Lands and Wildlife until 1992. Ralph Klein succeeded Don Getty as Premier and reorganization later resulted in AFS becoming

part of a new Department of Environmental Protection, later Department of Environment and now (2001) the Department of Sustainable Resource Management. Government fiscal policies also resulted in significant downsizing of government departments, in part based on a philosophy of increasing self-regulation by industries. As part of this process Lands Division was combined with AFS in 1992 becoming part of a new Land and Forest Service (LFS) and the Forest Research Branch was eliminated.

Fred McDougall retired in 1989, Cliff Smith became Deputy Minister, taking early retirement in 1992. Ken Higginbotham was named ADM for the AFS in 1989, but left to work with forest industry in 1995. At that time Cliff Henderson was appointed ADM. In 1999 the Premier announced and unveiled *Alberta's Commitment to Sustainable Resource and Environmental Management*. This led to some major changes in government departmental organization and structure. A new Department of Resource Development took over the Forest Industry Development Division (FIDD) of Alberta Environment. For a brief time (1999-2000), the new department had an Associate Minister of Forestry, Mike Cardinal, but this position was phased out in post-election restructuring of government departments in 2001. In early 2000, FIDD was given the lead role in forest management agreement negotiations under the *Forests Act* for the province. The LFS remains at the negotiating table, dealing with the management and administrative sections of the negotiations. In April 1999 a new Ecological Landscape Division (renamed Integrated Resource Management Division in 2000) was added to LFS and Dennis Quintilio was appointed the new Director to advance the development of integrated resource management in Alberta. Doug Sklar was named head of Forest Management and Craig Quintilio of Forest Protection.

HINTON

Led by Resident Vice-president Ken Hall, a new Agreement was negotiated, signed in 1988 to enable expansion of the pulpmill and construction of a new sawmill. The 385,000 tonne pulpmill was opened in 1990, the 220 million fbm Hi-Atha sawmill opened in 1993. However, the expanded area (Map 13) could provide only about 70 per cent of required wood supply. Further, the new sawmill had demanding requirements for size, quality and volume of timber, so it became the primary determinant of wood supply to the mill. The challenges for forest management therefore included those of increasing wood supplies, maintaining wood quality to the sawmill, managing the FMA for sustainability for a broader range of values including biodiversity and visual qualities and incorporating public participation, and all in a cost-competitive process. These objectives are being achieved through a number of technical forestry and resource management innovations within a sustainable forest management context.

Weldwood hired its first wildlife biologist and Alberta's first industry biologist, Rick Bonar in 1988, then formed a Company-government Integrated Resource Management Steering Committee (IRMSC) to enhance collaboration. This launched an expanded wildlife, biodiversity and recreation program. Two more biologists were added in 1994.

Public participation in Weldwood's forestry planning was begun in 1989 through the Forest Management Liaison Committee. This was the first such industry group in Alberta. It was reorganized in 1993 as the Forest Resource Advisory Group. Among its achievements were major inputs to the 1991 and 1999 forest management plans, and review and refinement of the Forest Harvesting and Operating Ground Rules published in 1996.

Jasper joins Foothills Forest

CARRIE HUTTON
The Parklander

The Foothills Model Forest doubled in size last week when Jasper National Park was officially added to the research area.

The Foothills Model Forest is one of 10 model forests in a network established across Canada in 1992.

Up until last week, the Foothills Forest boundaries included the forest management area of Weldwood of Canada and several Crown management areas.

The model forest maps showed the west boundary ending as it met up with the boundary of Jasper National Park.

But that was never truly the case. So on Sept. 15, a signing ceremony took place to formalize the involvement of Jasper National Park in the Foothills Model Forest.

"Forest and the animals and the water don't respect boundaries," said Anne McLellan, federal minister of natural resources.

That statement is just one of the reasons it has been important all along for the national park and the model forest to share research, said Michel Audy, parks superintendent.

"Here in Jasper we cannot manage large portions of the park without considering what's going on outside the park," he said.

For example, there is a large herd of woodland caribou that migrates between the park and the model forest, Audy said.

Expanding the boundaries of the Foothills Model Forest to include Jasper is beneficial, said Bob Udell, president of the

model forest.

"It adds longevity and continuity to the program," Udell said of a national park being officially included.

McLellan agrees that much good will come out of Jasper's inclusion.

"The national parks are so well known and such major tourist destinations. There are going to be tremendous opportunities to let people find out more what the model forest is about," she said.

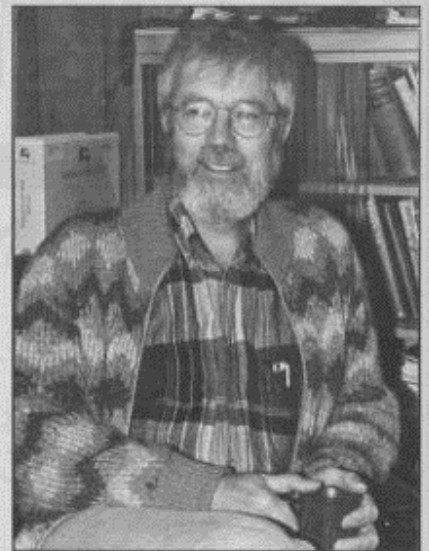
Jasper National Park and the Foothills Model Forest itself are both concerned with the health and sustainability of the forest. And since in the past their individual research has often focused on different areas, they can benefit from that, Audy said. The model forest, being a more commercial area, has done some concentrated research on vegetation and forest cover that is of benefit to the park, he added.

"We're all interested in seeing a well-blended approach to land use," said Audy.

Jasper National Park has always had a spot on the Foothills Model Forest board, and Audy fills that spot.

The 10 member board also includes three representatives from Weldwood, four from Environmental Protection and two from the partners' advisory committee who are elected each year.

With the inclusion of Jasper National Park, the Foothills Model Forest study area is nearly 23,000 square kilometres.

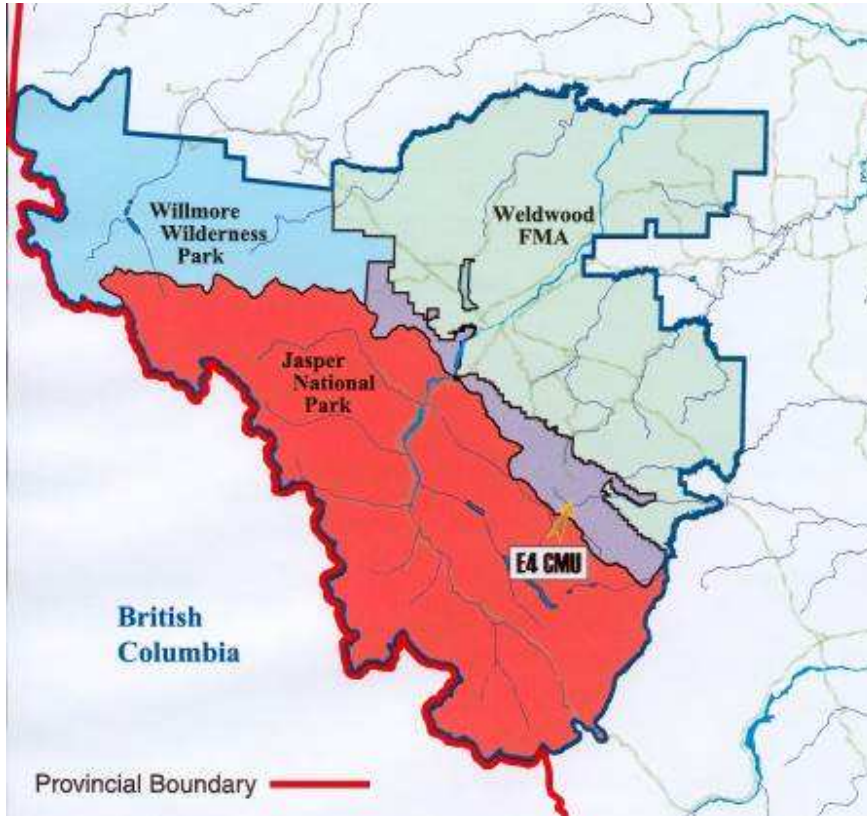


BOB UDELL, Model Forest president



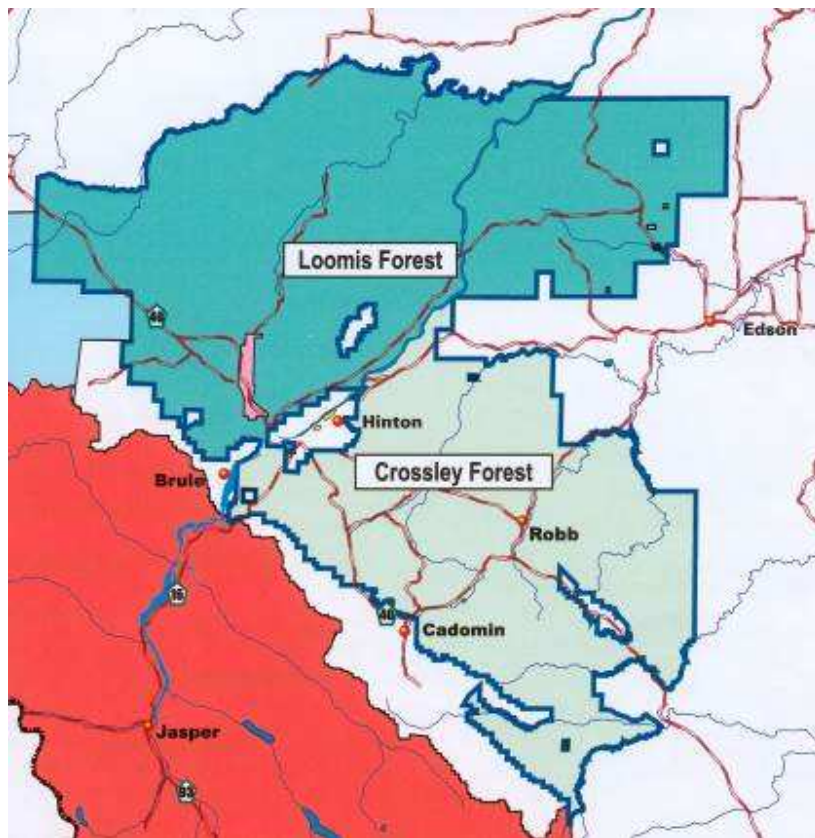
A Model Forest tour followed the signing ceremony Sept. 15. Among those on the tour were (Front row, from left) George Mercer, Jasper warden; Anne McLellan and Don Lashley, Weldwood employees and director on FMF board.
Photo by KENT McDONALD

A broad coordinated approach was taken by the Company to addressing forest management and wood supply. These included employment again of a tree improvement forester, joining the Huallen Seed Orchard in 1994, membership in an inter-provincial growth and yield cooperative, and introduction of the Linked Planning (developed with the LFS), Crossroads, Enhanced Forest Management, Intensive Silviculture, and ecological classification/pre-harvest assessment programs. Milestones included selection of the Weldwood area as the Foothills Model Forest (1992), expanded by the entry of Jasper National Park in 1995 and Willmore Wilderness Park in 1997 (Map 14); and celebrations of planting the 50 millionth tree in 1991, 100 millionth in 1999. The Hi-Atha sawmill came into production in 1993.



Map 1-14 Foothills Model Forest – established 1992, Jasper National Park added 1995, Willmore Wilderness Park added 1997

By 1997 the Company forest was certified by Alberta ForestCare, and celebrations marked planting of the 90 millionth seedling, and the 40th anniversary of first pulp production at Hinton. Part of those celebrations included renaming the two sustained yield management units of the FMA (Map 15) after Des Crossley and Reg Loomis. Two revised Forest Management Plans were submitted, the 1991 FMP incorporated planning for the expanded area, the 1999 FMP was restructured to reflect the Company commitment to sustainable forest management. The 1999 FMP was the first management plan in Alberta, perhaps in Canada, to include an explicit analysis of forests, wildlife and hydrological interdependencies. The Company received registration of its FMA as a sustainably managed forest under the demanding Canadian Standards Association Standard for SFM in 2000.



Map 1-15 Weldwood (Hinton) -- Crossley and Loomis Forests declared as two major forest management units 1997

Don Laishley transferred to Vancouver in 1994. Dennis Hawksworth had moved to Hinton in 1988 as project manager to design, build and operate the new sawmill. He was appointed General Manager of Forest Resources and Hi-Atha in 1994, Vice President of Hinton Forest and Solid Wood in 1997. In 1996, Forest Planning and Forest Operations were merged under one manager, Bryon Muhly. Bob Udell became Manager of Forest Policy and Government Affairs, to increase his focus on forest policy relationships with government, as well as his responsibilities as president of Foothills Model Forest. In 1999, Jim LeLacheur became General Manager of Forest Resources and Lumber. Bryon Muhly was appointed Manager, Resources Optimization, Alberta focussing on optimization of fibre exchanges for Weldwood's facilities throughout Alberta. Rick Kziesopolski was hired in 1999 to replace Muhly as Forest Resource Manager.

1.7 NORTH WESTERN PULP & POWER LIMITED AND THE NEW TOWN OF HINTON

This was a classic “greenfield” project. Virtually everything had to start from scratch, and everything had to be done at once! The projects of immediate concern included building the mill, bringing in utilities and services, building a community, planning for forest management, and starting to log to bring in the wood. Fortunately there were a lot of hard-working, creative and skilled people brought in at the outset to get on with the job.

It is impressive, for example, that although the decision to move the mill site to Hinton was only made after the trip to Hinton in January, 1955, field studies and engineering for the mill were completed in March, then building contracts were concluded, and the ground broken and construction started 23 May -- all in a period of just over 4 months!



MILL CONSTRUCTION 1956
PHOTO: SGV HART

Announcement of the mill project started a two-year “boom” of unprecedented proportions. Hinton had been only a hamlet, but grew quickly. As new staff arrived they were immediately struck by the small size of the community and lack of amenities. Jim Clark described their quick introduction to Hinton when he and his family arrived by train from Kamloops in the summer of 1955. The passenger train unloaded at Entrance, since the Hinton station was not yet in operation. Tom Lewko met them, loaded them into his jeep, and as they reached Hinton, as Clark²¹ stated, Lewko pointed out the features: “The motel on the left is Johnson’s and the log building across the road on the right is the Catholic church of Hinton’, Tom Lewko continued his tour dialogue.” The two-story old building on the right is Skogg’s grocery; the Bank is the little cabin beside it; opens one day a week with the manager coming from Edson. That’s Ray Fuller’s Esso garage here on the right; he sells GM cars on order but has none here in stock. On the left is the unused CN railway station.”



HINTON HOTEL, 1940

PHOTO: DENNIS
RADCLIFFE

And, of course, the old Hinton Hotel was another feature among the buildings along the highway across from the CN station. Robin Huth, one of the first timber cruisers, arrived shortly afterwards, travelling by bus from Calgary and Edmonton. In his book, *Outdoor Junkie*, he noted the contrast between the old town and boom-town atmosphere of the construction project. Temporary bunkhouses housed 800 construction workers, and the din of construction could be heard everywhere. The Hinton Hotel was bursting at the seams, and it was “standing room only” in its beer parlour as construction workers and forestry people jockeyed for positions at the bar and tables.

A new road was under construction to the town and millsite; the general store was chronically sold out of essential goods such as tobacco and writing paper; the Bank of Nova Scotia set up shop in a “skid shack” moved in for the purpose; other shops were hurriedly set up in similar temporary quarters.

HINTON TOWN HALL 1957
PHOTO: P. GIMBARZEVSKY



Housing for the forestry staff was provided in a collection of cabins on an old motel site purchased by the company. Jim Clark's²² impressions:

After Tom Lewko drove away, about one hundred feet to the car-truck hitch rail with electrical plug-in boxes, we three looked at our home. It was originally a one-room cabin. A second, new room had been added to the back complete with a small toilet-handbasin-shower room. A small, cast-iron cook stove sat to the right of the entrance door. A plain, white sink with two taps was set in a short counter on the left or north wall; a small, square window back-dropped the sink area. The only piece of furniture in the cabin was an old, neglected four-drawer desk. A quantity of split firewood lay in a cardboard box beside the stove. A brand new cardboard box stood in the right corner of the original room; 50,000 BTU Propane Heater was stamped on the box with additional information about make, model, serial number, place of manufacture.

In late September and early October of 1955 our Woodlands community spent the weekends building entrance porches for our non-winterized cabins. In retrospect, it was like putting a screen door on a walk-in cooler to keep the cold in. Phil Gimbarzevsky and Des Crossley and I, and Stan Hart and Robin Huth and the Duke (Frank LaDuc of St. Regis) were all busy with borrowed tools and company-supplied lumber and plywood. The professional and neophyte carpenters competed in designs and finishing to accommodate their perceived needs for the coming winter. Only Des Crossley, Robin Huth and me had experienced previous Alberta winters, but not in Drinnan-Hinton. In spite of much discussion among the porch builders, the results were by no means standard.

Phil Gimbarzevsky's porch had the most eye appeal because it resembled the leaning Tower of Pisa, attached as an after-thought to the west end of a perfectly vertical small cabin. The porch door always closed automatically from left to right because the hinges were hung left and the porch lean was right. Huth's was the largest porch that almost had more floor space than his cabin. It was designed to house his Boxer dog which "couldn't sleep outside in a dog house because its coat of hair was too thin!" The dog and whole family ended up hating the slippery, cold linoleum that Huth put on the floor.

Des Crossley's porch was the best since he had the largest cabin and he was our boss so we helped him; these were the realities of communal living on industrial projects in 1955.

Unfortunately, the winter of 1955-56 was a particularly cold one. As Jim Clark²³ commented:

The winter of 1955-1956 was the worst weather exposure any of our group had experienced. Three of the wives were pregnant. The cold weather started in late October and maintained temperatures of -30 F over the Christmas-New Year holiday. Des Crossley's father came to holiday with the family over the December-January months and one morning in January he awoke to find his false teeth frozen in a glass of water on his bed table. That afternoon he took the Greyhound bus home to Kelowna. As he said his good-bye's to us, he added with his handshake, "Please don't ask me to come again until you are all civilized in warm homes."

The weather was playing havoc with the construction of certain priority buildings like the pulpmill construction camp, the main office building that was being built of wood to a design produced in Florida by the Company engineers, and the framing of the water pump house on the Athabasca River. On the morning of February 17, 1956, we

woke to a very cold, ground-fog morning. All the propane heating stoves in the cabins were functioning poorly, as if they were starving for fuel. Roy Morton (H.A. Simons) was out at the parking lot trying to get his small Jeep four-by-four to start. Miraculously, we heard it suddenly start and saw it exhaust white smoke.



PHILLIP GIMBARZEVSKY'S RESIDENCE WINTER 1955-56
PHOTO: P. GIMBARZEVSKY

Then the group of us five men saw Charlie St. Denis, our boss of accounting from Godbout in Quebec, come out of his cabin in his slippers, pajamas, overcoat and Homburg hat. It was still dark. He stood on the entrance platform, looking mad and hurt. The French mixed with English expletives rolled out of his mouth and finally translated into, "Somebody's going to get that big, black Cadillac monster of that Gordon McNab's and take me to Edmonton and put me on a plane to Quebec and I'm never coming back! I leave the water in my hand basin a little running so pipes don't freeze and the goddamn drain freezes so the water runs over the basin onto my floor where it freezes my overboots into the ice! I get out of bed this morning, my feet hit the ice and I slip hard on my ass and hurt the arms and head! I get my slippers off my bed, get my feet in them and try to pull my overboots out of the ice -- they're still there -- and my suitcase, I check, is stuck in the ice too! Get me an axe and I'll chop the floor out!

'This was no laughing matter to lose our accountant', was our general thought as we all looked at Charlie St. Denis standing on the landing in the ground fog with the entrance light shining down on his hat, shoulders and shadow. None of us had ever experienced an accountant walking off the job and project before, especially a mad

accountant. Guy Dempsey saved our morning by walking over to Charlie and talked to him in French about something.

There was a thermometer in the Company pump-house down by the river. Roy Morton invited Jim and Stan Hart to go with him to check, as Jim²⁴ described:

The jeep's wheels sounded as if they were square as Roy drove us to the River; it was almost too cold to talk. The temperature registered -72F on the thermometer affixed to the board set against the unfinished north wall of the pump house.

That night our water system in the Woodlands' camp froze solid and the next morning, with the temperature at -58F, the sewer system also froze, with some backup occurring into some cabins. Our community of thirty people was in big trouble. We finally got the station wagon jeep running that morning and found a local heavy equipment contractor to start digging for a central toilet system with a septic tank outfall. Luckily, three outhouses still existed on site.

With the extreme cold, the propane gas was solidifying into a liquid and our heating stoves became more starved for fuel. Several of us men gathered up great bunches of discarded lumber remnants and built it into fires around the propane tanks. It was ridiculous to see propane tanks being fired to create fuel for fires in our cabins. This tank heating continued for four days until the temperature rose to around -40F where the propane easily gasified.

Water was also a major problem, with most water lines frozen. Company employees in temporary housing were issued 25 gallon water containers which were filled several times a week from a water truck.



**WATER BRIGADE WINTER 1955-56 (STAN HART STANDING FAR RIGHT)
PHOTO: P. GIMBERZEVSKY**

In the meantime, the company had contracted with Canada Catering to provide bunkhouses and meals for the workers constructing the mill itself. Ray Ranger²⁵ had come to Hinton from Saskatchewan in 1955 looking for work and described his experience when he was hired by Canada Catering. Ray later joined Des Crossley's forestry group.

--- My duties were to be a meal checker. At the construction camp there were ... construction workers (from) at least a dozen different major contractors (Poole Construction was the major contractor. H.A. Simons from Vancouver was the general contractor but Poole was the main construction sub-contractor). Then there were other specialty contractors. --- All these contractors kept track of the meals you ate by issuing you a round coloured numbered badge with the name of the contractor (i.e. PCL on it with a number) and you wore that at all times when you came for meals. At the north end of the buildings they had two great big double doors with steps leading up to them. Inside the doors and at the head of the stairs, behind a pedestal stood a meal-checker flanked on each side by a Corps-Commissioner. On the pedestal was kept a listing of contractors and names and numbers. The meal-checker's job was to record each worker's number as he came for meals as well as ensure that his general cleanliness met the Health standards that were set out for coming here. Because a lot of the people that were working there were recent immigrants and spoke very little English there was no time to discuss whether or not they were clean enough or they should go and wash their hands or whatever before coming for a meal. You had a Corps Commissioner standing one on each side of you and you simply pointed your pencil at an unclean worker and that was the signal that they didn't gain entry. Quite often that resulted in them getting thrown down the stairs a time or two before they got the message. So it was quite rough and tumble.

(The most typical reason was) they were dirty. There was a terrible lot of dysentery affecting us at that time and their hands would be soiled or look terribly dirty or they didn't smell so good. At that time in Hinton there was a terrible outbreak of dysentery that could not be stopped. Subsequently both the general contractors as well as Canada Catering were terribly concerned that the dysentery would continue to spread and everyone was trying various ways to control this outbreak. There were investigations on the go. Some days there would be no radishes served and the next day there would be very little salad and then they would cut this out and so on trying to determine what it was that could be lending itself to the spread of this dysentery.

Meals took up most of the day. For instance the dinner meal would start at 10:30 in the morning and go right through to about 1:00 so that your dinner hour was elongated and the same with your breakfast and your evening meal. So if you worked for Custodus Chimney you might be slotted for an hour beginning at 10:30 for a dinner. They would come all the way from the mill and form a single line all the way down and you would see that great big snake of a line going right back to the mill gates.

As well as checking meals three times a day a meal checker was also to aid the RCMP by looking out for the criminal element. These construction sites sort of were a gathering place for gamblers and people who were trying to hide themselves but still needed employment and still needed the dollar. Because the meal checkers were in contact with each construction worker three times a day, day in and day out, the RCMP realized that we were the obvious fellows to view their "mug shots" of the current "most wanted" citizens and indicate if, in fact, they were present in camp. So once a week we would review these mug shots of all these different guys to see if they were recognizable.

At the height of construction in 1956, there were about 900 workers on the mill site. That fall and winter, more than 1,000 additional people flooded into the area looking for seasonal logging work. Hundreds more signed on for permanent jobs in the mill and woodlands. Many businesses, from banks to beauty shops, set up to provide goods and services for the company and the workers. Rival developers built housing and shopping centres in the Hill and Valley districts. Unwilling to have two municipalities just five kilometres apart, the provincial government incorporated the New Town of Hinton in 1957. “New Town” status was an arrangement whereby the province assisted newly established, or rapidly expanding, communities such as Hinton.²⁶

The company and its employees were intimately involved in creating the new community. For example, they realized that the pulp warehouse would not be needed until production began, so it was loaned as a huge classroom while a new school was being built. School enrolment in Hinton soared from 58 in 1953 to 669 in 1957, and employees served on the school board and were active in school affairs. They also served on the hospital board that lobbied for several years to get the community a hospital. The first 25-bed hospital was finally built in 1959 (later replaced by a 40-bed facility in 1980). Prior to the hospital opening, the company’s clinic was the town’s major medical facility. Employee volunteers and company-donated materials made possible the construction of recreational facilities such as the recreation centre and swimming pool. The mill even provided water and sewage treatment for the community — still the only mill in Alberta to do so.²⁷

1.8 COMMITMENT TO SUSTAINED YIELD FOREST MANAGEMENT

This section describes the organization and the many commitments to sustained yield forest management, highlights life in the new town, and provides an overview of Crossley’s approach to forest management.

FORESTRY AND WOODLANDS DEPARTMENTS ESTABLISHED

The woodlands and forestry departments were officially established in May 1955 with the hiring of Gordon McNab as Woodlands Manager and Des Crossley as Chief Forester. Some of the original St. Regis foresters had stayed on, including Stan Hart, Frank LaDuc and John Miller. The group grew quickly with new hirings to add the expertise needed to get the forestry operations under way.



JOHN MILLER, ST. REGIS FORESTER SECONDED TO NWP&P TO DESIGN AND IMPLEMENT THE FOREST INVENTORY SYSTEM. HE DEVELOPED A SYSTEM BASED ON PERMANENT SAMPLE PLOTS. MILLER RETURNED TO ST REGIS OPERATIONS IN 1958

PHOTO: J.D. CLARK

Gordon McNab had been with the Rhinelander-St. Regis operation at Hornpayne, Ontario, where he was their Woodlands Manager²⁸. His responsibility at Hinton was to begin the logging process that would supply wood to the mill. He stayed on for two years.

Stan Hart was a graduate forester from the University of Michigan and was starting his career with the St. Regis Paper Company in their New Hampshire-Vermont Division. He had been a member of the forest survey teams sent out to Alberta in 1954 to look at the proposed lease. He stayed on in Hinton, later becoming Woodlands Manager. Frank LaDuc and John Miller were also St. Regis foresters with particular skills in inventory and management.

Desmond I. Crossley started as Chief Forester for North Western Pulp & Power on 1 May 1955. He was raised in a pioneering atmosphere – his family was one of the Barr Colony settlers in the Battleford area of Saskatchewan. His interest in the outdoors led him into forestry, graduating from the University of Toronto in 1935. His career at the Indian Head forest nursery in Saskatchewan was interrupted by wartime service in the RCAF, after which he joined the Canadian Forest Service as a research scientist. Des developed a great reputation for his solid and innovative research in Alberta, particularly for his work on how spruce and pine regenerated and grew. He had been asked by the St. Regis team investigating the proposal to write a brief describing how the forest could be managed to ensure regeneration. The quality of his work and his inherent professionalism earned him their offer to become their first Chief Forester. Recognizing that the position enabled him to advance his work from trials to an operational level, he accepted.



DESMOND I. CROSSLEY
NATIONAL PRESIDENT
CANADIAN INSTITUTE OF FORESTRY 1966
WELDWOOD OF CANADA COLLECTION

The forestry staff who began in 1955 and who survived the bitterly cold winter of 1955-56 became known as the “55ers.” The first of these was Tom Lewko. He had been working for Frank Ruben at the Robb Coal Mine and was asked to consider a transfer to the pulp company since Ruben said there would be more future opportunity there. Lewko was hired as Woodlands Clerk and became a valued member of the administration. Gordon McNab and Des Crossley were the second two. Among the others were Jim Clark, hired as Assistant Chief Forester, Ken Williams as a forester, Phil Gimbarzevsky as photogrammetrist, and Bob Hallam as draftsman and map-maker. Also among the 55ers were several who started as timber cruisers, later moving on to senior positions: Guy Dempsey, Osie Hansen, Robin Huth, Bob Mackellar, and Vern Truxler. They all played important roles in forestry and woodlands.



**55-ERS REUNION, DATE UNKNOWN. WIVES NAMES ARE NOT KNOWN BUT THE EMPLOYEES ARE:
 BACK ROW L-R: TOM LEWKO, STAN HART, BOB MACKELLAR, BOB HALLAM, ROBIN HUTH;
 FRONT ROW L-R: PHILLIP GIMBARZEVSKY, GUY DEMPSEY, DES CROSSLEY, JIM CLARK, OSSIE HANSON, KEN WILLIAMS.
 AMONG THE WIVES PRESENT: STELLA LEWKO, RUTH HART, DONNA HALLAM, DORIS MACKELLAR, DOROTHY CLARK, ISOBEL CROSSLEY,
 WINNIFRED GIMBARZEVSKY, OTHERS UNKNOWN.**

PHOTO: P. GIMBARZEVSKY

This initial group was given a strong endorsement and encouragement in the fall of 1955 during a visit by the President of St. Regis Paper Company, William R. Adams. As recalled by Jim Clark²⁹:

In late 1955, the President of our New York company William (Bill) R. Adams, President of St. Regis, visited the project site briefly with a number of his executive staff and some of the partner's staff from Calgary. The group filled our small office building and the meeting was brief.

"Our Company has visited the Minister of Lands and Forests in Edmonton and the Premier of this province yesterday. We delivered a signed letter of understanding to the government obligating us to minimize the number of American employees on site at this mill. We intend to meet this obligation. This will be a company run by Canadians. You will work with some of our United States employees at this site for a short period during construction and start-up; these employees will return to their jobs in our U.S. plants and forests, some before and some just after mill start-up. They are here now or in the near future to help you with their knowledge and expertise. Many of you will replace them. Thank you for attending here".

In reflection, as I remember and document that happening, it is noteworthy to report that Bill Adams' obligation was fulfilled in a most gentlemanly fashion.



NWP&P TIMBER CRUISERS SNOW CAMP- LATE 1950S
L-R: BOB MACKELLAR, KEN CASEY, JOHN MILLER, OSWALD HANSEN, JIM CLARK.
PHOTO: J.D. CLARK

DEVELOPING THE COMMITMENT

The strong commitment to forest management through sound forest practices was established early by the principal foresters involved. It was started by Huestis who made his feelings clear about perpetual sustained yield in the 1949 amendment to the Forest Act.

Reg Loomis was deeply committed to forest stewardship. He had been disheartened by the poor forestry practices he had seen while working for government and industry in eastern Canada. He resolved that he would do better if ever he had the chance. He got his opportunity in Alberta. His vision for forestry in Alberta was "to set up the whole province on a sustainable basis." Although the enabling legislation in the Forests Act referred to "growing continuously and perpetually successive crops of forest products" Loomis was concerned that the initial agreements were not sufficiently explicit. He therefore had the words "sustained yield management" added to the 1954 Hinton agreement, and followed through with personal representations to ensure they were honoured.

Harold H. (Pete) Hart, General Woodlands Manager for the Northern Timberlands Division of St. Regis, was most directly involved with negotiating the lease agreement, assessing the value of the timberlands and coming up with an estimated wood cost to the mill. His son Stanton was also a forester with St. Regis, as noted previously. Loomis³⁰ spoke highly about the Harts, saying that, compared to other corporate foresters, they were "more open to accepting sustained-yield forest management ... they seemed to be of a different calibre altogether."

Stan Hart³¹ returned the compliment:

Reg Loomis, Eric Huestis and Charlie Jackson [of the Alberta Forest Service] didn't want to see repeated the type of 'forest management' that had been traditionally practised in the east. St. Regis apparently went along with this and, in fact, embraced the concept wholeheartedly as the project progressed. I remember my father telling me many times that the Alberta government forestry people with whom he was dealing seemed to want to do things 'right' in the woods.



AT AGE 80 AND IN RETIREMENT (1984) REG LOOMIS NEVER LOST HIS PASSION FOR WORKING IN THE WOODS

ALBERTA FOREST HISTORY COLLECTION

Desmond Crossley shared Loomis's commitment to sustained-yield forestry. The position of chief forester enabled him to advance his previous work from research trials to a large-scale commercial operation. "This was an opportunity to satisfy my obsession to demonstrate that our forests should and could be managed as a renewable resource without pillaging the land," Crossley³² said. "The fact that this could be undertaken on the finest piece of timberland in Alberta was an obvious plus."

As Crossley³³ related later, "Both Loomis and I were very concerned over the doleful status of professional forest management as it was being 'practised' in the Canadian provinces to the east, and were anxious to accept the challenge that had not been faced in the past. As fellow professionals, we had discussed this challenge in previous years and I have no doubt that we influenced one another as our philosophies matured." Reg Loomis³⁴ commented that Des Crossley was "very, very good" – meaning that he would co-operate with the Forest Service to ensure that the right things were done, and done correctly. With the approval of their respective superiors, Loomis and Crossley agreed on full company responsibility for regeneration, along with inventories and planning, as part of their commitment to sustained-yield forestry.

Crossley, who was chief forester at Hinton until his retirement in 1975, continued his professional and scientific contributions throughout his working career and right up to his death in 1986. He authored more than 40 papers and articles on silviculture and forest management. His government counterpart, Reg Loomis, also made major contributions to policy and science before and after his retirement in 1969. Both men received honorary doctorates for their achievements, Crossley from the University of Toronto in 1982 and Loomis from the University of Alberta in 1991.



JACK WRIGHT (1961) WAS NEVER HAPPIER THAN WHEN IN THE WOODS, ESPECIALLY IF HE COULD COMBINE WORK IN THE DAY WITH FISHING IN THE EVENING

JACK WRIGHT COLLECTION

Their philosophies were carried on by their successors. At Hinton, Jack Wright, who joined the company as a young forester in 1957, succeeded Crossley as chief forester from 1975 to 1987, during a period when environmental and land-use issues became increasingly important. Subsequently the company's forestry and woodlands departments were merged, and the position of "chief forester" disappeared. Don Laishley became head of the new combined department of Forest Resources in 1986. When Jack Wright retired in 1987, Bob Udell assumed his responsibilities. Laishley was subsequently replaced by Dennis Hawksworth in 1996 in an expanded role with responsibility for both forest resources and the Hi-Atha sawmill. In 1999, Jim LeLacheur replaced Hawksworth as General Manager of Forest Resources and Lumber.



JIM LELACHEUR, 2002

BOB UDELL PHOTO

FOREST MANAGEMENT AGREEMENT MANDATED SUSTAINABLE FOREST MANAGEMENT

Crossley³⁵ later identified what he considered were the four most fundamental clauses in the Agreement:

1. The Agreement is for intervals of twenty years, with automatic renewals depending upon performance.
2. Multiple use of the leased lands is mandatory, but, in this context, it is recognized that the growing of timber is the prime use.
3. We are obliged to follow sound forestry practices with a view of achieving and maintaining a perpetual sustained timber yield from the productive forest land.
4. We must harvest the annual allowable cut or net growth of our timber in approximate equal annual or periodic cuts.

These clauses illustrate the challenge Crossley faced, both to fulfill these commitments and to meet their implied expectations. These were clearly in his mind when in 1985 he wrote a synthesis of his experience with the inception of this program³⁶.

There was little for the principals to turn to in the way of applicable information on the initiation of the management program. The general opinion was that the long distances to the pulp markets would doom North Western's enterprise. This, in effect, provided an incentive not to fail, and it was under the resolution to succeed that the company responded.

Senior management of the company assured its Forestry Department that the agreement would be honoured in toto, that it would be the latter's responsibility to recommend the approaches to that end, and to incorporate them during the preparation of the first Management Plan. This department responded enthusiastically to the challenge, and therein lies an important key to a successful management program.

Success throughout Canada had often been thwarted by the excessive costs involved and on the uncertainty of co-operative funding. It was internally predicted that public funding would always be scarce, or, at best, intermittent and its availability unpredictable. The solution would be a company commitment to finance its own management program, thereby avoiding falling behind in its management performance targets. In this connection it should be recognized that the current assumption of the costs of forest renewal by some provincial governments precludes the option of claiming a tax rebate from the senior government.

The challenge that North Western faced was to make a concerted effort to initiate a program that would keep costs to an acceptable level, without destroying the goal of sustained yield management to which it was committed. Innovation became an ongoing challenge and the staff was encouraged to adopt a critical attitude to previously acceptable procedures and to become aware that improved and less expensive approaches lay all around, that it would require wit and imagination to recognize them, and that it must keep abreast of advancing technology and the possibility of adapting it to its cause. The challenge turned out to be very productive in innovative cost-cutting approaches, and staff involvement resulted in an invaluable *esprit de corps*.

The Crown had provided the initial motivation to ultimate success in the adoption of renewable tenure. The company's contribution was to provide the operational funding in an effective dual approach to management. This could be described as "management by innovation" or "incentives to affordable management."

FOREST MANAGEMENT AS A COST OF DOING BUSINESS

One of Crossley's first challenges in consolidating the St. Regis commitment to forestry was to ensure that adequate funding was provided by the Company for forest management planning and to enable appropriate practices to ensure forest regeneration. He did this by negotiating a distinctive financial arrangement with the Company. During negotiations leading to the 1954 Agreement it was clear that both the government and Company were committed to sustained yield forest management. That this commitment also included Company responsibility for forest management planning and renewal also evolved during that time.

When Des Crossley was invited to apply for the position of Chief Forester he also sought personal assurance that the Company was committed. As he explained, when he was asked if he was interested in the position³⁷: "I therefore indicated my interest, provided that St. Regis would be approaching its management commitments seriously. I was assured that I would be given full authority to prepare and administer such a program. --- my support from the New York office was never in doubt, which of course was the critical thing."

Crossley also was keenly aware of the heavy initial expenses incurred by the Company during the development phase of both the mill and forest management program, and Company concerns about expenditures and cash flow. However, he also considered it fundamentally important that the Forestry department be allocated a specific budget to ensure that he could deliver on the forestry commitments in the Agreement. As he explained³⁸:

We had agreed within our department to cut every possible expense corner. Shortly after we had arrived on the site we prepared a broad outline of the program we were proposing for the approval of our New York office. Once this was accepted we then requested some guidance on the magnitude of the Forestry Departments annual budget that might be acceptable. After considerable discussion it was agreed that it should be tailored to the Operations Departments costs of annual harvesting and the laying down of the wood furnish, at the mill gate. Ten percent of that figure would be the limit of the Forestry Departments budget for each ensuing year. Over the first twenty-year cutting cycle this figure was never exceeded. It was not a munificent sum but the staff was aware of its restraining effect, and with imagination and innovative approaches it was made to suffice.

This assured budget for forest management was a rarity among forest companies. Crossley resolved to make the most of it, gaining a reputation for being frugal; some would say parsimonious. However, he encouraged the goals to be met through incentives and innovation.

Crossley's negotiation of the "ten percent" support for forestry practices was prompted in part by the fact that he reported to the woodlands manager, and that historically woodlands managers had a primary concern to deliver adequate wood to the mill at a reasonable cost. However, as Crossley explained:

St. Regis hired its first Woodlands manager (Gordon McNab) from Ontario, and his experience had been confined to timber extraction. He was initially content to concentrate on preparing for the extraction program. I didn't find him too difficult to work under. He admitted that he knew nothing about forest management and charged me to undertake full responsibility in this area and he would learn as we progressed. This was a comforting way for me to proceed. The new man (Adrien Provencher) who took his place was another easterner whose experience was similarly confined to wood extraction. He too admitted to knowing nothing about forestry and did not wish to interfere with our program.

There was a steady turnover in Woodlands managers for various reasons --- I therefore found myself in the position of continually having to defend it in order to prevent the losing of the ground we had already won, and to satisfy our commitments to the Crown. The program would have ended in disaster if we hadn't done that. The Resident Manager made it very clear "you've (forestry and woodlands) got to work together. Although you don't report to one another, you can plan together."



NWP&P FORESTRY TEAM, GROUP PICTURE AT MCLEOD RIVER CAMPGROUND CA 1963.
L-R BACK ROW: STEVE FERDINAND, BILL HANINGTON, RAY RANGER, JACK WRIGHT, DES CROSSLEY.
L-R FRONT ROW: ERIC MARRISON, PHIL APPLEBY, HANK SOMERS

WELDWOOD PHOTO COLLECTION

Another of the innovative policies suggested by Crossley was to argue that the cost of regeneration should be treated as an operational cost rather than capitalized. As Crossley explained:

Over a rotation period of eighty years following harvesting, capital costs of [establishment planting] can go out of sight and such an eventuality could not be countenanced. Even forest economists had missed the point that since the stand of mature timber being harvested was put in place by natural means, its harvesting must generate the source of funds to finance its replacement. We kicked the idea around amongst ourselves while expensing these regeneration costs before approaching our Comptroller. He agreed that we had a viable argument, and the next time the tax officers appeared they agreed to it.

From startup of operations, until 1968 the Chief Forester reported to the Woodlands Manager. Following Stan Hart's departure and Jim Clark's subsequent hire as Woodlands Manager the Chief Forester reported to the Resident Manager. This relationship continued until the major restructuring of the Department in 1986 where both departments reported to the new Forest Resource Manager Don Laishley.

1.9 FOREST MANAGEMENT -- SCOPE OF THE UNDERTAKING

When Crossley was asked in 1983 to describe his impressions about the magnitude of his task as Chief Forester when he arrived in the spring of 1955, he replied³⁹:

I think it apropos to your question that I recall my first reconnaissance flight over the 2,000,000 acres of choice timberland below that I was committed to manage. I was not so much overwhelmed, although that certainly gave me pause, as awed of its magnitude, the fact that it was relatively unspoiled and that I had been lucky enough to have been approached to become involved. The successful meeting of the challenges involved would depend a great deal on the calibre of the staff yet to be acquired and my ability to create the enthusiasm to fashion a successful program. I cannot deny the concern over what I had got myself into, but that was transient. There was too much to do to waste time dwelling on it. The Woodlands senior staff arrived early in May and with a year's lead over the initiation of mill construction, a timber inventory had to be initiated and preliminary management plans written. Roads had to be located and built, initial harvesting areas selected. The initial wood furnish for the mill had to be ready for mill start up.

In other words any significant infrastructure was not available. We were starting completely from scratch in developing the whole area. One of the initial tasks of course was to get in touch with the various authorities in the Alberta government, and particularly Reg Loomis in the Forestry Department, in order to discuss with him how we were going to attack the problems involved. We needed to know what information on the area was available. For instance, was the Forest Service's forest inventory of any value to us, what about the efficiency of the forest protection program, and so on. We needed to get a handle on how far the Forest Service had gone on its planning, and what information was available for our immediate use. I can't say that it was to our horror, because I guess that I must have expected it, but soon we realized how little information there was. We would have to gather much of it ourselves, and as fast as possible. We would have to decide on the initial areas to commence harvesting, the extraction roads necessary and a start made on locating and building them.

We did learn however that Loomis was quite prepared to work closely with us, thrashing out our problems together, with each accepting different responsibilities in order to get things underway. From the Company's point of view staff acquisition was most urgent. Staff accommodation was at a minimum during the first two years and this didn't help in attracting some of the candidates. We were determined to search out qualified people who recognized the importance of spending as much time as possible in the forest. We required a basic staff of professionals who could learn to manage with growing confidence, backed by an intimate knowledge of the lease area that could only be gained through familiarity. The original technical staff was raised from the Maritime Forest Ranger School in New Brunswick, but we also found men who had acquired the fundamental skills in Alberta.

FOREST MANAGEMENT PLANNING

Even though the Company has a forest management agreement giving it the rights to manage and harvest the forests, the Company also has to abide by a number of other legal requirements. The Agreement of 1954 itself required that the Company, before starting any logging must “submit to the Director of Forestry for his approval a general working plan for the first rotation. Any subsequent changes in the working plan are to be submitted to the Director for approval.” The “first rotation” in this case meant for the first one hundred years the Company had to show, at least in general terms, how it planned to build roads and harvest the forest, and the technical basis on which decisions about how specific locations and volumes to be cut were determined. The plan also required them to show how the forests would be renewed, protected and generally managed to ensure “sustained yield.”

As well, by the first of September of each year, the Company had to show in detail “the area over which all cutting operations will be carried out during the following winter and summer seasons. Such operation plan shall set out in detail the types of timber to be cut, the areas to be cut over, and shall show such areas on a map to be considered as part of the plan. The Director of Forestry will approve such plan as submitted or, in time to avoid delay in cutting operations, instruct that amendments be made.”

In addition to the specific requirements in the Agreement, the Company had to follow the requirements of the Forests Act, forest management regulations, and Forest Protection Act. These had all evolved, as explained, to try to ensure sustained yield of the forests.

The first plans were rather straightforward, dealing primarily with timber and regeneration. However, they have since become much more complex in order to deal with sustainability of the forested ecosystem and to provide for a broader range of values. These will be described in a concluding chapter.

So, Crossley and McNab and their teams were faced with two basic challenges. First they had to get the information needed to do the planning for both the long-term forest management as well as short term operations. Second, they had to decide on the specific practices needed to ensure results. Their task can perhaps be seen more clearly in a brief outline of forest management planning and practices.

THE CYCLE OF FOREST MANAGEMENT ACTIVITIES

The main elements of managing a forest management area may be seen as a cycle of requirements. These are all linked, one set forming the basis for the next. Figure 1 illustrates the cycle of forest management activities. Some of the terms used are technical – we will try to explain them as we go along. The diagram starts with the forest. We are fortunate in this country to be able to start with established forests. It is our responsibility to ensure that we also finish with established forests. The forest itself comprises a complex living community of plants and animals. It also represents a wide range of values to people. People outside the mill are now being consulted as part of the planning process to help to identify the various values.

Build Knowledge

One of the first tasks is to find out about the forest itself -- what kinds of forest stands there are, species, ages, sizes and qualities. To do this we need aerial photographs and maps. We call this stage “inventory.” Tree volumes are calculated from measurement of individual trees. Diameter is measured at 1.3 meters from the ground. This is a standard called “breast height” so all trees are measured at the same point. Heights are measured using “clinometers” by which the angle to the top of the tree enables calculation of the height. Ages can be counted on cut stumps -- the annual growth can be clearly seen in

the annual rings. An increment borer is used on standing trees to take out a core about 3-4 mm in diameter on which the rings also show up. Soil types are also studied since they greatly influence nutrition, rates of growth and wind-firmness of trees. Soils are also important when locating and building roads.

Growth and yield go along with the inventory process and are calculated from field measurements. By determining rates of growth and volumes of forest stands the productivity can be determined. In addition to volume, the quality of wood is also considered. From this information calculations can be made to regulate the yield for rates of harvest so that on balance rates of harvest eventually balance the rates of growth. These calculations are used to set an “allowable annual cut” (AAC).



FIGURE 1 THE CYCLE OF SUSTAINABLE FOREST MANAGEMENT

Plan

Next to consider are the silvicultural harvesting methods. The determination of whether to partial cut or clear cut depends on the way different species renew themselves and grow, and on the availability of seed sources or the ability of some of the hardwoods to sprout. Other considerations include the needs of the seedlings themselves – how much sun or shade they prefer and their moisture requirements. This process is part of a “pre-harvest assessment.” From these foresters can determine the appropriate size and shape of cutting areas, and site preparation needs after harvest to ensure suitable seed beds or opportunities to plant.

The term “silviculture” means the growing and tending of trees. It has the same derivation as “agriculture” which is the growing and tending of agricultural crops. Other silvicultural considerations are selection of the right species for the particular sites and ensuring suitable nursery stock if planting is to be done.

Multiple use is a term used to describe the other uses of the forest and some of its other values. These typically include a host of recreational opportunities, during all four seasons, fishing, wildlife, hunting, berry picking and use of trails for hiking, skiing, with horses or quads. The intent here is to both ensure opportunities for these multiple uses exist but to also encourage their uses at times and places least disturbing to other living forest creatures. The lands of the FMA are also underlain by deposits of oil, natural gas and coal. This means that other industrial uses are carried out, both for exploration and extraction -- drilling and pipelines for oil and gas, and strip mining for coal. Forestry staff work with these other industrial users to try to minimize their impacts on the forests and forest ecosystem.

Implement the Plan

Logging has two important purposes. The obvious one is to remove the trees from the site and deliver the wood to the mill. The other important step is to prepare the site for the new, regenerated forest. In this sense logging is both the end and the beginning of forest stands. It is important to plan for both at the same time. Selecting the specific areas to be cut takes a lot of thought. There has to be enough wood in the area to cover the costs of roads and logging, it should be suitable quality for the mill -- larger trees for the sawmill and residual trees for pulp. One of the profound decisions that was made at the start of this operation was that logging would be spread out over the entire FMA as much as possible to try to balance the hauling distances as well as distributing the disturbances. Once cutting areas have been selected, then the rest of the planning involves locating camps or arranging commuting, developing road systems and determining how specifically to fall the trees, to remove the limbs, move the wood to landings, to load it and haul it to the mill.

Logging involves people and machines, maintenance and service. The wood itself is heavy and bulky -- between 700-900 kg per cubic meter. In earliest days logs were typically skidded (dragged) to rivers with animal power to float them down to the mill. Then, tie hacking and portable sawmills were located in the bush so that only the rough products had to be hauled out. Now, with greater power and mechanical capabilities, along with better all-weather road systems whole stems may be brought to a mill yard for sorting and processing. At the mill yard, the wood is weighed and measured. Depending on size and quality of the wood, trucks are sent to the sawmill or pulpwood areas to unload. All the trimmed wood from the sawmill is later delivered to the pulpmill, so there is very little waste.

The next step is forest renewal -- the process of establishing the new forest. This may be achieved by preparing a suitable seed bed on the cutover by exposing mineral soil so that seeds from cone-bearing slash or from adjacent trees may establish the new forest. Alternatively seedlings may be planted. In either case, the cutover is usually treated to break down the slash (branches) to encourage decomposition and to reduce fire hazards. It is usually best to get the new crop of seedlings growing as quickly as possible so they can successfully compete against the other natural vegetation which also establishes itself after these disturbances.

Stand tending is a general term for looking after the growing forests. If seedlings are too dense spacing, or “thinning” may be necessary. This activity leaves more room for the remaining trees in which to grow. Tending may also include “cleaning”, whether by mechanical or chemical means to remove hardwoods or grass which are overtopping and choking out young softwood species. Also related to stand tending is forest protection -- to protect the forests from fire, insects and diseases.

On the ground activities to support multiple use can include a range of things from the development and maintenance of trails and campsites to setting aside areas of special value for protection to active management of habitat and activities to conserve wildlife species.

Monitor, Report, Adapt

The final sector in the cycle is the essence of adaptive management. Here the manager considers the outcome of his decisions and activities against a set of “indicators” that he can measure to see if the desired or predicted outcomes have been achieved. For instance, were the assumptions contained in the allowable annual cut estimate met by the forest operation itself. Examples of these assumptions include tree and stand merchantability, utilization standards, sequence of harvest by age class and stand vigor, actual harvest per hectare compared to estimated volume harvested per hectare.

In preparing the forest management plan and the sustainable forest management plan for certification, these assumptions and their measures, or indicators, are described. An annual stewardship report then reports to the province and the public the Company’s success in meeting these assumptions.

The management plan is revised every ten years, but could be revised sooner if very large gaps emerge between management plan assumptions and actual delivery as reported by various tracking mechanisms or catastrophic events such as large fires. These periodic revisions take into account all the changes occurring in the interim, develop a new picture of the forest through reinventory of various values, and produce a new analysis and plan to guide the ensuing period.

This brings us back to the beginning of the cycle again. Naturally, at any time, any or all of these activities are taking place simultaneously. These activities are generally planned and managed by graduates of four-year professional forestry programs at universities, some of whom have acquired specialization through masters and Ph.D. programs. As well, forest technologists, graduates of two-year technology programs with a more applied orientation, are part of the planning and management teams. These programs typically include a solid grounding in biology and forest ecology, forest soils, silviculture and forest management. These are underpinned by chemistry, calculus, statistics and economics. As well, language and communication skills and an understanding of social sciences and humanity are also required. The required forestry courses cover the range of practices shown in the chart. As Hugh Loughheed recalled about his introduction to forestry:

I went into forestry, not with a great deal of understanding about what it was ... it was quite an eye opener. I went into the program with some misconceptions about forestry really was. ... I was quite amazed at the breadth of what needed to be understood, some of the technical skills that were required and the background knowledge. That I think ... impressed me the most. The breadth of understanding that was required. Just looking at the program in the subsequent years, it was quite intimidating -- there was so much, right from biochemistry to wildlife, ecology, computer science, calculus, you had to take a second year calculus course and I ended up in a thermodynamics course, third year engineering. That was pretty wild!⁴⁰

And now, with the increasing complexity of management, additional staff with training in biological sciences and ecology, such as wildlife and fisheries scientists have been added to the management teams.

1.10 CROSSLEY'S OVERVIEW 1975 – A CASE HISTORY IN FOREST MANAGEMENT

With that brief review, we return to the history about how forestry practices and logging unfolded. It is interesting but complex. To give an overview, a summary by Des Crossley himself is presented next. Crossley wrote an excellent review paper in 1975, his retirement year, which earned him an award at the Canadian Pulp & Paper Association annual meeting in 1975⁴¹. Who better to tell this part of the story than Crossley himself? The rest of this Chapter is extracted from this paper. A more detailed account of how various practices evolved follows in ensuing chapters.

In Crossley's words, then:

HOW MANAGEMENT WAS PLANNED

Initial management planning suggested that administration would be made much easier by the creation of several working circles. Four were created, and it was eventually decided that each should be managed as an entity with its own allowable cut. This meant that each could be brought on stream individually as the new mill's demand for wood increased.

Both the lodgepole pine and white spruce stands clothing the Forest Management Area were of fire origin and therefore even-aged, and their fire borders were readily recognizable from air photographs. A combination of fire-boundary delineation on the photos, together with on-the-ground dating of fire occurrence, provided the age-class information considered indispensable to management planning.



**AGE CLASS BREAKS IN FIRE ORIGIN LODGEPOLE PINE STANDS, NORRIS CREEK AREA
WELDWOOD PHOTO COLLECTION**

The company was fortunate that existing Forest Service, timber operators', and oil company roads provided a fairly comprehensive access system. With additional new road building to service heretofore untapped areas, access was soon available to the major areas of static timber stands that were scheduled for immediate harvesting.

The establishment of a continuous forest inventory at a sampling intensity of 1/5 acre permanent sample plot per square mile provided the original data necessary to plan the sustained yield

management and establish the allowable cut. An 80-year rotation for pulpwood management was indicated, and the decision was made to adopt four 20-year cutting cycles.



**FOREST TECHNICIAN PETE DEZWENKO
PLOT MARKING, PERMANENT SAMPLE PLOTS, EARLY 1960S**

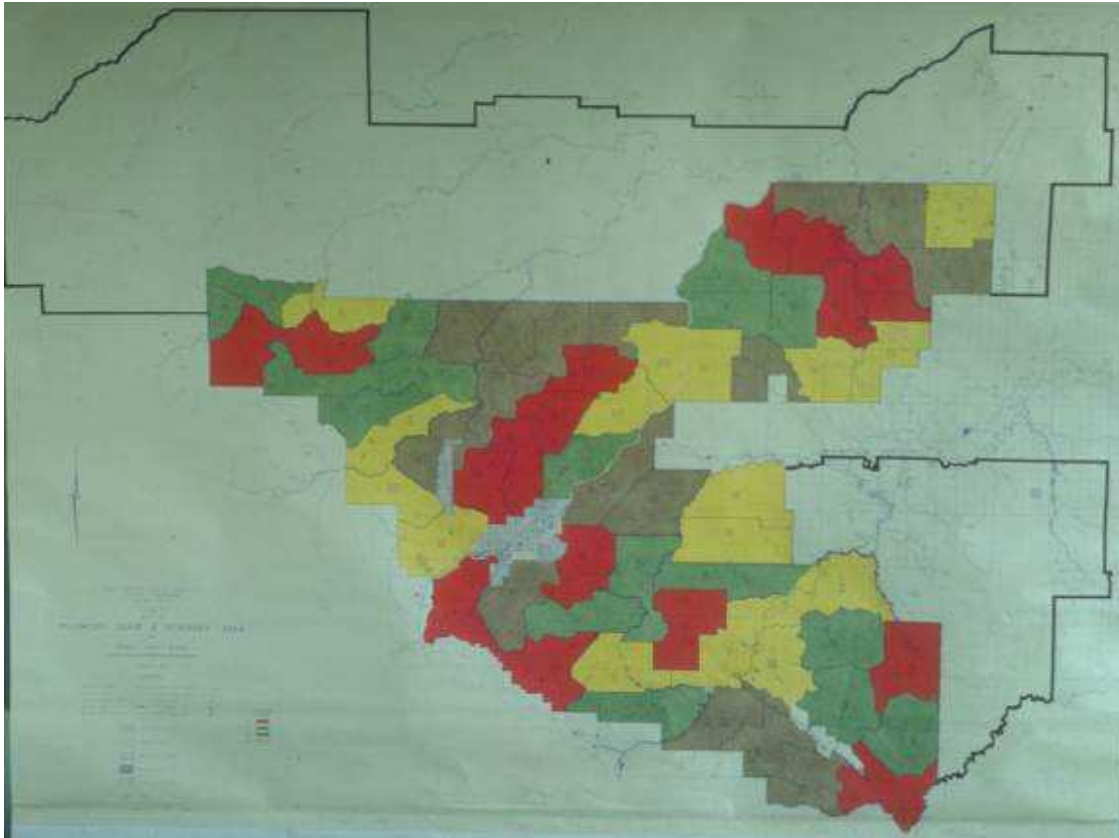
WELDWOOD PHOTO COLLECTION

In its initial planning, the Company made the major and unusual management decision to seek out and eliminate high-risk, overmature and climax stands, and to harvest throughout the rotation by senior age classes.

Compartments were then delineated, each to support an estimated half-million cords over the 20-year harvesting periods, each classified according to the predominant age class of the timber contained therein, and each allocated to its appropriate cutting cycle. Clearcut harvesting was dictated by the even-aged nature of the stands, and accomplished in strips and patches. The first harvesting passage through a compartment removes half the volume in the initial 10-year period, and the second passage harvests the residual stands in the next 10 years. See Map 16.

The average haul distance to the mill at Hinton from all the first cycle compartments was 45 miles, and - aided by the natural distribution of age classes - we were able to allocate compartments to the appropriate cutting cycles so that this average mileage would not vary by more than +/- 5 miles over the three subsequent cycles.

One-hundred-inch wood, Swede-saw felling and horse-skidding were gradually replaced by advancing technologies to the present-day feller-buncher, tree-length skidding and hauling to the mill.



Map 1-16 Allocation of Compartments to 20 year cutting cycles for an 80-year rotation – 1966 forest management plan

HOW SILVICULTURE WAS PLANNED

From the past history of harvested areas on the east slopes, it was abundantly evident that regeneration to adequate stocking levels in an acceptable length of time would depend upon the preparation of an improved seed bed. On the basis that an acre of timber worth harvesting now, no matter what its site, will support a second growth stand that is worth harvesting in all subsequent rotations, no consideration was given to confining the regeneration efforts to the most productive or accessible areas. These two precepts imposed immediate rehabilitation treatment on each harvested area. Regeneration techniques from the very first involved the preparation of a seed-bed by scarification. After experimenting with a variety of powered equipment, it was decided to cast our lot with wide-tracked, highly-powered tractors, and our own specially-designed toothed blade to break down the slash and tree residue, turn over humus and mineral soil, and reduce the whole to a less flammable condition and a more receptive seed-bed. The scattering of the serotinous cones of lodgepole pine over this seed-bed, and smoothing it down somewhat, was accomplished by a following anchor-chain drag.

Over the majority of our harvested areas this equipment has proved highly satisfactory; but certain conditions have been encountered where it has been ineffective. Many of our climax spruce-fir stands have been in existence over 300 years, and during this time have developed a very moist deep-duff layer, up to 24 inches in depth. The scarification equipment so satisfactory elsewhere on the Lease proved ineffective in reducing these heavy volumes of humus to a receptive seed-bed. This

stubborn problem was eventually resolved by blading both slash and humus to one side in parallel windrows, and seeding or planting the intervening areas.



**FORESTER OWEN BRADWELL EXAMINES SCARIFICATION PLOUGH MOUNTED ON A D-9 CAT, 1959
WELDWOOD PHOTO COLLECTION**

The success of natural regeneration on prepared seed-beds has been about 75%. Fail areas, bladed areas, and controlled burn areas usually have to be regenerated artificially, as do harvested white spruce stands whenever no natural seed source is available. To this end the company established its own nursery complex in 1962. With the assistance of specialists in the Canadian Forestry Service, several years of experiments were undertaken to perfect an acceptable technique for growing containerized seedlings. We were destined to progress through the plastic tube, paper-pot trails and a fruitless search for bio-degradable materials, and we became more and more disturbed over the possible ultimate balling-up of the root. We finally settled on the unrestrained root-plug approach, and adopted the Spencer-Lemaire six-celled plastic Roottrainer. Our nursery has reached an annual production capacity of 2.5 MM seedlings.

Aerial seeding has proved to be a very effective method of regenerating bladed areas and difficultly-accessible sites, provided some control is possible over the loss of seed to rodents. Winter-seeding has enabled us to hang the seed up in the snow mantle, out of the rodents' reach during the long winter months.

THE ROLE OF PROTECTION

The company experienced heavy and consequently disturbing fire losses in 1956. Since then, continued improvement by the Protection Branch of the Alberta Forest Service in prevention and control techniques have been gratifying. While fire towers are still manned, the detection system has been supplemented by aerial patrols. at the same time, reliance upon ground access for initial attack has been largely supplanted by air drops and crew transfer by helicopter. Rapid, heavy and expensive initial bombing attacks are the order of the day. The Branch set as its 20 year goal an

average annual burn of 1/10 of 1%, i.e. 2,000 acres, and this assumed loss is accommodated in the allowable annual cut.

Insects and diseases fortunately have not as yet posed any serious threat. They are probably minimized by our concentration on the rapid removal of decadent and over-mature stands.

HOW HAS IT ALL COME OUT?

As we approach the conclusion of the first cutting cycle the following results will be of interest. The Athabasca-Berland Working Circle was one of the first to be brought on stream, and thus exhibits the greatest lapse of harvesting time and the most pronounced improvement in age-class distribution.

Recently, a decision was made to revise completely the initial delineation of compartment boundaries. The constant compartment size was abandoned, and existing age-class boundaries were more consistently followed. This has resulted in a heavier concentration of the over-mature age-classes in the first and second cutting cycles. The pay-off will be in improved stand sanitation, and in the even more rapid rehabilitation of static areas.

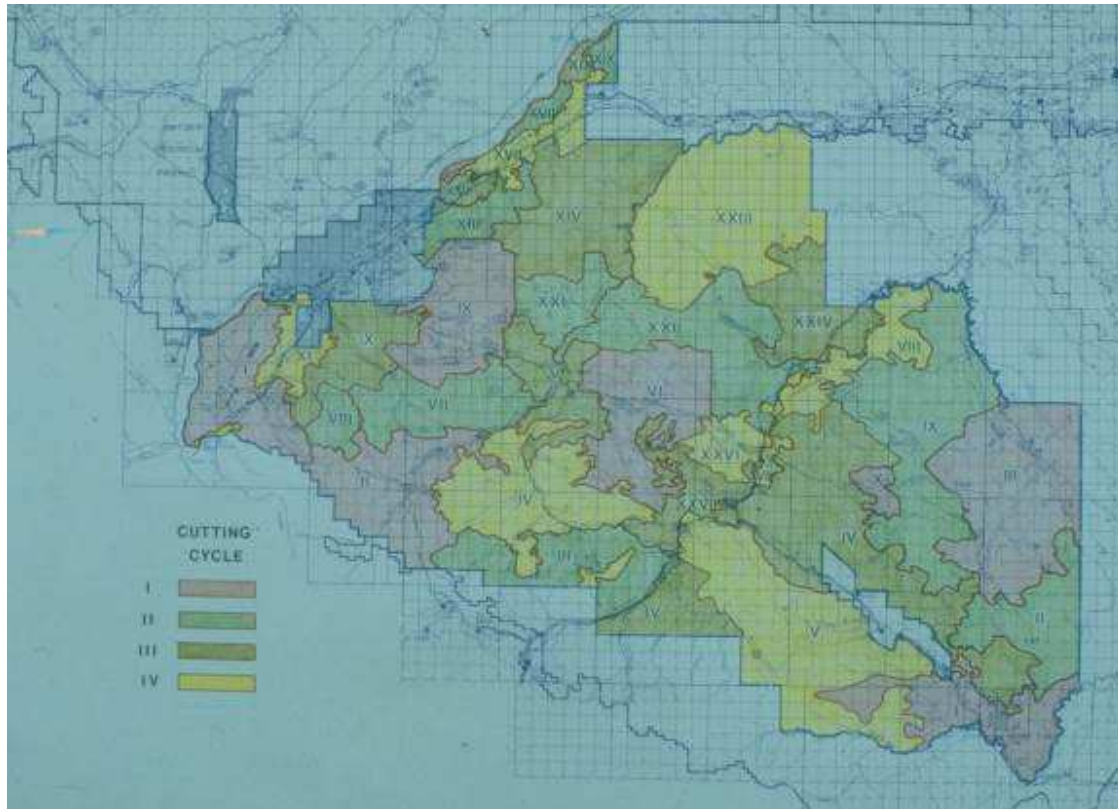
In 1957 a complete re-organization of the protection systems was undertaken by the Alberta Forest Service and since then statistics have been kept. The intervening 18 years include a fairly comprehensive variety of seasonal hazard ratings.

While it is unwise to become complacent about protection, the goal of 1/10 of 1% average annual fire loss has been surpassed since the protection system was re-organized, which gives us confidence that we can at least maintain it in the future.

With changes in lease area acreages, and improved utilization standards, the allowable annual cut has fluctuated somewhat through this first cycle. It took some years to gear up to full utilization of the lease's productive capacity, but this has been fairly well sustained since 1969.

The permanent 1/5 acre plots were initially established for the purpose of a continuous forest inventory. From the initial inventory data, localized aerial stand-volume tables were prepared, and the inventory has since been maintained through the use of interpreted photo points. The continuous forest inventory has since evolved into a permanent growth sample for the development and maintenance of growth and yield information.

In the initial inventory, plot trees were tallied down to a dbh of 4.6 inches. On plots being currently re-established on harvested areas, total stems are tallied. In this way we are preparing for the eventual preparation of the all-important managed-stand volume tables.



Map 1-17 Allocation of Compartments to cutting cycles based on age class only, not based on a 20-year harvest by compartment – McLeod & Embarras Working Circles, 1968

I can now report that the original 3,000 permanent plots have been re-measured twice, and from the accumulated data localized aerial stand volume tables by major type, crown density and 10-foot height classes have been developed for use in our operational inventories. The data pool has proved to be an invaluable source of reliable information in planning improvements in utilization standards, assessing the feasibility of broader integration of forest products, and channelling wood to more lucrative manufacturing processes. The information resulting from the tallying of smaller-diameter classes in the younger stands is proving of value in the management program as it relates to juvenile spacing and stocking standards, and will be available for the development of stand models when sufficient data in these areas are accumulated.

Progress has been made toward an integrated operation. Besides the original commitment to the annual manufacture of 195,000 tons of pulp, a 13,000 ton tall-oil plant, a 50 MM board feet studmill, and a 300,000 railroad-tie operation have been added, in that order. The need for extra wood to satisfy the increased demand for raw material is resulting in the surpassing of our original calculated

allowable cut. This is being met by harvesting all merchantable wood standing dead, and by buying chips.

The commitment to regenerate all our cut-overs has been approached conscientiously, but has suffered several setbacks. Not the least of these was the delay that ensued while we experimented with a suitable technique to prepare a receptive seed-bed under deep-duff conditions. Another was the need to find a method of protecting our broadcast tree seed from severe rodent depredation. A third resulted from unforeseen delays in developing a viable containerized seedling nursery program.

We have now harvested 160,000 acres of land. The 1974 regeneration survey sampled the 1968 cut. Up to and including that date we had harvested 100,000 acres. The results were as follows:

We thus show an unregenerated backlog of 5,600 acres, or 5.6 percent of our total commitment of 100,000 acres. We are committed to the elimination of any backlog by 1976. Many of our earliest regenerated stands indicate that the densities which have resulted from our post-harvesting treatment are markedly better than the regeneration densities which have resulted from wildfires. As a result we are experiencing an explosion in juvenile growth rates in the neighbourhood of 300 percent. This suggests a considerable reduction in rotation age in second growth stands.

One of the management problems we face is the many acres of dense lodgepole pine regeneration that have resulted from the passage of wildfire. Densities of 15,000 to 40,000 stems per acre are common, 40,000 to 60,000 not uncommon, and extremes of one-quarter million are sometimes encountered. To aggravate the situation, the original stand that was destroyed by fire remains in both a standing and down position for many years, which results in a tangled wilderness unattractive to game and a very effective barrier to attempts at reducing stand density. It is a problem that we have made several unsuccessful attempts to resolve at an acceptable cost. Its resolution will be given high priority in the second cutting cycle.

WHAT ABOUT MULTIPLE USE?

The principle of multiple use of wild forested lands is one that has long been accepted by the Canadian forestry profession. It was a meeting theme at the National Convention of the Canadian Institute of Forestry in 1952. It was the theme of the World Forestry Congress in Seattle in 1960. We were therefore in a position to anticipate the eventual public concern that was soon to arise, and have found it easier to accommodate multiple users into our forest management program than we had supposed.

The eastern slopes of the Rocky Mountains are unique in their beauty, the diversity of wildlife, and as a major source of water for the lands to the east and to the north. They also encompass immense wealth in the form of natural gas, oil and coal deposits, all of which are being developed to satisfy the nation's energy demand from non-renewable resources. Our lease area is representative of these diverse resources and must shoulder its share of multiple uses.

Outdoor recreation is a natural and increasingly popular use of our management area that is encouraged by the encompassing network of 500 miles of company all-weather roads, plus an additional 250 miles of provincial highways and other extraction roads - all of which the public is free to use. Road closures are by Ministerial order only. This takes care of concern related to periods of high fire hazard, and there is no evidence that recreational use during the remainder of the fire season presents an unacceptable hazard.

The weekend use of the lease area during all seasons of the year is impressive. The company has participated in the development of a comprehensive camping facility bordering a beautiful chain of lakes, and has developed two hiking and riding trails for free public use.



“HOODOOS” – WIND-ERODED SANDSTONE BLUFFS ALONG THE WILD SCULPTURE TRAIL, SUNDANCE LAKES AREA. THE FIRST HIKING TRAIL DEVELOPED BY THE COMPANY IS IN THIS VALLEY

WELDWOOD PHOTO COLLECTION

If the public is to be educated to recognize and understand the rationale of renewable resource management, the task is made easier by exposure to it. To this end we have established a 57 mile Forest Management Trail, with 17 stations identified along its route which demonstrate the need for, and the results of, the husbandry process.

The even-aged nature of our forest stands, and the clear-cutting harvesting process, automatically results in improving the game habitat. Dramatic improvements in forage, together with the edge-effect resulting from the many miles of residual block edges, has greatly increased the gross inventory of game animals. However, because of the increased hunting pressures that are the direct result of the increase in resource extraction roads, the net increase is not so dramatic.

Residual strips of timber are mandatory on the borders of fishing streams, and rigid controls are in effect over the location and construction of stream crossings.

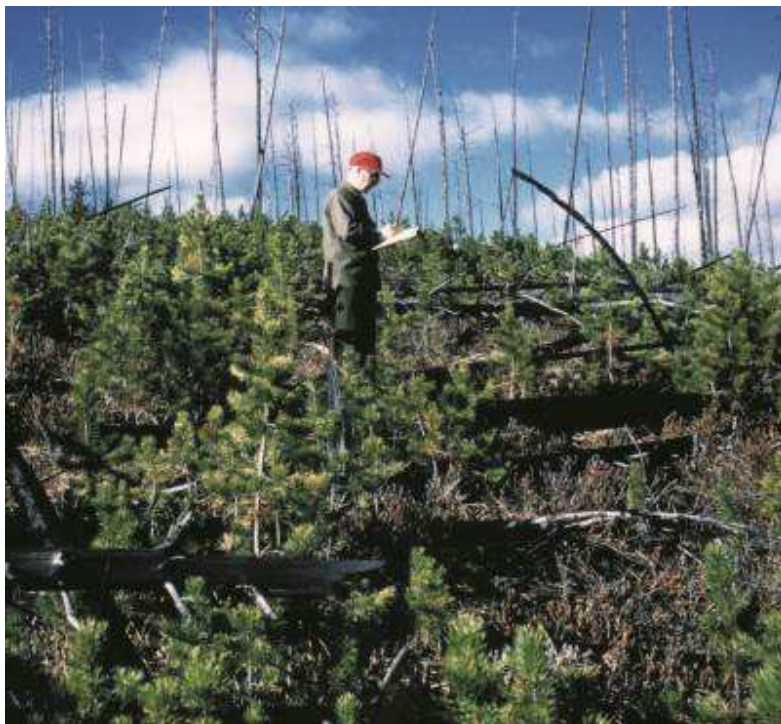
While residual timber fringes along major travel routes were originally mandatory, the company's strong objection on the grounds that it was not ashamed of any of its management practices, and would prefer that nothing be hidden from public view, resulted in the rescinding of this regulation.

The principle of multiple use surely assumes that each legitimate user of land or resource rights will be prepared to sacrifice some of these rights for the overall benefit. Our experience indicates that

few others want to pay more than lip service to such a principle, and our company finds itself bearing the brunt of the load. This has been allowed to go on in spite of the fact that our agreement with the Crown recognizes the growing and harvesting of timber as the lease's prime use.

CO-OPERATION AIDS RESEARCH

As we progress with our management commitments, problems are continually arising (usually peculiar to our own forest region) for which there are no ready solutions. In most instances we have not been staffed to undertake the research necessary to solve them, and have been very fortunate in being able to turn to the Canadian Forestry Service, the Canadian Wildlife Service, the Alberta Research Council and the universities for expert assistance. At the present time (1975) some 25 projects are being actively pursued within the boundaries of the management area, many of them involving the co-operation of several disciplines. Company involvement is generally in providing facilities.



DR. BILL CORNS, FROM U OF A FACULTY OF AGRICULTURE, CONDUCTED RESEARCH IN CHEMICAL THINNING OF OVERLY-DENSE, FIRE-ORIGIN LODGEPOLE PINE. GREGG BURN, 1967.

WELDWOOD PHOTO COLLECTION

The effect of forest harvesting and subsequent management on the watershed is under rather intensive study on the lease area. There can be no doubt that the clearcuts result in greater water yield. That this yield comes at the time of year when it may be least wanted cannot be ignored, nor can the possibility of increased stream sedimentation. Current research underway identifies roads and seismic lines as the sources of increased sedimentation, and projects are studying ways to control it. Our post-harvesting scarification methods appear to be very effective in preventing soil erosion, particularly once the haul roads have been put to bed.

As concern has grown over the multiple-use aspects of wild land management, particularly as to the effect of our timber harvesting methods on the ungulate game population, and on the erosion and siltation of fishing streams, it has become evident that a variation in harvesting methods might assist in minimizing these effects. As a result, permission has been obtained to introduce on an experimental basis the concept of progressive clearcutting which forsakes the practice of clearcutting in strips and patches, and it simply the progressive harvesting of stands in a compartment by

contiguous annual operating units over period of 20 years. Such an approach and progression around the compartment can be designed to permit the removal of all extraction roads the year following harvest, rather than leaving them for a 10-year interval to service the harvesting of the second half of the cut. This enables us to put extraction roads to bed during the scarification process, consequently minimizing hunter access and pressure on the game population, and resulting in the reduction or elimination of stream siltation. Game movement is accommodated in the planning by leaving appropriate game corridors and refuges approved by Fish & Wildlife Officers.

An extensive series of spacing studies established in the early sixties is beginning to provide valuable data on which to base thinning operations. Over 160 acres of regeneration stands in the juvenile stage have been thinned experimentally by the Company in preparation for a much more intensive program as we enter the era of high-yield forestry. Genetic improvements are so far limited to the establishment of two seed production areas, and to preliminary surveys to establish a bank of plus trees in preparation for a preliminary breeding program. The evidence is there that our forest location can support startling rates of growth. (Crossley 1975⁴²)

CHAPTER TWO - INVENTORY, GROWTH & YIELD AND ALLOWABLE ANNUAL CUTS

This Chapter is a tribute to the many individuals who responded to the challenge of the forest inventory. Their names appear throughout the text as their contributions are described and discussed. Their achievements are acknowledged with great appreciation.

Many individuals provided input to this chapter also. Forest inventory was Jack Wright's particular field of interest -- his insights, suggestions and reviews were especially valuable. Colin Bamsey prepared a first summary draft that was edited by Wright and extensively reworked by Bob Udell.

The most important requirement for the preparation of a sound sustained-yield plan of regulation is a good inventory by species, types, sites and age class from which sufficient information as to growth can be readily derived - **Reg Loomis, 1955**

The foundation of any forest management plan is a good estimate of the volume and species of trees growing on the forest estate (forest inventory), combined with the tools with which to accurately forecast the growth and volume yield of these trees.

At Weldwood's Hinton operation, both inventory systems and forecasting systems have improved over time. When St. Regis Paper Company agreed to undertake on behalf of the joint venture partners the management of the pulp mill and forest, it cast about to find and hire the best foresters available for the job. Supporting these Canadian foresters were a team of specialists from St. Regis who came to Hinton to help establish the program. By 1960, the Canadians had taken over.

2.1 INTRODUCTION AND HISTORY

Timber has been an important resource for at least the last 4000 years, especially for construction of buildings and ships. Ancient references describe important timber-growing areas throughout the Middle East and Mediterranean regions, and timber specialists were always on the move to find and evaluate new reserves. In British North America in the 1700s Crown Timber Agents located the best white pine and marked them for the Crown, and recorded their measurements for the record. This was an early form of 'timber cruising' in which mast-quality trees were located, measured, recorded in the inventory of the Crown and marked with a 'Broad Arrow' blaze to identify it.

In Alberta, the qualifications for early timber cruisers were years of experience in both the forests and the sawmills. Cruisers would walk through stands of timber, observing the diameters, heights and shapes of the trees. From the heights they could judge how many 16-foot logs the trees would yield, and from the diameters they could estimate how many logs would be needed to produce 1,000 board feet of lumber. (A board foot to "foot board measure" is 12 inches by 12 inches by one inch; a common unit is 1,000 feet board measure or 1 Mfbm, equivalent to 2.36 cubic metres of lumber.) Since the traditional product was lumber, the unit of 'board foot' made sense - it represented a board 1-foot square and 1 inch thick, or equivalent. The number of logs per Mfbm was known as the "Log Run" of a timber stand. An excellent stand might have a log run of 4-5, poorer ones up to 8 or 9 logs per thousand. Timber cruising this way could even be done quickly on horseback. The results of these 'horseback' estimates could be quite variable, accuracy depending on experience of the cruiser, but they were an adequate measure to indicate what size of sawmill would be needed for any one location, or if there was enough timber to support an existing mill.. This kind of "ocular" cruising was done in Alberta

into the 1940s. By then a more 'scientific' approach was made possible by technology and the application of statistics.

Meanwhile, as early as the 1920s, Dominion Forestry Branch (DFB) researchers were measuring individual trees to determine the relationships between diameter at breast height (DBH)^{vii}, tree height and the shape (form or taper) of the tree for the most important timber species. From these data were developed 'Form-class Volume Tables' that showed the 'average' volume of any given size of tree in either board feet or cubic feet units.



BREAKFAST IN CAMP – DOMINION FORESTRY BRANCH CRUISE PARTY, 1913
ALBERTA FOREST PROTECTION HISTORY COLLECTION

Cruising could then be done by laying out sample plots and measuring the diameters of trees on them. Plots used in Alberta were commonly rectangular measuring 0.5 chains by 5.0 chains, containing 0.25 acres.^{viii} These were laid out along a 2.5 chain long steel measuring tape, and the cruiser would tally all trees that lay within 0.25 chains of the tape. A second 'pull' of the chain would extend the plot to its 5-chain length. The cruiser could then measure and record the DBH of each tree on the plot along with species and a sampling of tree heights. Volumes could then be estimated by taking the tree volumes from the Volume Tables for each diameter, multiplying by the number of trees and adding the total of volumes on the plot. Statistical techniques were, and still are, used to determine how many plots were needed in any stand, and what the range of accuracy would be. This was a more standardized approach,

^{vii} Diameter measured at the standard height of 4.5 feet above ground, now 1.3 m.

^{viii} The 'chain' was long used by land surveyors. A 'chain' was 66 feet long (30 m) and there were 80 chains per mile. The 'beauty' of this system of measurement was that an acre was 10 square chains, making calculation of areas very simple.

reducing the need for experience, and lending itself to calculation by hand, then calculator and now computer.

As will be explained, refinements in both technology and statistical techniques have made volume estimates much simpler and faster to make, as well as more reliable. However, the scope of 'cruising' has greatly expanded to include many other forest values, so the inventory effort has increased in both complexity and time required.

2.2 PRELIMINARY INVENTORIES

There were four preliminary inventories of particular interest for the Lease area before the company Forestry Department was set up at Hinton in 1955. The first was a very broad survey of the forests conducted by DFB foresters in 1913⁴³. The foresters had an immense area to cover during their limited spring-to-fall field season. They measured a few sample plots and individual tree volumes but their reports of forest conditions were largely descriptive. However, the reports were important in their day to confirm the presence of extensive forests valued for timber, watershed protection and wildlife.

The second of these was an innovative assessment of timber volumes done by Reg Loomis in the fall and winter of 1951-52. Loomis had been hired in 1949 by the Government of Alberta to spearhead the province-wide inventory of the "Green Area", the area reserved from settlement, within which the future Weldwood-Hinton FMA was to be situated. The government objective at the time was "...to complete and make full use of aerial survey and forest inventory in the protection, conservation and full utilization of our forest."⁴⁴

However, during the early 1950s, while the pulpwood lease was being negotiated, the provincial forest inventory had just started so there were no forest cover maps or inventory data yet available. Loomis was retained, with government permission, by Frank Ruben in 1951 to prepare a broad forest inventory from photo interpretation for his proposed forest management area to support a mill site at Edson. Ruben had an initial lease area drafted in by a consultant from eastern Canada for his 1951 agreement, but he wanted to confirm the volumes.

The technique Loomis used in 1951 and 1952 may have been the first photo point sample (PPS) inventory in Alberta. His approach was to overlay the aerial photographs with a grid, assign a volume and representative area to each point, and add them together for a total inventory volume. The purpose was to provide assurance to the investors that there was indeed enough wood to supply a pulp mill. Loomis also suggested moving the proposed area further west to include more of the coniferous timber, a step to which Ruben agreed. As Loomis recounted, it was on the strength of his map and volumes that Ruben was able to later get the St. Regis people interested.

Once St. Regis was interested they sent out (May 18-28, 1954) an inventory team of their own, directed by George Abel, one of their company foresters. As Stan Hart explained, "Our objective was to check out the area in general, particularly the accuracy of the stand-typing and volume estimates shown in the government cruise. It was really a very superficial look but it served the purpose at the time."⁴⁵ They used the sample plot system but used just a few plots in selected areas to confirm Loomis' data. Abel concluded his report with the comment: "The timber resources of this reserve offer a splendid opportunity for a sustained yield operation considerably expanded over that now contemplated."

Then, when the new Forest Management Agreement was signed in September 1954, St. Regis cruising parties were again sent out (Oct. 21- Nov.15, 1954) in a fourth round to locate possible cutting areas and to determine more precise estimates of volume. They also used sample plots but with higher-intensity sampling.



THE ST. REGIS RECONNAISSANCE PARTY, 1954. FRONT ROW L-R: JOHN MILLER, FRANK LADUC, GEORGE ABEL, BOB HYDE
BACK ROW L-R: STAN HART, DYER PHILLIPS, KNOLL VAN CLEAVE, PILOT TELEF VAASJO

STAN HART COLLECTION

When the decision was made in January 1955 to move the proposed mill location to Hinton, Loomis was again asked to draft a new map and prepare volume estimates for the new area based on his same system.

2.3 PREPARING FOR THE INITIAL FOREST INVENTORY

Limited data were available to the Company in 1956. The Alberta Forest Service had prepared province-wide aerial stand volume tables and forest type maps which provided a good start on the information needs. But more information was required specific to the new FMA and the Company set about to get it.⁴⁶ This was an ambitious task to tackle an area of about 8,000 square kilometres, a quarter again larger than Prince Edward Island.

The inventory maps prepared by Loomis were for purpose of broad planning for the initial mill proposal but were not sufficiently detailed for developing the management and operating plans required to initiate sustained yield forest management on the new Lease Area, but they had certainly been sufficient to determine the adequacy of the overall wood supply.

Loomis remarked to Huestis in a 26 April 1955 letter⁴⁷ that:

The most important requirement for the preparation of a sound sustained yield plan of regulation is a good inventory by species, types, sites, and age class from which sufficient information as to growth as can be readily derived. This must be obtained:

on a systematic basis if any true understanding of the growth and development of the forest is to be acquired. If we had been able to force PSC^{ix} into taking ages and growth figures on each of the plots, it would have been possible to correlate height classes with age and thus obtain a distribution of age classes.

This same type of analysis was conducted by Chief Forester Des Crossley and his team. Although their objectives were similar, they chose a different approach, one that worked very well for the Company. For their Management Inventory, the one on which the forest management plan would be based, they chose a Continuous Forest Inventory. They also needed aerial photographs at a larger scale than were available from the province and maps with sufficient planimetric detail to serve as a base for inventories and planning.

Action was initiated quickly. Aerial photography of the entire FMA was done in August 1955 under the direction of forester Philip Gimbarzevsky. The progress in marking the photos for the mapping template was remarkable. Mapping laydown started immediately following in November in their new office.



PHILLIP GIMBARZEVSKY DOING MAP LAYDOWN 1955-56

P. GIMBARZEVSKY COLLECTION

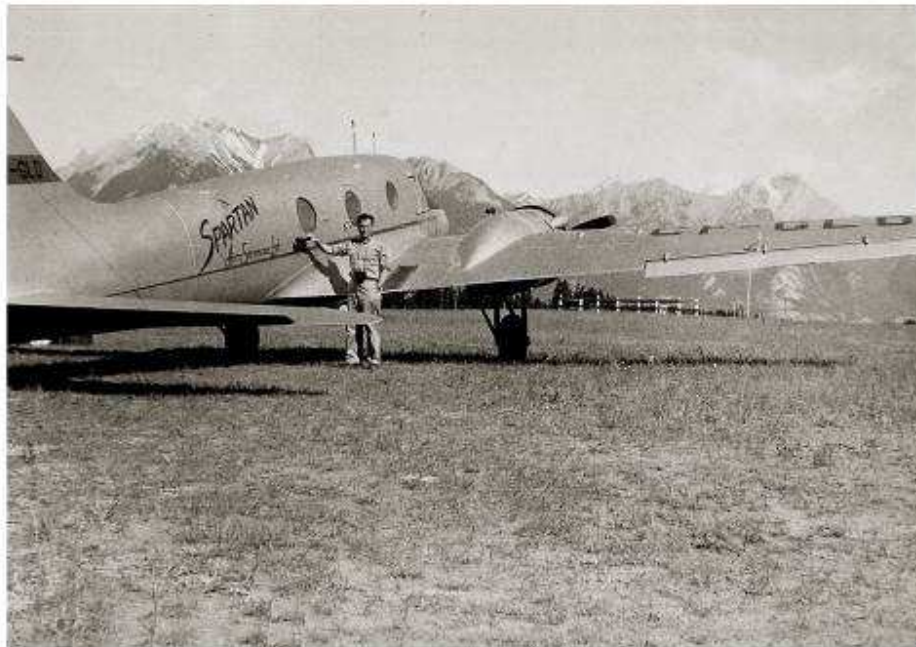
Crossley was able to report in October 1955 this impressive list of achievements.⁴⁸

Photogrammetry & Drafting

1. Principal points and conjugate principal points have been marked on all the glossy print photos of the Lease Area - total photos so marked total, 3200 out of a total of 3400.
2. The Lease Area has been photographed by Spartan Air Services with infra-red photos of a scale of 1 inch equals 1320 feet. Except for 200 photos, a complete set of double weight gloss photo have been received.
3. Five hundred (500) photos have been marked for ground control points.
4. Five hundred (500) photos have been marked for wing or pass points.

^{ix} Photographic Surveys Corporation -- Toronto-based consultants contracted in 1949 by the government of Alberta to do the forest inventory in the southern half of the province.

5. A complete, small-scale index map, showing photography flight lines, has been prepared.
6. Three complete townships (69,000 acres) have been forest typed and interpreted.
7. A11 photos have been indexed into boxes until more permanent storage facilities are available.
8. A new sketch map, at a scale of one-inch equals three miles, has been prepared showing the Lease Area and the Provisional Reserve Area. A11 alienated land and miscellaneous reserves are shown thereon.
9. Small scale maps, of a scale of one inch equals eight miles, have been prepared showing alienated land only, on one map, and on another, topographic detail in 1000-foot contours.
10. A standard legend has been prepared on tracing linen, to allow printing of such legend onto our standard map sheets of the Lease Area.
12. Layout of a standard map sheet, of a scale of one-inch equals 1320 feet, has been made on tracing linen.
13. A map, at a scale of one inch equals three miles, has been prepared showing a11 active and cancelled Timber Berths.



SPARTAN AIR SERVICES AERIAL PHOTOGRAPHY AIRCRAFT, JASPER AIRPORT 1955. P. GIMBARZEVSKY STANDING

PHILIP GIMBARZEVSKY COLLECTION

Crossley was evidently so impressed with the progress his team had made that at the end of this report he added: "The initial staff acquired has proved to be capable, congenial and industrious. It is strongly recommended that consideration be given to a review of salaries in order to bring them more in line with the responsibilities assumed."

During that same time a total of 12,500 ha at 1.2% cruise intensity^x had been covered by the operational cruisers. This was done on the Green Timber area between Highway 16 and Brule Lake - commonly called "Camp 1" when logging began - and an area around Peppers Lake. The operational cruise was done as a basis for logging planning and layout of cutblocks and cutting strips. It was therefore done at this more intensive level.⁴⁹

2.4 DEVELOPING AGE CLASS INFORMATION

Unless the age of forest stands is known, it is impossible to forecast how quickly they will grow. In 1956, very little was known about ages - except for the 20,000 hectares which burnt that year which were starting over again at age class 0. Crossley explained that this specialized inventory survey was one of their first projects.⁵⁰

Following the interpretation of forest types on the photographs the age classes were delineated. To the best of my knowledge this had never been done before, at least in this magnitude. The task was approached with the knowledge that our stands of spruce and pine were all the result of previous fires and therefore even-aged. Consequently the stand borders that were delineated on the air photos represented fire boundaries, and the date of each fire could be established by observing the bordering fire scars and the adjoining timber that survived the fire. The reason for this immediate age-classing program was to establish the location of the overmature and the decadent timber. It was our considered opinion that it was vital to harvest these as rapidly as possible in order to avoid the possibility of future insect infestations and disease epidemics, and to get such static areas back into wood production again. This justified a very concerted effort to establish this information so that it would be available as we proceeded with preliminary management planning.

Bob Udell⁵¹ described how the boundaries and extent of past forest fires were mapped between 1958 and 1961.^{xi} Forest technicians interpreted the apparent fire boundaries on aerial photographs and went to the field to sample and record the years of stand origin from tree ages and fire scars. At the interface between different stand ages, they searched for fire scars on remnant older trees. They then chopped notches into the tree until they found the point at which fire had damaged the tree and the fire scar originated. By measuring the years since the fire scar, they were able to identify the year in which the younger adjacent stand had originated.

Some stands were so old that stand succession had already taken place and this method did not work. These stands, because of mortality and decline combined with the ingress of shade tolerant species, contained a variety of ages of trees and were so noted.

^x Percentage refers to actual area of sample plots -- in this case 1.2% of the area was covered by sample plots.

^{xi} A similar project between 1968 and 1970 mapped the fire origin of the "expansion area" added to the FMA with the 1968 Forest Management Agreement

Four “Working Circles”, or sustained yield management units were established within the 800,000 ha forest. The age class information was used to stratify these units into Operating Compartments for priority of harvest entry. Each Operating Compartment was designed to contain roughly 500,000 cords of wood - sufficient to keep a 100 man camp of horse loggers working for 20 years. At 25,000 cords per year they would complete the first pass of a two pass clearcut system in 10 years, and return to harvest the remaining blocks in the second half of the period.



**FIRE SCARS ON PINE TREES ALONG AN AGE CLASS BREAK, BERLAND 14, 1970S
WELWOOD PHOTO COLLECTION**

2.5 CONTINUOUS FOREST INVENTORY

A limiting factor to the new operation was the absence of good information on forest growth and yield. This would have to be put in place before a good forest management plan could be developed. St. Regis sent John Miller, a growth and yield specialist, to Hinton to help develop the growth and yield program. Miller, building on his experience with permanent sample plot (PSP) programs in the St. Regis organization, set out a plan to install a similar system at the Hinton operation. (Jack Wright was actually offered the job first in 1955 but turned it down then because there was inadequate housing in Hinton for him and his family.) Jack Wright was recruited in 1956 from the Canadian Forest Service in Ottawa, and succeeded John Miller as Management Forester when Miller returned to St. Regis in 1958.

LINKING AERIAL PHOTO ATTRIBUTES TO STAND VOLUMES – CFS RESEARCH

Wright’s experience at the National Forest Management Institute with the use of aerial photographs in inventory, and the development of “aerial stand volume tables” -- linking interpreted features of species composition, stand density and height to volumes by type class -- had a major impact on the design of both management and operational inventories on the FMA area.

PERMANENT SAMPLE PLOTS

Between 1956 and 1961, 3000 permanent sample plots were established throughout the Forest Management Area as a “Continuous Forest Inventory” (CFI) program.⁵²

Jack Wright reported in his 1971 article (*Photo-point sampling for forest inventory*⁵³) for the Canadian Pulp and Paper Association (CPPA) that:

The history of timber cruising at North Western Pulp & Power Ltd. has been one of continuous evolution in technique. The original “Management Inventory” consisted of some 3000 permanent, one-fifth acre, sample plots established on a mechanical grid over the entire 3000 square miles of the original Lease Area in our “Continuous Forest Inventory” (CFI) program.

This new inventory would also provide the mensurational basis for the company’s sustained yield timber supply forecasting , or allowable annual cut (AAC). The basis for this new AAC approach was the Judeich Stand Method of even-aged forest management. Developed in Europe, it was reviewed by Crossley in a paper presented at the Annual meeting of the Woodlands section of the CPPA in Montreal in March 1959 -- *Continuous Forest Inventory and its Relation to Forest Management at North Western Pulp & Power Ltd.*⁵⁴ In this excerpt Crossley described the characteristics and objectives of CFI:

Because of the importance of accurate basic data and since we were starting from scratch, our Company decided to implement a Continuous Forest Inventory system. This method has been used in Europe for some time ... [Here] it is regarded as a perpetually recurring inventory which systematically samples the forest, and in which detailed records of individual trees on permanent, mechanically-located plots are analyzed and summarized by rapid electronic computing machines, providing up-to-date, comparable and business-like inventory reports.

The essential characteristics of this type of inventory are:

- a. Permanently located sample plots
- b. Plots established on a mechanical grid basis
- c. Permanently identified trees
- d. Refined measurements of both plots and trees, the measurement procedure being followed meticulously at all times.
- e. Use of modern electronic accounting systems for recording, computing and analyzing field data.
- f. Remeasurement of plots at frequent and regular intervals to furnish a guide to effective forest management planning.

Crossley also listed and described the three objectives they hoped to obtain from the CFI program:

1. *To provide an estimate of the timber volumes presently existing on our Pulpwood Lease Area, our Working Circles and our Compartments. This would be realized when the original inventory is analyzed to provide a picture of the growing stock and other data which can be incorporated into the management plan.*

2. To provide accurate figures on growth and yield by Working Circles. This objective would be partially realized at the end of the first inventory through the development or construction of empirical yield tables. However, as he pointed out, highly accurate tables would only result from the planned repeated measurement of the permanent plots.

3. To provide a picture of changing forest conditions. This also would involve plot remeasurements.

The plots, each 1/5 acre in size, were established in clusters of four on a two mile grid tied in to the Dominion Land Survey system.

Wright shed some light on the added values of the CFI system as NWPP designed it⁵⁵:

Since, at that time, the most widespread use of permanent sample plots in Canada, particularly by industry, was to gather growth and yield data for research purposes, many foresters questioned the advisability of a systematic distribution, disregarding timber typing, rather than a stratified sample layout. The answer was simply that at the time of establishment of the inventory, the forest cover type information and mapping program for the area had not been completed nor would it be by the time the establishment of the approximately 3,000 CFI plots was complete. Therefore the forest inventory was available some five years earlier than it would have been had it been a stratified rather than a systematic sample. Since the sampling was done on a systematic basis, area expansion factors could be applied to provide information on area distribution by major forest cover type, age, and crown density classes, not only for the Lease as a whole but for each of the five working circles and for the individual compartments within each working circle.

In Udell's discussion of working conditions⁵⁶ during this first management inventory he reminisced:

Establishing this Continuous Forest Inventory system was not easy. Road access was limited to old logging roads, roads to the soon-to-be abandoned Coal Branch towns, oil and gas exploration roads, plus the early road network being established by the Company in support of its fledgling logging operations. Four wheel drive Land Rovers were purchased and used by the field parties to get as close as possible to their work. When these could go no further, they walked, with the aid of snowshoes in winter. In the early sixties, an early trail bike known as the Tote Gote was used in summer, and Bombardier brought out a new machine called the Snow Toboggan, the prototype snow machine. These improved travel times considerably (although, surprisingly enough, not overall production per man-day).

Crews scavenged a variety of accommodations in the field. These included Company and Timber Berth logging camps, the Mercoal Collieries (still active in 1956-57) bunkhouse, Forest Service patrol cabins, abandoned log cabins of trappers or loggers, and tents. Field supplies were kept in the Forestry storeroom in the Administration Building, and rigorously tracked by the Forestry Secretary.⁵⁷



CRUISERS CHRIS PARMETER AND RON WHYTE ON TOTE GOTES, EARLY 1960S – WELDWOOD PHOTO COLLECTION

ADVANCES IN DATA COLLECTION – COMPUTER TECHNOLOGY

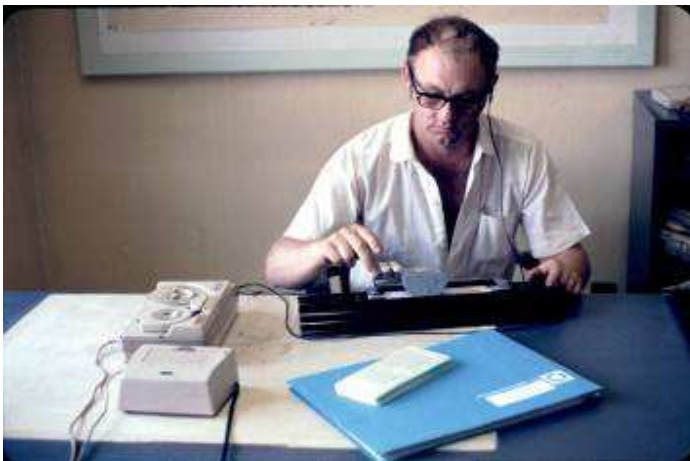
Throughout this period the foresters were relentless in their pursuit of new technologies to improve the efficiency and cost of field and office work. This led to one of the earliest adaptations of computer technology to forest management.

Plot data were recorded in the field on IBM “mark sense” cards which were collected and sent to the IBM processing centre in Michigan for compilation. Beginning in 1956, they were compiled at the IBM Service Centre in Edmonton - 107th St. and 100th Ave. In the early 1960’s the Company pioneered the development and use of tape recorders to collect field data. The tapes were taken back to camp and the data transferred to IBM “punch cards” using an IBM Model 001 Manual Key Punch (leased to the Company for \$7/mo including service by Bill Redpath, IBM Service Centre Manager at the time). This speeded up the work considerably, as well as preserving the cards. Later, the Company bought two “Wright Line” manual key punches for use in field trailers.

Jack Wright initiated this unique approach while he was actively involved in the fieldwork, later presented as a paper:⁵⁸

In January, 1961 investigation commenced into the applicability of portable tape recorders for field tallying permanent sample plot data. Several makes and models were studied and the most interesting was satisfactorily tested in March under varying winter conditions to extremes of -35 degrees F. It was purchased in April and has since been used continuously in the field by one of our Continuous Forest Inventory crews.

This machine has given complete satisfaction and has reduced the crew size from three men to two. Since the cost of this recorder is the equivalent of one tally man's salary for one month, and maintenance after nine months of operation has been nil, the dollar saving is obvious. While the total number of plots tallied per week is slightly less than with the conventional three-man crew due to the time spent transferring the data from the tapes to the IBM cards (a maximum of one day per week) production per man-day is higher with the tape recorder since there is little difference in the amount of work completed per day on the plot between the two types of crew.



FORESTRY SUPERVISOR RAY RANGER TRANSFERRING DATA FROM TAPE RECORDERS TO IBM CARDS USING IBM MODEL 001 MANUAL KEY PUNCH.

WELDWOOD PHOTO COLLECTION

After the tapes had been transcribed it was important to erase them completely before reusing them, lest previous tallies return to the record. Wright described how they did this by recording music on the used tapes. In this way the data on the tapes were completely obliterated. In the meantime, the crews could enjoy their favourite music in the bush until the tapes were needed again.

In the plots, each tree was measured to provide information on total height, diameter and species, vigour, % sound, as well as any damage from insects, disease or physical damage. Average height and height weighted by merchantable volume were calculated from the measurements. Crown density and forest type were interpreted from aerial photographs.

2.6 OPERATIONAL CRUISING

Frank Laduc, one of the St. Regis foresters involved in the 1954 timber reconnaissance's, stayed on to help set up the "operational" inventory and cruise program. The first 'Operational' cruising method for logging planning, adopted in 1955, was conventional "Mechanical Strip Cruising" with a 2.5% cruise

intensity and a resulting volume accuracy of $\pm 25\%$ ^{xii}. Since the objective in volume estimation was to be within $\pm 10\%$ of actual scaled volume this system was modified in 1958 to vary the sampling intensity according to forest cover-type using a table of stand factors. This table indicated the sampling intensity necessary in each of the various cover types to achieve this objective in light of its inherent variability. This system, while it did result in an overall reduction in cruise intensity did little to increase the accuracy of the volume estimation since in many of the smaller types it was impossible or impractical to establish the required number of plots.⁵⁹

In 1960 “Wedge-Prism Cruising” was introduced using a stratification technique similar to that adopted in 1958 with the conventional strip cruising. This type of sampling is also known as “variable-radius plot sampling.” The cruiser holds a specially calibrated prism over a point on the ground, and circles around it counting each tree that is partially contained within the prism refraction. The number of trees is then multiplied by the “prism factor”, i.e. the number of square feet each tree so recorded represents, to arrive at a basal area per acre. This, multiplied by the average height of the stand, produces the volume per acre.

While this reduced the manpower requirements and hence cost and offered certain advantages in that the men involved became more familiar with the stand conditions, the desired accuracy could still not be consistently assured.⁶⁰ The tendency to use prisms with too high a factor (20 factor vs. 10) likely caused the accuracy to slip. Ideally, the prism factor should be such that it captures 10 to 12 trees per plot.

Shortly thereafter, aerial stand volume tables were developed which allowed the interpolation of stand volumes based on the interpretation of aerial photography. Wedge prism cruising was used to supplement the fine type information, especially in reconnaissance work.

2.7 AERIAL STAND VOLUME TABLES

The Company prepared Aerial Stand Volume Tables^{xiii} which were designed to provide volume information based on stand features interpreted from aerial photographs. This approach provided the foundation upon which the management inventory could be prepared for the entire FMA.⁶¹

“Fine-Type Cruising” using locally prepared aerial stand volume tables had been initiated in late 1961. With the completion of the “Management Inventory” in the spring of 1961 it became apparent that a considerable amount of stand information which could be directly related to aerial photographs was available. The construction of reliable local aerial stand volume tables from permanent sample plot (CFI) data held the key to improved and simplified methods of cruising.

These Aerial Stand Volume Tables (AVST) were derived by linking stand characteristics which could be interpreted from aerial photographs to corresponding volume summaries derived from CFI plot analysis.⁶² Interpretation of the CFI plots was undertaken and aerial stand volume tables based on major species combinations, crown density class, and average stand height (weighted by merchantable volume) were prepared in 1962.⁶³ This work was done by Jack Wright based on his previous experience at the Forest Management Institute with Cy Seeley, Canada’s leading pioneer photogrammetrist. By

^{xii} Statistical term, expressing that the estimate of volume is expected to be within 25% of the actual volume.

^{xiii} ASVT's used Type class, Density, and Average height of the stand weighted by merchantable volume (equivalent to average height of dominant and co-dominant trees in the plot/stand). Height had the largest influence on volume of the three variables used.

1963 a revised forest type map and management inventory for the entire FMA was completed.



TIMBER CRUISER PETE DZWENKO USING A HAGA ALTIMETER TO MEASURE TREE HEIGHTS ON A CFI PLOT, 1963. NOTE THE TAPE RECORDER PACK ON HIS BACK

WELDWOOD PHOTO COLLECTION

In the spirit of adaptive management Crossley noted⁶⁴:

Here the forester will be provided with data which will enable him to continually refine and adjust the management system to actual forest conditions. The analysis and comparison of our measurement with previous ones will help to establish significant trends and will point up weak points and malignant situations in the forestry program. For example, it is important for us to know more about the trend toward normality^{xiv}, particularly in young, overstocked stands of lodgepole pine. We need to know which densities at each immature age class will reach pulpwood merchantability at rotation age, all others will require some form of stand treatment.

Yield tables are developed empirically at first and are used to apply the rate of growth by species. As measurements are repeated the data will improve and, consequently, yield tables will be continually revised. As our figures on annual increment become more firm, so will our figures on allowable annual cut.

The stand and stock table data from the I. B. M. listings will form the basis for any stand improvement work that may be contemplated.

As a further innovation, the volume data were used immediately in the construction of local aerial stand

^{xiv} Normality -- more equal distribution of areas of forest in each age class over the rotation age.

volume tables. He noted presciently that eventually, through the use of these tables, together with accurate type maps, they hoped to be able to largely eliminate the conventional operational ground cruise. And as further application of adaptive management through observation and measurement Crossley described how:⁶⁵

The residual volumes encountered on previously harvested areas will provide us with basic information on past silvicultural treatments. As the inventory is repeated it will present a broad picture of the effect of our own cutting methods on regeneration, erosion, site conditions, species composition, blow down and so on. For example, it is expected that the percent of hardwoods on our limit will generally increase. The Continuous Forest Inventory data will allow us to follow any such trend and will perhaps suggest the action to be taken should we wish to prevent, minimize or perhaps even encourage it.

Wright added comments on the CFI system as NWPP designed it:⁶⁶

One concession that was made to those advocates of stratified sampling was to move the plots in the field a sufficient distance so that the entire plot was located within the type in which the plot centre fell (usually one chain forward or back along the bearing from the cluster centre). This of course disturbed those proponents of systematic sampling but enabled us and others to use the CFI plots for many related and non-related studies.

The initial establishment of the 3,000 plots was completed in five years and soon after the inventory had been completed and the management plan for the Lease prepared, it became evident that the future value of these plots lay not in the preparation of future inventories but in the calculation of growth and mortality by major cover type and ten-year age class as well as preparing and updating localized yield tables.

2.8 FINE TYPE AND MANAGEMENT INVENTORIES

To adapt these aerial stand volume tables to "Operational Inventory" requirements it was necessary to interpret the areas on "fine-type" maps. Fine-typing meant interpreting forest cover types to a minimum area of 0.5 acres (0.2 ha) to be inventoried to the same minimum-area standards as the permanent sample plots were, and classified through interpretation.

By 1963, landform mapping and site classification were completed for the lease area. Photo interpretation, sampling systems and volume tables were refined to the point where annual harvest volume estimates had a margin of error of less than 10 per cent. All operating compartments scheduled for harvest were "fine typed."

In "fine typing" a skilled photo interpreter, using matched pairs of photos and a stereoscopic viewer, mapped the boundaries of forest stands directly on the photos. These stands were generally interpreted to ten-foot (three-metre) height classes and further refined based on proportions of tree species present and the density or trees per acre of the stand. These stand boundaries and type classes were then transferred directly to topographically corrected maps, the areas by type class calculated, and volume summaries prepared using various tables derived from permanent sample plot and other analysis.



DRAFTSMAN ED STARKO USING A STEREO PLOTTER TO TRANSFER DATA FROM INTERPRETED PHOTOS TO A MAP BASE, CA 1960

WELDWOOD PHOTO COLLECTION

From that point, on-the-ground cruising (using the wedge-prism method) was only used to supplement results from photo interpretation. One experienced technician could then prepare the operational inventory for the entire year's harvest -- about 1.25 million cubic metres -- a task that formerly required 10 people working in the office and the field.⁶⁷ In addition to the reduction in manpower the accuracy of the volume estimate increased from $\pm 25\%$ to better than our goal of $\pm 10\%$.⁶⁸

This approach to operational inventories continued until the late 1960's. At the time, the Company was switching its management inventory system from *Continuous Forest Inventory* using its permanent sample plot system, to *Photo Point Sample* based on interpreted photo points at 1200m (40 chain) intervals.

This section would not be complete without a brief discussion of the various height classifications used in inventories up until the 1990s.

The original "fine type" maps prepared for the 1949 forest inventory recognized only four height classes (0-30, 31-60, 61-80, 81+ feet) and did not provide any age-class information. The Company adopted a more precise, but still "broad" height classification for its management inventories up to and including the 1991 forest management plan, i.e. five height classes (0-30, 31-45, 46-60, 61-80, 81+ feet) and included age class information. This information was interpreted from 1:40,000 photography.

Company "fine type" maps for operational inventories were interpreted to 10 foot height classes, and interpreted from 1:20,000 photography.

Beginning with the 1999 forest management plan, both management and operational inventories were based on the Alberta Vegetation Inventory standard with heights interpreted to 1 metre intervals.

2.9 EARLY GROWTH AND YIELD ANALYSIS

The 1961 and 1966 forest management plans and their annual allowable cut calculations were produced using CFI data as the core source of both growth and inventory data. Empirical growth data were derived from CFI plots which were used to develop volume/age curves grouped in 10-year age classes. Current volumes were projected to scheduled time of harvest using an 80 year rotation length; a change from a 100-year rotation to an 80-year rotation was approved in 1964, leading to the 1966 management

plan revision and increase in AAC. All compilation was done by hand. The 1966 annual allowable cut (AAC) in current metric units was 899,316 m³ per year on a net productive FMA area of 650,430 hectares. This meant the estimated average AAC per hectare could be shown as 1.38 m³/ha, a nominal increase over the 1961 plan which was calculated to be 1.07 m³/ha.⁶⁹ The nominal increase was a result of change in rotation age, and the resulting acceleration of cut necessary to achieve full harvest of the landbase in the defined “rotation.”

2.10 PHOTO-POINT SAMPLING (PPS)

In a 1971 paper, Jack Wright⁷⁰ reported:

Timber cruising both for “Operational Inventory” and for “Management Inventory” has always been a costly, monotonous and time-consuming experience. Our company has been constantly searching for a method that would eliminate much of the traditional field work and compilation by making more use of the aids and information already available.

The system recently adopted and described in this paper combines the information available on aerial photographs with data from past inventories to produce a cheap and reliable inventory system. This method can be applied to both general and more intensive inventories simply by varying the sampling intensity.

In 1968, a new Forest Management Agreement was signed, essentially doubling the size of the forest estate. The Company faced the challenge of developing a reliable inventory for management planning on the expanded landbase without adding another 3300 permanent sample plots to its network. Since the forest types and stand structure on the expansion area were similar to the existing FMA the yield tables already available were considered reliable. All that remained was to develop a statistically reliable yet cost-effective inventory procedure.

Updated aerial photography was then available. By overlaying a mechanical grid of sample points on the new photos, interpreting the stand type at each point for major species and age class group, and applying the appropriate yield table data, a reliable inventory could be accomplished.⁷¹ This methodology was similar to that used by Loomis in developing the first preliminary inventory in 1952. It also appeared to hold promise for operational inventories.

In 1968, as a test, 59 cutblocks were inventoried using the “fine type” approach and compared to PPS methods. Although the type maps were already prepared, five man-days were needed to calculate the areas by cover type and calculate the volume using aerial stand volume tables in the fine-type approach. A 600 m (20 chain) grid of photo points was superimposed on the same area, and the cover types listed at each point, then the volumes compiled based on the proportionate area of each type. A discrepancy of less than 1% was found, while manpower needs were cut by more than half. This technique also avoided the largest sources of error in fine type maps, i.e. errors in the definition of stand boundaries and their transfer to maps, and errors in measuring and calculating areas for each type so classified. At that point, the Company abandoned fine typing of operating compartments in favour of the PPS system, using the 20-chain grid which provided the necessary inventory reliability at that scale.

When Jack Wright became Chief Forester in 1975, Bob Udell was brought back from Ontario and became Forester in charge of Inventory and Management.⁷² Udell used PPS for inventory for the 1977 and 1986 Management Plans (using a 1200 m or 40-chain grid) and for operational inventories (using a 600 m or 20-chain grid) until demands for more detailed stand information evolved. The 1960 and 1966

detailed FMP used the CFI plots as the inventory system -- 1/5 acre plots on a one-mile grid throughout the FMA. By switching to interpreted photo points on a 1200 m (40 chain or ½ mile) grid, the samples were effectively quadrupled. The more efficient inventory methods allowed four times the number of samples to be used at a compartment, or operational level, and thus a higher level of certainty and reliability of the data was gained.

This method of operational inventory continued until the early 1980s, when the demands for more specific information on a block by block basis encouraged a return to the traditional fine typing method of volume calculation.⁷³

2.11 PERMANENT GROWTH SAMPLE (PGS)

By 1970 the first remeasurement, on the planned five-year cycle, of the 3000 CFI plots was completed. This provided the first important indication of rates of growth. However, this approach to obtaining forest inventory data was proving to be more expensive than anticipated. The second re-measurement, which commenced in the fall of 1970 was aimed at providing reliable growth information in the range of age classes where it is most needed, and was changed to a 10-year return period. At this time the system was renamed the Permanent Growth Sample (PGS) to represent its continuing purpose. Harvesting crew were instructed, when encountering CFI plots, to log right through them. The Company had a policy of re-establishing these sample plots ten years later in the new regenerating forest to provide valuable comparison of the new with the original stands. Additional emphasis was also placed on locating new plots in young fire origin and regenerated stands where they were not well represented in the age class distributions.⁷⁴

For the first time clear evidence pointed to a significant influence of stand density on subsequent growth and yield of lodgepole pine. Des Crossley described this, in 1975 as suggesting “an explosion of juvenile growth rates” with significant future implications for increased AAC and growth modeling. The investigations led the Company to the decision in 1972 to refocus the program to primarily gather growth and yield information. It was renamed the Permanent Growth Sample program.

In later years, this combination of old stand/ new stand information on the same plot site has proven invaluable in comparing the growth rates of fire origin versus reforested sites. Examination of successive measurements on the same plot centre has shown a dramatic increase in growth rates on the regenerated forest landscape. This is attributed to early stocking levels. Fire origin stands, which can come in at stocking levels of up to 1 million trees per hectare, grow like overstocked carrot patches for a long time. Regenerated forest stands, typically established at levels of less than 10,000 trees per hectare, distribute the growth potential of the site on fewer stems which thus can achieve their optimum growth potential instead of fighting for survival with thousands of other seedlings.

The data from the PGS plots, many of which have been measured four times (2000), represents the largest repository of growth and yield data on lodgepole pine in North America. In 2001 the company maintained 3200 of these plots, with over 10,000 measurements. These data were supplied to the British Columbia Forest Service to form the core of their lodgepole pine volume tables for interior British Columbia. Besides basic information on stand growth and yield, the dataset supplied invaluable information on tree diameter distributions which were used in the design of the new sawmill at Hinton.

⁷⁵

2.12 FORECASTING GROWTH AND YIELD

PGS growth information was used in the 1977 FMP to produce empirical yield curves - based on point-in-time measures of volume per unit area. From these volume/age curves, average increase in volume per 10-year period - growth factors - was used to forecast stand growth, and the intersection of Current Annual Increment (merchantable volume growth/year) and Mean Annual Increment (average merchantable volume growth/10 years) was used to determine "rotation age." See Figure 1.

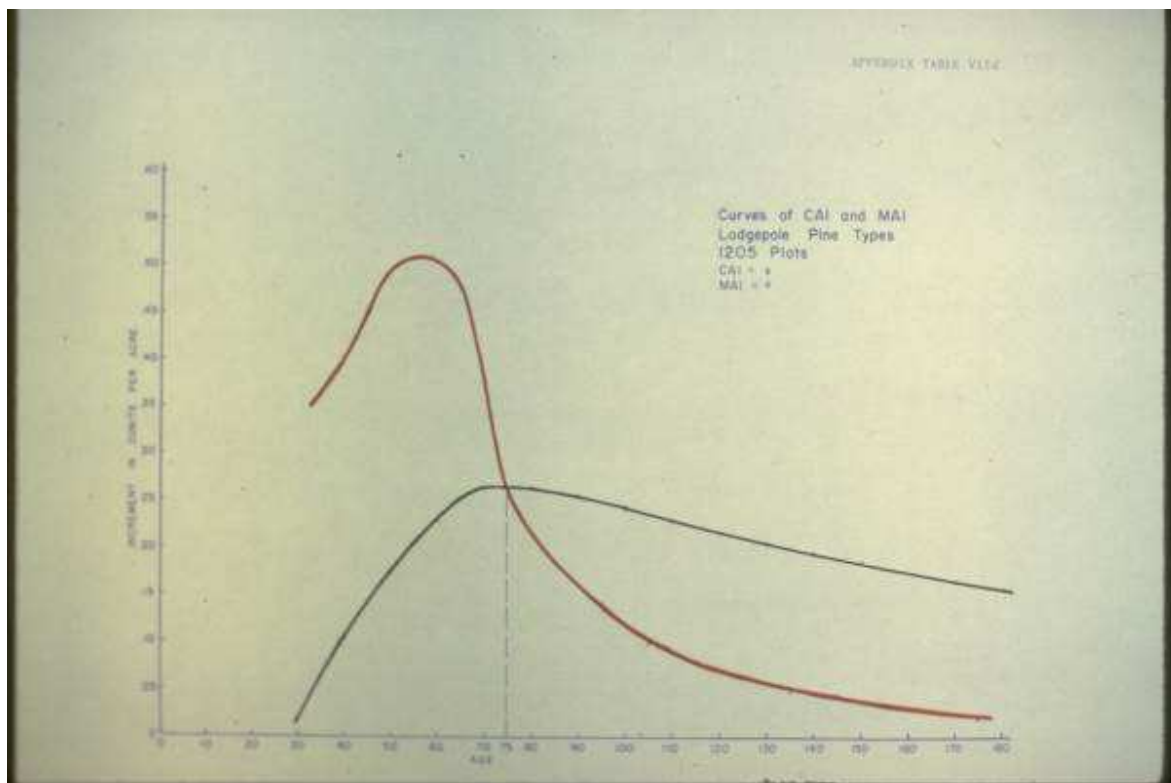


FIGURE 2-1 CAI/MAI CURVES, 1977 FOREST MANAGEMENT PLAN

In 1986 a major advance in growth and yield took place. Bob Udell representing Champion Forest Products (Alberta) Ltd. and Dick Dempster, W.R. Dempster & Associates co-authored an award-winning paper describing the growth and yield projection for 'regenerated' lodgepole pine.⁷⁶ Their concern with the current methods used at that time was "...if the regenerated stands grow at the same rate as indicated by the empirical yield curves, a reduced allowable cut occurs. The reduction derives from the fact that they will be harvested at a younger age (and resulting lower yield) than the natural stands which have been harvested at ages well beyond rotation, with higher equivalent yields." Company foresters knew from PGS plot observations that regenerated stands were growing at rates that exceeded those of natural, fire-origin stands. Equally significant, it was obvious from PGS plot analysis of successive measures that fire origin stands were also growing at rates far above those indicated by

traditional empirical yield curves. The challenge was to quantify these changes and develop an effective, reliable method of forecasting future growth.

Bob Udell described the background to this:⁷⁷

In 1985, the Company initiated a paired plot stem analysis project which made direct comparisons between the growth rates of lodgepole pine in regenerated stands and those of fire origin stands. By this time, there were many locations throughout the FMA where older reforested lodgepole pine was growing adjacent to uncut fire origin lodgepole pine on the same sites. Dominant trees in both stands were felled and sectioned along the length of the stem. This provided detailed information on a direct comparison basis between the development of lodgepole pine growing on sites with the same inherent growth potential, but arising from different reforestation treatments -- one from fire, the other from man. (Figure 2)

The resulting analysis showed that, on average, the young lodgepole pine stands arising from reforestation would result in stands 25% taller than the fire origin stands at maturity (figure 3). This pointed to a dramatic increase in stand volumes.

At the same time, measures were taken of the height growth of the dominant (top height) stems in the five and ten year periods above breast height. Accurate formulae were developed to use these measures to forecast subsequent height development of both fire origin and regenerated lodgepole pine. This method of forecasting was based on earlier work done in red pine in the Lake States⁷⁸, and is known as the Growth Intercept approach to forecasting stand development. (Figure 3)

This work was reported at the 67th annual meeting of the Canadian Pulp and Paper Association in January 1986⁷⁹. It was widely circulated and the growth intercept approach to site index forecasting became a standard practice in lodgepole pine growth and yield in western Canada.

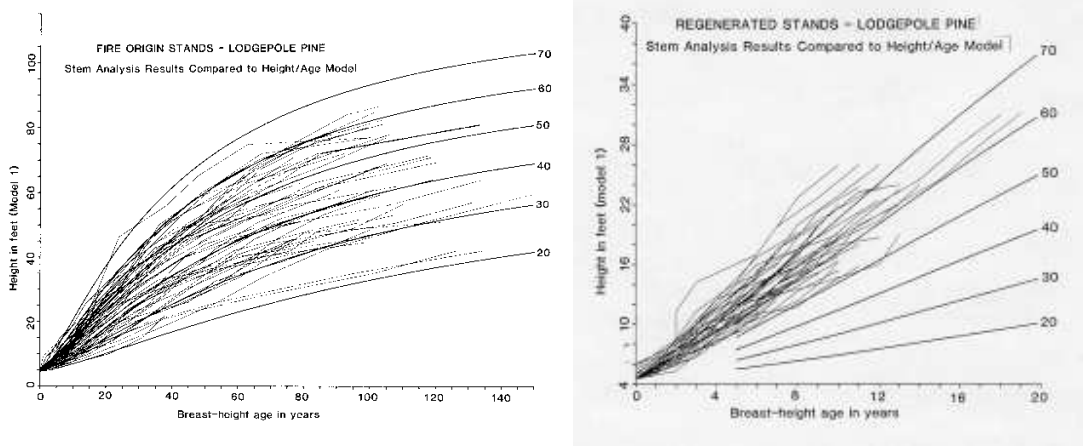


FIGURE 2-2 STEM ANALYSIS OF FIRE ORIGIN AND REGENERATED LODGEPOLE PINE FROM EQUIVALENT AND ADJACENT GROWING SITES

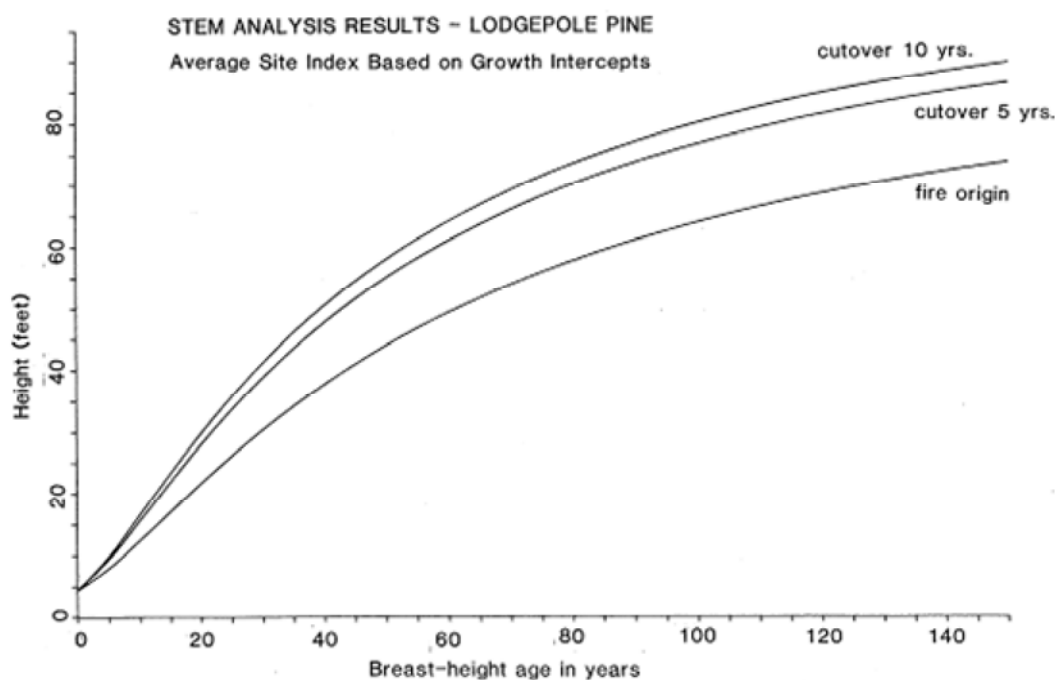


FIGURE 2-3 AVERAGE REGENERATED STAND SITE INDEX EXCEEDS THAT OF FIRE ORIGIN STANDS

As a check against these estimates, growth intercepts and dominant heights were measured on permanent sample plots in regenerated lodgepole pine stands. The growth intercepts were used to forecast the stand heights, which then compared to actual heights with remarkable accuracy. Udell and Dempster demonstrated, through PGS data from 18 plots established after harvesting, that "the future yield of regenerated stands will surpass that of natural stands of lodgepole pine."

Foresters spend a lot of time quantifying the growth performance and volume production of forest stands and trees. Computer-based models are developed which use field measures of such factors to reliably forecast the future development and volume yield of similar stands. Two such models being evaluated were the Tree and Stand Simulator (TASS) developed by Ken Mitchell and Jim Goudie of the BC Ministry of Forests, and the Stand Projection System (SPS) developed by Jim Arney of Washington State University. Both were stand-based, as opposed to tree-based models.⁸⁰

In the period 1975 to 1985 major emphasis was placed on PGS plots and the growth and yield data bank which had become the largest repository of lodgepole pine growth and yield data in North America^{81,82}. During this period Mitchell and Goudie borrowed the Weldwood PGS data to develop and calibrate their own lodgepole pine yield curves. In return they used the data to calibrate the Timber and Stand Simulator (TASS) model for the FMA. The model needed substantial further work because it did not function well for mixed stands which characterize regenerated stands on the Weldwood FMA. Jim Arney's Stand Projection System (SPS) was also being examined as a possible model for mixedwood stands.

Information from the permanent sample plot program was used in the 1986 forest management plan revision to more accurately forecast the development of both fire origin and regenerated stands over time as the basis for the sustainable allowable annual cut (AAC). Dempster developed a new model - the Forest Yield Projection System - which was used to develop an AAC for the FMA. This was the first computer-based model used by the Company to calculate AAC. Predicted average AAC per hectare increased as a result the refined data with this system from 1.72 m³/ha/yr in 1977 to 2.31 m³/ha/yr in 1986. This increase is attributed to better information on fire origin and regenerated stand growth performance used in the AAC forecast.

For the 1991 Management Plan an additional 10% AAC was justified by applying growth-intercept measurements to all regenerated pine stands on the FMA older than 10 years (Regenerated Stand Inventory) and applying resulting height growth projections to Aerial Stand Volume Tables⁸³. For the 1991 plan, methodology moved away from setting a traditional rotation, and employed an advanced computer simulation model ATAMO. ATAMO was based on the FORMAN optimization model developed in eastern Canada, but adapted to the two-pass compartment-based system used at Hinton. This in-house development made it possible to consider and compare the yield effects from a wide variety of alternative harvest levels and management strategies.

For the 1991 plan, explicit analysis of wildlife impacts arising from forest management activities was impossible. Appropriate wildlife and wildlife habitat information was lacking, and models of this kind were only in the early stages of development. One such model was developed by Drs. Jim and Barbara Beck of the University of Alberta for the Hinton FMA. Their "CRITTERS" model was used to give a reasoned preliminary evaluation of the impacts.⁸⁴

2.13 INCREASED INVENTORY DEMANDS FOR THE 1991 FOREST MANAGEMENT PLAN

Sean Curry took charge of the inventory in January of 1988. His immediate focus was on specific needs for the expanded FMA. He soon found himself not only adopting the new Alberta Vegetation Inventory (AVI) Standard but adding enhancements. Closer attention was paid to stand height and species composition within it. Also, more understory information was added to serve wildlife, harvest operations and silviculture needs. All map and attribute (volume tables, diameter distribution tables) information is contained within the Geographic Information System (GIS), established in 1993, to make it more readily applicable.⁸⁵

In the 1991 forest management plan revision, field crews conducted a Regenerated Stand Inventory on all regenerated stands older than 10 years throughout the FMA. Direct measures of Growth Intercepts were taken on all the lodgepole pine stands sampled in this survey. By combining the Growth Intercept methodology for height development forecasting with Aerial Stand Volume Tables for lodgepole pine, better yield forecasting for regenerated stands was built into the allowable annual cut calculation, contributing another modest increase in allowable annual cut.

Growth intercept work combined with other research into the growth and yield of mixed wood stands continued through the 1990's, both independently by Weldwood and in a co-operative project with Weyerhaeuser Grande Prairie. The prime objective of this research was to develop reliable *Managed Stand Yield Tables*. These yield tables were needed to reflect the very different growth and yield patterns of regenerated stands, quite distinct from those of fire origin stands.

Among the differences which had to be accounted for were:

- a. Originating at lower stocking levels, individual trees in regenerated stands have proportionately more nutrient available to them, therefore their height development is faster than those in fire origin

stands. This phenomenon was beginning to be well understood and predictable through such research as the *growth intercept* work. Current fire origin yield tables were used to forecast stand volumes and, because of the accelerated height development, resulted in higher yields per hectare at maturity.

- b. Similarly, since there are fewer trees competing for nutrients and other growth factors the individual trees develop girth at a faster rate than those in fire origin stands. This has been compared to the development of carrots in overstocked vs. thinned out patches. This development was not well understood, and was the focus of a lot of the current research. Fire origin yield tables did not reflect this phenomenon of regenerated stand development, therefore they tended to underestimate the forecast of merchantable volumes at harvest age. Nailing this down through growth and yield research was a very high priority, particularly as companies began to implement enhanced forest management programs.
- c. Because regenerated stands develop at lower stocking levels, there is considerably more diversity in both tree species on the site - including potential competitors such as aspen - and also more brush and herbaceous species growing beneath the canopy. This has positive implications for biological diversity on the regenerated landscape as well as potential downsides for timber management due to competition from non-preferred species. Neither of these was well understood and both required continuing research.⁸⁶

Following the 1993 completion of the new HI-ATHA sawmill, and the ramping up of operations to full allowable cut in the early 1990's, the determination of volumes and species size class distributions on a block basis became more critical. This need led to refinements of the fine typing system.

By 1992 wildlife habitat inventories had begun, in support of the development of specific wildlife habitat plans. Fisheries and bird inventories were accelerated after 1992 in the Foothills Model Forest (FMF) program, as well as by Weldwood itself⁸⁷. It is interesting to note that wildlife biologist John Stelfox, then with the Alberta Department of Lands and Forests, had the foresight to start a set of permanent sample plots for vegetation and browse on the early logging in Camps 1, 5 and 9. His objective was to determine the effects of logging on ungulate habitat and use. This study was supported by the Company and a 40-year remeasurement was recently completed.

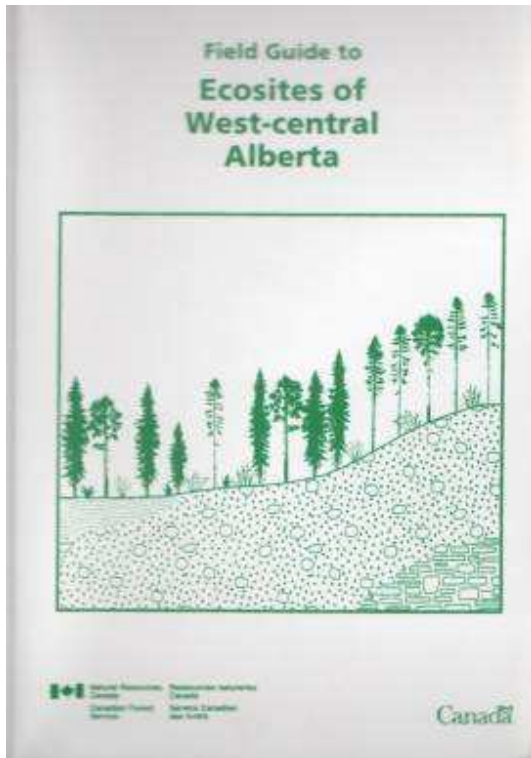
2.14 ECOLOGICAL SITE CLASSIFICATION

The "Crossroads" report, a 1993 internal examination⁸⁸ of silviculture needs for the FMA clearly identified the requirement for an ecologically-based planning system, as opposed to a primarily timber-based one. Through an ecological approach logging planners, biologists and silviculturists could together develop the best plan for an operating compartment using a common language and information base.

Davis Presslee, already an expert in such classification in British Columbia, took this as a personal challenge. Earlier work by Dr. Ian Corns of the Canadian Forest Service had developed an ecosite classification guide for West Central Alberta. Corns agreed to work with Presslee and Foothills Model Forest to update and adapt the guide to better suit local conditions and needs. Consultant John Beckingham and Harry Archibald of the Land and Forest Service joined the team and the new guide was produced in 1996⁸⁹. This work was largely supported by Weldwood through its Forest Resource Improvement Program (FRIP) funds.

The development, understanding and application of ecological site classification systems is critical to the further advancement of growth and yield research and knowledge. Herein lies a major contribution of

the Model Forest Program to forest management. The Model Forest adapted earlier work by Ian Corns^{xv} of the CFS to produce an ecological site classification system for the West Central Region. Use of the system allows foresters to more accurately forecast inherent growth potential of the site, while providing information on other vegetation and habitat values.



THE 1996 FIELD GUIDE

FOOTHILLS MODEL FOREST

The first trials of the developing system in 1994 covered 74,000 ha. Harvest planners, biologists and silviculturists were extremely pleased with the results as all aspects of planning were improved. A second 100,000 ha prototype in 1995 was equally successful, and operational classification of the FMA (1,012,000 ha) began in 1996. By 1999, approximately 400,000 ha were done. By mid-2001 this number increased to 637,000 ha and the completion date for the entire FMA was scheduled for 2003. A parallel project to classify each of the Company's 3200 permanent sample plots was completed by the end of 2001.

Integrated planning based on this common platform became mandated -- one of Presslee's lasting legacies. This new ecosystem-based inventory was initiated on the FMA to provide a database for integrated resource management and to support modelling of different management scenarios for enhanced (intensive) forest management aimed at increasing the AAC. This inventory also supported the move to ecosystem management at the landscape level in the 1999 Management Plan, as well as providing important wildlife habitat information.⁹⁰

The information provided by the ecological site classification informs planners evaluating the most effective harvest and reforestation system to use for an area. In addition, it provides guidance in selecting those sites in which investments in intensive forest management may be fruitful.⁹¹

^{xv} Beckingham/ Corns/ Archibald field guide replaces earlier Corns/Anas Field Guide

2.15 THE DEVELOPMENT OF FOREST INVENTORY SYSTEMS: MANAGEMENT INVENTORIES

Inventories are clearly essential first steps to forest management planning. Over the 45 years of experience and learning on the Hinton operation inventory systems have been improved and many new aspects have been added.

FOREST MANAGEMENT PLANS: 1961, 1966

In the early years of the Company's operations at Hinton, the permanent sample plots provided the inventory information (Continuous Forest Inventory) for the forest management plans (1961, 1966). These plots, 3000 in total, proved sufficient for a basic timber inventory for broad scale management planning purposes. But the continuous measurement of the 3000 plots at ten year intervals was an expensive program.

FOREST MANAGEMENT PLANS: 1977, 1986

In 1968, the Company was facing the new challenge of conducting a management inventory of an expanded FMA which had gone from 3,000 square miles to 6,000 square miles. A management inventory of the expanded FMA was critical to the development of a new management plan. Time and money precluded the expansion of the permanent sample plot system to the larger landbase. A grid of photopoints at 40 chain intervals was superimposed on an existing working circle where PSP's provided the inventory. These points were interpreted and compared to the PSP inventory, with remarkably consistent results at a fraction of the cost and time. As a result of this trial, the decision was made to use the *Photo Point Sample* system for management inventories from that point forward. Not only did this promise a timely and effective inventory but it supported the decision to refocus the permanent sample plot system exclusively to developing growth and yield information.

The promised expansion of the operation at Hinton did not happen, and the FMA reverted to its original size, but the *Photo Point Sample Plot Inventory* remained as the management inventory for the 1977 and 1986 management plan revisions.

THE 1991 FOREST MANAGEMENT PLAN

In 1988, the Company signed a new FMA expanding the landbase from 800,000 ha to 1,012,000 ha and began planning for the new forest management plan which was necessary as a result of the expanded operation. Two new imperatives forced a re-evaluation of the inventory approach.

- research on growth and yield pointed to the need for better inventory and growth measurement of regenerated stands
- expansion of operations to fully use the allowable annual cut demanded specific inventory information in detail on upcoming operating compartment.

As a result, two new inventory systems were added to the traditional photo point sample inventory

- a *Regenerated Stand Inventory* was conducted on all reforested stands older than 10 years, some 100,000 ha. Detailed stand typing as well as growth intercept measurements were used to not only define the characteristics of the new stands, but also forecast their growth and yield development.
- *operational or fine type inventories* were done on approximately 300,000 ha of upcoming operating compartments. This inventory supported not only the forest management plan but also provided specific stand detail required for planning forest operations and forecasting product mix to the new pulpmill and planned sawmill

Photo point sampling at the 40 chain grid completed the inventory on 600,000 ha.

THE 1999 FOREST MANAGEMENT PLAN: A COMPLEX CHALLENGE IN FOREST INVENTORY

Management level inventories have become increasingly complex since the *photo point sample* system was introduced in 1968. Effort and detail contained in them eclipses any previous inventory and is well beyond anything being done by any other company in Alberta, or elsewhere to our knowledge.

This complexity was driven by a number of factors

- a. increasing knowledge in growth and yield (regenerated and fire origin stands) demands site-specific forecasting
- b. large areas of reforested stands (and immature fire origin stands) which require specific and detailed information
- c. management plans must incorporate a variety of forest values
- d. increasingly precise information on forest and tree characteristics is critical to the success of the new pulpmill and sawmill
- e. inventories must be spatially referenced and stored in the Company's Geographic Information System

To support this need, the Company spent over \$2 millions on forest inventories for 1999 FMP, plus about \$1 millions on wildlife and fisheries inventories. A many-layered inventory process was used, including:

- a. An ecological site classification was being done of the entire FMA - focusing initially on upcoming operating areas. 637,000 ha were completed by mid-2001 with the final completion scheduled for 2003. This system supports modeling needs for not only enhanced forest management, but also for integrated resource management.
- b. Fine type inventories to *Enhanced Alberta Vegetation Inventory* standards on upcoming operating areas, approximately 300,000 ha. (1 m height classes, intensive ground checks)
- c. Conventional *Alberta Vegetation Inventory* typing on about 570,000 ha. (1 m height classes, extensive ground checks).
- d. Detailed *Regenerated Stand Inventory* typing on "high risk" regenerated stands (risk relates to competition from other species) in the Lower Foothills ecoregion of the FMA - 60,000 ha
- e. Standard *Regenerated Stand Inventory* typing on "low risk" regenerated stands in the Upper Foothills and Subalpine ecoregions of the FMA - 70,000 ha
- f. Wildlife and fisheries inventories being conducted by the Company through Foothills Model Forest
- g. A visually sensitive inventory of viewsapes along major travel routes
- h. A recreation inventory of the FMA area
- i. A cultural and historic inventory
- j. Hydrologic inventories and analysis

The 1999 Management Plan (described in more detail in Chapter 11) incorporated new managed stand yield tables using an improved growth-based approach to yield determination. It did not include AAC uplift projections from the Enhanced Forest Management (EFM) Program -- but it set the stage for detailed work to prove up EFM contributions to growth and yield for use in interim planning and the FMP of 2008.

The 1999 FMP was a much more integrated resource plan than any preceding one and was the first plan in which the entire enterprise was linked intimately with the relationship between assumptions – many of the growth and yield-driven -- and field performance based on the Linked Planning Process.⁹² The 1991 plan offered the intent to explicitly link wildlife and forest management strategies but the delivery of this integration had to wait until the 1999 plan. As Bob Udell noted earlier: “differences between the 1991 plan and what is going to be done in 1999 are like the differences between night and day.”⁹³

On the other hand, the range of necessary inventory information for sustainable forest management has greatly increased to include many forest-related values. Computer capabilities and innovative programs have made these inventories possible, but the human resources and time needed to do them has almost trebled for the 1999 plan. This is shown in the summary of human resources for the broader management inventories, illustrated in Figure 4 and Tagble 2-1.

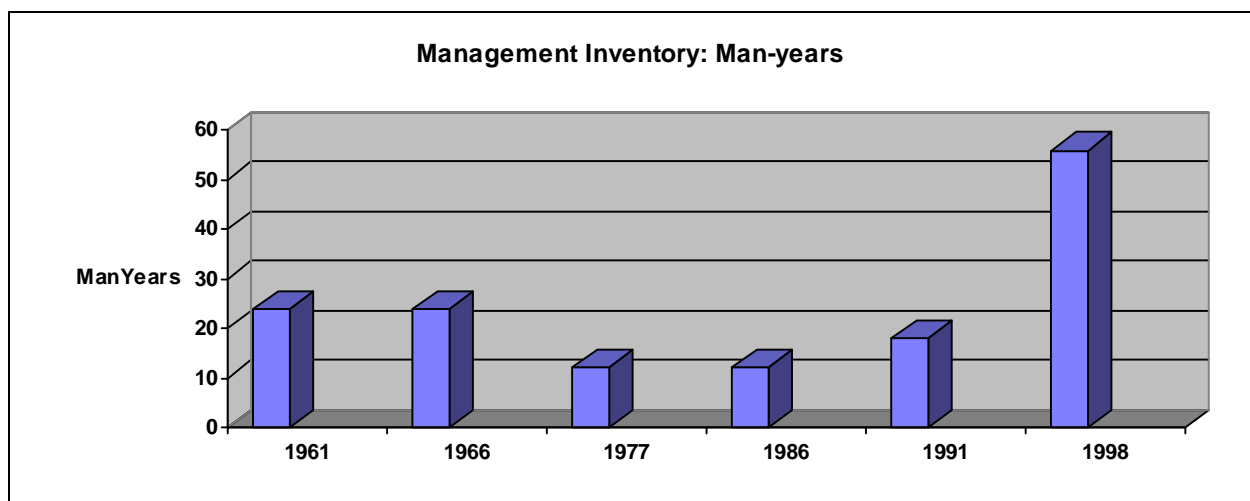


FIGURE 2-4 MANPOWER REQUIREMENTS FOR MANAGEMENT INVENTORIES – 1961-1998

TABLE 2-1 THE EVOLUTION OF MANPOWER REQUIREMENTS FOR MANAGEMENT INVENTORY

1961, 1966	24 man years to measure 3,000 permanent sample plots (800,000 ha) ^{xvi}
1977, 1986	1 man year to photo interpret 12,000 photo points (800,000 ha) 11 man years to maintain PSP system (150 plots/ yr).
1991	$\frac{3}{4}$ man year to photo interpret 9,000 photo points (600,000 ha) 2 man years to conduct Regenerated Stand Inventory (100,000 ha) 4 man years to fine type near term operating compartments (300,000 ha) 11 man years to maintain PSP system (150 plots/ yr)
1998	15 man years to fine type to Alberta Vegetation Inventory standard (540,000 ha) 10 man years to fine type near term operating compartments to enhanced AVI standard (330,000 ha) 10 man years to ecologically classify near term operating compartments (330,000 ha) 5 man years to conduct detailed Regenerated Stand Inventories (60,000 ha) 5 man years to conduct other Regenerated Stand Inventories (70,000 ha) 11 man years to maintain PSP system (150 plots/ yr)

2.16 THE DEVELOPMENT OF FOREST INVENTORY SYSTEMS: OPERATIONAL INVENTORIES

Inventories of the timber resource have been refined through the application of technology and statistical analysis. Estimates are now made more quickly and more precisely, and incorporate a great deal more information about the volume and quality of the trees. Development of computer programs has certainly made many more kinds of calculation possible. The net result is that the time needed for operational inventories for wood supply has been considerably reduced, as described in the summary of human resources for operational inventories and illustrated in Figure 5.

The permanent sample plot system was neither designed, nor ever used, for operational planning purposes. Beginning in 1955, conventional "strip cruising" was used to estimate volumes in planned operating blocks for the annual operating plan.

In 1960, use of Wedge Prisms was introduced to provide similar information to the strip cruise at much lowered cost. The accuracy was not much better, partly because of the tendency to use prisms with too high a factor inappropriately (20 factor vs. 10).

^{xvi} $\frac{1}{2}$ plot/ man-day requires 6,000 man-days. At 250 man-days/ yr = 24 years.

Shortly thereafter, aerial stand volume tables were developed which allowed the interpolation of stand volumes based on the interpretation of aerial photography. Wedge prism cruising was used to supplement the fine type information, esp. in reconnaissance work.

This approach to operational inventories continued until the late 1960's. At the time, the Company was switching its management inventory system from *Continuous Forest Inventory* using its permanent sample plot system, to *Photo Point Sample* based on interpreted photo points at 40 chain intervals.

In 1968, as a test, 59 cutblocks were inventoried using the "fine type" approach. Although the type maps were already prepared, five man-days were needed to calculate the areas by cover type and calculate the volume using aerial stand volume tables. A 20 chain grid of Photo Points was superimposed on the same area, and the cover types listed at each point, then the volumes compiled based on the proportionate area of each type. A discrepancy of less than 1% was found, while man power needs were cut by more than half. This technique also avoided the largest sources of error in fine type maps, i.e. errors in the definition of stand boundaries and their transfer to maps, and errors in measuring and calculating areas for each type so classified.

This method of inventory continued until the early 1980's, when the demands for more specific information on a block by block basis encouraged a return to the traditional *fine typing* method of volume calculation.

Following the construction of the new Hi-Atha sawmill, and the ramping up of operations to full allowable cut in the early 1990's, the determination of volumes and species/ size class distributions on a block basis became more critical. This need led to refinements of the *fine typing* system. The Alberta Vegetation Inventory Standard was adopted, with enhancements. Closer attention was paid to stand height and species composition within it. Also, more information was derived from the *ecological classification*. This information is vital from both a wildlife, harvest operations and silviculture perspective. The *ecological classification* supports a new planning process introduced in 1996 whereby harvest planning and silviculture planning were done at the same time. All map and attribute (volume tables, diameter distribution tables) information were contained within the Geographic Information System. See Table 2 and figure 5.

TABLE 2-2 THE EVOLUTION OF MANPOWER REQUIREMENTS FOR 800,000 M3 OPERATIONAL INVENTORY

1955: 120 man months to strip cruise

1960: 50 man months - wedge prism cruise

1961: 4 man months - fine type inventory

1966: 1 man month - photo point sample inventory

1986: 4 man months - fine type inventory

1996: 8 man months - fine type inventory to AVI standard plus Ecological Classification - map & inventory data contained within GIS for easy tabulation/ modification

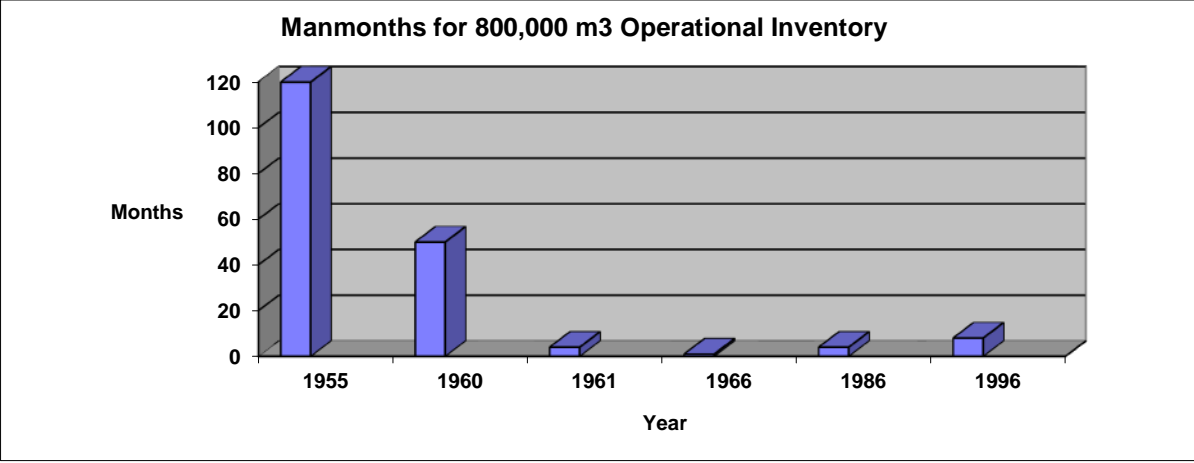


FIGURE 2-5: MANPOWER REQUIREMENTS FOR 800,000 M3 OPERATIONAL INVENTORY – 1955-1996

CHAPTER 3 - SILVICULTURE AND FOREST RENEWAL

“ ... in my career, I've gone through where I saw the forestry side as being the conscience of the company. I'm starting to believe that the smart companies are seeing that the renewal of forest resources is their future. The forest is their business and if they are not linked and strongly looked after, you will not be ensuring the long term survival of the business...effectively in the past ...the loggers logged and the silviculturists came in later and fixed it up. Silviculture was more a rehabilitation operation rather than integrally linked. We weren't practicing a silvicultural system, we were logging and reforesting. It wasn't a linked system, so the Pre-Harvest Prescription we envisaged is that the harvesting and the silviculture had to be intimately linked.”

David Presslee⁹⁴ 1997

ACKNOWLEDGEMENTS

The practice of silviculture lies at the heart of any sustained yield forest management system. As well, silvicultural regeneration methods have a profound impact on other forest values, including those of biodiversity. Silviculture has therefore been an important consideration by the Weldwood Hinton operation -- from the very moment the 1954 FMA Agreement was signed by the two initial partners of St. Regis Paper Co. Ltd. and North Canadian Oil Co. Ltd. The philosophy of silviculture has permeated Company operations and has involved a large number of individuals.

It is therefore not surprising that many people have also been involved in writing this Chapter 3 Silviculture and Forest Renewal, and that so many others who have contributed to its content. **Bob Udell** not only initiated this history project but wrote a significant portion of the text for this chapter; and contributed his outstanding “corporate memory” to ongoing editing and identifying gaps in the narrative. Earlier drafts were prepared from the extensive list of documents by silviculturist **Lorne Brace** and forestry consultant **Colin Bamsey**, and we have drawn heavily on their material. Several staff contributed through personal interviews, among whom were two historical ones with **Des Crossley** and **Reg Loomis**. Others related to silviculture included **Hugh Lougheed**, **David Presslee**, **Diane Renaud**, **Bob Udell** and **Jack Wright**. The section on Tree Improvement was written by **Diane Renaud** and forest genetics consultant **Dr. Sally John**.

Writer, editor and communications consultant, **Bob Bott** contributed of his considerable editing skills while also reducing the volume for a more concise publication. Forest historian **Bob Stevenson** contributed from his impressive collection of historical and contemporary photographs to better illustrate the story.

Two individuals, in particular, warrant special recognition. **Jack Wright** was at the leading edge of forest management and silviculture throughout his 30-year career with the Company. Jack not only contributed through his interviews but more importantly by reviewing successive drafts of this and other chapters to make corrections to dates and events, and to add succinct text for omissions, most of which have been included.

David Presslee (1952-2000) had a tragically shorter career with the Company at just nine years. However, when he arrived at the end of 1991 he came with a rich background of silvicultural experience in British Columbia on which he expanded in Alberta. Above all, he brought with him a passion for the practice which he displayed with great enthusiasm. David contributed significantly to advancing

silvicultural practice both within the Company and in Alberta. He was also a keen supporter of this history project and kept feeding and inspiring us with ideas throughout the time he was with us.

To this outstanding aggregate of contributors -- many thanks.

PREFACE

The development of the practice of silviculture by the Company was its most profound and lasting contribution to forestry in Alberta. Until the Forest Management Agreement of 1954 and setting up of the Woodlands Division and Forestry Department in 1955 forest regeneration remained a concern of foresters but there was no legal requirement to ensure that it followed after logging. Forest harvesting was designed to try to encourage it, and fire control attempted to protect what grew, but it was not until the Company committed to forest regeneration as a contractual requirement was the practice of silviculture taken seriously. The year 1955 also represented a change in commitment to silviculture by the Alberta government. However, Company foresters with their mandate, dedicated leadership, corporate resources and competent staff with the opportunity to focus on their FMA led the way.

With the assurance that forests could, and would, be renewed and forest productivity sustained, then it became worthwhile for the Company to invest intellect and funds to undertake the other innovative work that led to improved inventories, growth and yield studies, integrated land use planning and sustainable forest management for a broader range of values and products. These followed, but they were built on the assurance of forest continuity that successful silviculture was able to provide.

3.1 INTRODUCTION

The 1954 Forest Management Agreement was unique. If we had to select its single most distinguishing feature, it would have to be the requirement that the Company ensure regeneration of its cutovers to achieve sustained yield forest management. For the first time in western Canada a company was required to practice silviculture as a condition of its lease to harvest timber.

By this time there was a modest body of scientific knowledge on which to draw, but the Company had to develop its own working practices to encourage regeneration and to ensure that the seedlings survived and grew to create the new forest. Besides the legal requirement to do this, for the task to be successful required a spirit of commitment to the long time-scales involved. Fortunately, as discussed earlier, that spirit has been clearly evident among both Company and government forestry practitioners.

The science and art of growing forest trees is called *silviculture*. The terms *silvics* and *silviculture* are defined as follows in *Silvicultural Terms in Canada*, a 1995 publication of the Canadian Forest Service⁹⁵:

Silvics - The study of the life history and general characteristics of forest trees and stands, with particular reference to locality factors as a basis of silviculture.

Silviculture - The theory and practice of controlling the establishment, composition, growth, and quality of forest stands to achieve the objectives of management.

These definitions are based on the 1971 terminology authorized for the Joint FAO/IUFRO Committee and published by the Society of American Foresters.⁹⁶

The term *silviculture* has roots similar to those of *agriculture* -- silviculture dealing with forested rather than cultivated lands. The word is derived from the Latin word *silvaticus* which means "of the woods, wild." That, in turn, is believed to stem from Silvanus, a Roman god of the woodlands.⁹⁷ Silvanus is a spirit of the wood and forest land lying outside the agriculture clearing, said to retain an "impish"

character. This spirit, as described by C. Bailey in his *Phases of the religion of Ancient Rome*⁹⁸ “... might be hostile, if neglected, but, if ... duly placated and receives the offerings which [he] requires, will be friendly and give the worshipper health and prosperity.” The description is a fitting analogy to the care and attention that must also be offered to the successful practice of silviculture, and to the benefits which accrue.

In Alberta, as noted earlier, silviculture and forest renewal were not really considered until the start of the Dominion Forestry Branch in 1899. Dominion regulations on timber berths stipulated a diameter limit, a stump diameter below which trees could not be felled.^{xvii} The intent was that the residual trees would grow faster in the full sunlight and also provide seed to regenerate the stand. Too often the residuals were damaged and many blew down. The result was typically a very slow regeneration of trees. This problem was recognized by Dominion foresters such as H.R. MacMillan⁹⁹ and T.W. Dwight¹⁰⁰, but changes were a long time coming as a result of bureaucratic conflicts within the Department of the Interior and a lack of budget for applied silviculture. However, research in silviculture and forest renewal was begun in Alberta by the DFB in the late 1930s and through the 1940s, largely at Kananaskis. Des Crossley’s work on both spruce and lodgepole regeneration into the early 1950s was notable and lead to major changes in practice.

It is interesting that when Crossley became Chief Forester in 1955, he was able to immediately apply his scientific findings with great success. In the meantime, the Alberta Forest Service, particularly at the instigation of Reg Loomis and Charlie Jackson, was undertaking regeneration trials and advocating a higher profile for silviculture. The new foresters hired in 1949 and placed in field positions gradually assumed these responsibilities. Silvicultural practices grew in parallel within the company and in the province as a whole. The Weldwood story, in many respects, is a microcosm of the story of silviculture in Alberta, a saga to which the company foresters contributed immensely. Their techniques drew on historic practices in Europe and eastern North America. But their practices reflected innovative approaches to managing local species under Alberta conditions, not only adapting other practices but also contributing to the scientific base of silviculture in Canada.

3.2 EARLY DAYS IN FORESTRY: 1956-1964

REFORESTING FOR SUSTAINED YIELD

In all forests trees grow, eventually die, and are renewed through a variety of mechanisms. In this region forest fires have been the major cause of mortality and the forests have developed a variety of renewal strategies. Sometimes the natural succession after a fire, insect infestation or logging is directly to trees. This is particularly the case with lodgepole pine and black spruce with their abundant seeds stored in fire-resistant cones. It is also the case with poplars which have the ability to re-sprout from root stocks. In other cases seeds have to blow in from residual or adjacent trees -- such as white spruce and balsam fir. In these stands sometimes the vegetation passes through a grass phase, a brush phase, a deciduous or mixedwood forest and finally to a coniferous forest again.

Harvesting trees is not the same disturbance as a forest fire but there are similarities in the vegetation that grows in immediately after either disturbance. Silviculturists, those foresters charged with maintaining the cycle of establishment, growth, harvest and re-establishment, don't always wait for all those phases to run on their own. Their initial task is to create conditions or help ensure regeneration to conifers occurs right after harvest.

^{xvii} Stump diameter: tree diameter measured 12 inches from the ground. Diameter limits were variable, usually in the range of ten to fourteen inches.

The initial forest management agreement signed by Frank Ruben in 1951 included mandatory Sustained Yield Management (SYM), consistent with provisions in the recently-enacted new Forests Act (1949). This Agreement would lead to the first Alberta industry to accept this obligation and honour it with a full program of forest management anchored on a progressive reforestation program. Full reforestation of all areas harvested was required within 10 years.

During his tenure as Chief Forester 1955 to 1975 Crossley was passionate about achieving SYM through successful reforestation - preferably natural means. He insisted on counting every seedling, no matter how small, during the course of the regeneration survey. By today's standards, that seems unreasonable, but he was also convinced - and conducted studies that proved it - that "ingress" of seedlings into reforested cutovers would continue for years after the surveys, replacing non-survivors. This is a function of his commitment - not to mention the necessity - to extract every penny of value from the silvicultural dollar spent.

Subsequent events have shown this to be false economy, but it represented current understanding of the day. Crossley would have been the first to change this approach were he still at the helm of the program today. Had the Company persisted in this definition of an acceptable seedling it would have tens of thousands of hectares of NSR to deal with today instead of the current "no backlog" status.

CHOICE OF REPRODUCTION METHOD - CLEARCUTTING

Reforestation is closely tied to the harvest system used. For example, the old selective cutting based on a diameter limit created fairly cool, shady conditions for seedlings trying to get established underneath the remaining trees. This is a condition more suitable for spruce or fir regeneration than for pine. But selective cutting was not a regeneration system. It was primarily a harvest method of convenience. In a few cases it resulted in increased growth as well as regeneration. However, in most cases the residual stand was left in a damaged condition, regeneration was spotty, and the seed source was typically from the less vigorous and genetically inferior trees.

Spruce, primarily due to its tolerance to shade, often forms stands with trees of varying ages (multi-aged), whereas pine loves the sunny conditions created after a devastating forest fire, and tends to establish an entire forest all within a few years of the fire, therefore the whole stand consists of trees of the same age (even-aged).

Today as then, most of the natural spruce on the FMA are in stands of even aged origin (94%) with only 6% multi-aged, mainly old spruce-fir. Converting even aged stands of spruce to uneven aged stands presents a real challenge. This is exemplified today, where silviculture foresters are attempting to effect this conversion in riparian areas through light partial cuts.

Reg Loomis¹⁰¹ noted that in 1955 he and Charlie Jackson from the Alberta Forest Service,

... spent a lot of time out there trying to get them to cut the way we thought should be proper silviculture -- good forestry. And one of the things we thought would be better, and I certainly did, was to selective cut. You know, no clearcut at all. But it was almost impossible for Des, who didn't agree anyway.

Loomis' beliefs stemmed from observations on the family farm in the eastern townships of southern Quebec, and his experience with the many untreated clearcuts he saw during his early career in Ontario and Nova Scotia. What impressed him most, in a positive way, was the 25-acre patch of forest on their farm that had been left as a natural forest by his great-grandfather. The forest had been logged by him selectively for sawlogs to build the original house and barn. Loomis recalled when the barn burned down when he was a young man and had to be rebuilt. He returned home to help, explaining¹⁰²: "We

got logs out of the 25 acres that was standing. We picked the mature, mostly coniferous trees -- selectively -- and they were cut and hauled to a mill and sawed, and my father built a barn that was 100 feet by 40 feet. It was two stories. It was built in such a way that there were no beams in it."

Then in the mid 1930s when the bank threatened to close the mortgage on the farm because they had been unable to pay the interest. Loomis said he went to the little forested area again: "... and we cut trees -- all mature, coniferous too -- hauled them -- sold them to the nearby sawmill. And I managed to straighten that [mortgage payment] out before I left. So that was twice that I know of that there was a heavy cut. And the last I knew, that 25 acres was just... like it was when my great-grandfather had it. So you could sustain an area with various ages and various species in the same area."

However, as Des Crossley¹⁰³ explained:

... we had been able to convince the Forest Service that the type of timber stands in the limits were all even-aged, that clearcutting was therefore obligatory in spite of the fact that what had been used in the past in the Province was a diameter-limit system with 50% volume removal, or a marked system to the same end. Such harvesting removed "genetically superior" trees, leaving the smaller, but inferior trees to form the next harvest.

REGENERATION--"NATURALLY"

Given that clearcutting was the harvest system chosen for these even-aged forests, and natural regeneration was significantly cheaper than seeding or planting, the reforestation effort focussed on ensuring an adequate seed supply and suitable seedbeds for germination. Natural regeneration, employing post-harvest site preparation, was adopted as the primary regeneration method for both pine and spruce, with planting or seeding as the backup regeneration method.

Seed supply came from two sources: cones present in the logging slash after logging, and from trees in the adjacent stands of mature, seed producing trees. Spruce cones open on the tree during the early autumn and seeds are carried by the wind into the adjacent cutover. One of the challenges of relying on naturally-disseminated white spruce seed is the so-called "periodicity" of cone production. A crop of cones is grown each year, and the seed is shed in the fall. However, in most years only a few cones are produced, not enough to effectively regenerate adjacent areas. Only at intervals of seven to nine years do spruce grow abundant crops of cones, referred to as "seed years", that will broadcast enough seed to both feed the rodents and birds with enough left over to grow seedlings.

Different cutblock sizes and shapes were tested for effectiveness in providing seed for natural regeneration and to prevent soil erosion and windthrow of the trees to be left. The system for spruce was to be 50 percent removal in alternate strips perpendicular to the wind, and for pine, 50 percent removal in rectangular blocks on relatively flat areas and irregular patches on rougher ground. There was also provision for up to 95 percent removal for pine, with seed blocks left that were one and two ha in size.

Pine cones from harvested trees were left scattered throughout the cutblock. Unlike spruce, the seed will stay in these pine cones until high temperatures, greater than 50⁰ C, break the resin seal and the cones open up. These conditions occur generally in two ways: in the tree crowns during forest fires, or else when the cones are lying close to bare ground where a combination of direct and ground-reflected heat from the sun provides the necessary heat to break the resin seals and allow seeds to fall out.

Natural regeneration may also be achieved in a number of other ways. These include direct seeding, coppicing (native hardwoods sprouting shoots from the stump after harvest), suckering (native

hardwoods growing shoots from the root system after disturbance) and layering (black spruce growing a new tree from a live branch buried in organic matter), and by protecting existing understory. These are also planned and practised as regeneration strategies on some areas.

SITE PREPARATION FOR REFORESTATION

The seedbed for regeneration after a fire is typically an ash covered mineral soil, not an thick cover of dry moss and leaves (duff) as found in a cutover area. Early attempts at natural regeneration by seeding brought out the fact even if sufficient seed was available, seedlings could not survive unless their roots got down to the moist mineral soil below the duff. Site preparation or "scarification" was done to break up the duff and expose mineral soil for the seed to germinate on and grow in.

A variety of equipment that was available at the time was tested including the Flecco Rake, Brush Rakes, V-Blades, Athens Disc^{xviii}, etc. In 1957 it was decided to opt for the new generation of wide-tracked, high powered crawler tractors and a Company-designed toothed blade to break down the slash and residue, baring the mineral soil and thus preparing a more receptive seed bed..

Most tractors at the time did not have the power necessary for the job at hand, as Jack Wright noted: "We tried D-8s but they didn't have enough power and had to keep backing up. You don't make money going backwards, so we got in touch with Dick Corser^{xix} who had a D-9". With its greater power the D-9 could keep moving ahead despite slash and stumps". Because the Company was targeting its oldest age classes for the first harvests, the stands harvested had heavy slash, lots of dead trees and wood on the ground.

The Company continued to work on designing a better scarification plough, eventually producing the later-named "Crossley scarifier", consisting of three small "V-ploughs" on a T-bar at the front of the D-9 tractor. By 1958, while it was still being refined in use, it was creating the desired 60% mineral soil exposure for natural seeding.



D-9 CAT WITH CROSSLEY PLOUGHS

WELDWOOD PHOTO COLLECTION

^{xviii} The first three of these pieces of equipment were front-mounted push-type rakes designed primarily for land clearing for agriculture. The Athens Disc was a pull-type large-disc plough.

^{xix} Dick Corser was an independent contractor from a long-established lumbering family on the Coal Branch.

This was fine for seed from nearby spruce trees, but the cone-bearing slash needed to be pulled into the furrows so the seed could drop directly onto the soil. Bob Ackerman from the Canadian Forest Service suggested dragging something behind the cat for this purpose, which evolved into use of a spreader bar with a combination of anchor chains and cat pads – soon changed to just spiked anchor chains – pulled behind the tractor. Both the scarification blade and the drags underwent several modifications up until about 1965 when the final design was adopted. It became the standard scarifier for natural regeneration until it was supplemented with a variety of other tools in the late 1980s.



CHARLEY JACKSON (AFS), REG LOOMIS (AFS) AND DES CROSSLEY EXAMINE EARLY SCARIFICATION DRAG AND SPREADER BAR, LATE 1950S
WELWOOD PHOTO COLLECTION

Wright¹⁰⁴ further recalled,

St. Regis commenced woods operations on its Forest Management Area in 1955 and regeneration techniques from the beginning involved the preparation of a proper seedbed by scarification. From a knowledge of history and research of harvesting and regeneration techniques on the East Slopes, it was abundantly clear that regeneration of white spruce and lodgepole pine to acceptable stocking levels within the time constraints of 10 years, as referred to in the Agreement with the Crown, would depend upon the preparation of a receptive seed bed. It was also our policy that every acre that supported a merchantable stand worth harvesting at maturity in the first rotation was also worth regenerating to produce at least as valuable a crop in succeeding rotations.

While the plough and drag combination worked well and gave satisfactory results on about 70% of the stands being harvested, there were certain conditions where it was ineffective:

We decided that the drags were only necessary in areas where pine cones were relatively scarce such as in the very old pine stands and along skid roads and landings. In spruce stands and in pine stands closer to rotation age where there was no shortage of cones, the well-spaced furrows created more favourable microsites when the ploughs only were used and consequently the drags are no longer used in such stands.

The next such condition was the very moist, deep duff, up to 24 inches in depth, which had built up in the old "Climax" spruce-fir stands of high elevations. The furrows made by the scarification ploughs frequently didn't penetrate the heavy slash and duff to reach mineral soil and where this was accomplished, the duff layer merely fell back

into the furrow behind the tractor. In 1965 we began a program of angle dozing or “blading” this material off into compressed windrows in the spring of the year as the snow was melting and when the duff layer could be peeled off to the still frozen mineral soil.”

MEETING THE REFORESTATION STANDARDS ON ALL CUTOVERS

The Annual Allowable Cut calculation was based on bringing all cutovers back into fully productive forests within ten years. Over time, reforestation standards were developed which required that cutovers be stocked to a minimum standard with established seedlings of acceptable species by 10 years after harvest. A valid survey was required to measure stocking (the number of trees and how they are distributed) by year 7, with remedial action taken if necessary by year 10. In order to be considered established, a spruce seedling must have been growing on the site for three years, or in the case of pine, two years.

The intention was to scarify as much of the cutover as possible within a year of harvesting, and by 1966, 40% of the 30,000 ha cut since 1956 had been scarified. Sixth-year regeneration surveys of blocks cut from 1956 to 1960 showed only 27% not sufficiently restocked (NSR) on scarified ground but 98% NSR on unscarified areas, proving the effectiveness of scarification. Crossley knew that in order to meet the policy of sustained yield management, he must address the NSR issue. The “Camp 1” area west of Hinton, where harvest and reforestation began exemplifies both the silvicultural and perceptual or social challenges this presented.

The stands at Camp 1 were old, even aged white spruce which had developed over time in a harsh, dry, wind-blown and loess-capped Montane forest site. Reforestation by natural means was expected from seedthrow arising from uncut residual stands in an alternating cut/leave strip pattern at right angles to the prevailing wind. Various strip widths were tested to evaluate the effectiveness of seedthrow. Reforestation was a challenge, not only because of the harsh growing conditions but also because of the periodicity of the seed crops in white spruce, typically ranging from seven to nine years. In the intervening years between crops, as harvest proceeded the cutover strips became invaded with grass and shrubs which also challenged reforestation. But, in the end, with adequate site preparation and supplementary planting, virtually all of the initial cuts were fully reforested.

Second pass cuts presented more of a challenge because of the removal of natural seed sources from standing mature timber, as well as their sheltering buffer from the unremitting winds. Because of the loss of standing seed sources, second pass cuts were without exception planted, mainly to white spruce. Attempts to plant pine in this high pH^{xx} calcareous soil proved fruitless and were abandoned. Also, the removal of the sheltering adjacent strips presented problems with seedling survival in the harsh, windy sites. This was successfully addressed in 1976 when the Company purchased its first Bracke scarifier^{xxi} and used it at Camp 1 to scoop out planting “scalps” wherein seedlings were planted on the lee side of the prevailing wind.

^{xx} The glacial silt (loess) is largely derived from the limestone mountains, giving the soil a high pH -- a high alkalinity.

^{xxi} The Bracke scarifier is a Swedish invention. Pulled behind a wheeled skidder, the machine features a pair of chain-driven mattock wheels about 2 m apart which scoop out depressions in the soil, depositing the material as an inverted cap adjacent to the excavation. Depending on soil moisture and vegetative competition conditions, the seedlings can be atop or on the sides of the cap, or in the bottom of the hole.

Over the years, Camp 1 was frequently cited by opponents of the Company as an example of reforestation failure and corporate mismanagement. Company foresters challenged this perception pointing out that reforestation was successful and the trees were growing at rates which exceeded the natural forest previously on the site. These perspectives continue today, although somewhat muted because the visible evidence of successful restocking, even in the second pass blocks, is hard to dismiss.

This perception of substandard performance was not limited to the public alone, as Dave Presslee noted¹⁰⁵:

There still was this illusion that there was nothing growing there because it's a very poor harsh site - very slow growing. I came here in 1992. One of the first challenges I received came from our Company president who landed at the airport in the middle of Camp 1 and told us "You guys fix that Camp 1, it looks awful."

This direction resulted in a series of studies and surveys of the Camp 1 area which now reveal that 97% of the all the areas cut to date are fully stocked to acceptable standards. The remaining area comprises steep, west-facing slopes and low lying wet areas which likely carried few trees in the first place. The camp 1 story is revisited again at the end of this chapter.



AERIAL VIEW OF THE "CAMP 1" AREA WEST OF HINTON, 1990S. THE DARKER STRIPS ARE FIRST CUTS IN THE 50S AND 60S, NOW FULLY REFORESTED, FROM NATURAL SEEDING. THE LIGHTER STRIPS ARE SECOND PASS CUTS, USUALLY PLANTED. THE YOUNG REGENERATION CAN BE SEEN AGAINST THE SNOW ON THE STRIPS.
WELDWOOD PHOTO COLLECTION

PAYING THE COST OF REFORESTATION

Crossley was keenly aware of the heavy initial expenses incurred by the Company during the development phase of both the mill and forest management program, and Company concerns about expenditures and cash flow. However, he also considered it fundamentally important that the Forestry department be allocated a specific budget to ensure that he could deliver on commitments in the Agreement. As he explained¹⁰⁶:

We had agreed within our department to cut every possible expense corner. Shortly after we had arrived on the site we prepared a broad outline of the program we were proposing for the approval of our New York office. Once this was accepted we then requested some guidance on the magnitude of the Forestry Department's annual budget that might be acceptable. After considerable discussion it was agreed that it should be tailored to the Operations Departments costs of annual harvesting and the laying down of the wood furnish, at the mill gate. Ten percent of that figure would be the limit of the Forestry Department's budget for each ensuing year. Over the first twenty-year cutting cycle this figure was never exceeded. It was not a munificent sum but the staff was aware of its restraining effect, and with imagination and innovative approaches it was made to suffice.

This assured budget for forest management was a rarity among forest companies. The Hinton arrangement was unique in Alberta, probably in Canada. Crossley resolved to make the most of it, gaining a reputation for being frugal; some would say parsimonious. However, he encouraged the goals to be met through incentives and innovation. As Jack Wright put it¹⁰⁷:

Crossley's negotiation of the "ten percent" support for forestry practices was prompted in part by the fact that he reported to the woodlands manager, and that historically woodlands managers had a primary concern to deliver adequate wood to the mill at a reasonable cost.

However, as Crossley explained¹⁰⁸:

St. Regis hired its first Woodlands manager from Ontario^{xxii}, and his experience had been confined to timber extraction. He was initially content to concentrate on preparing for the extraction program. I didn't find him too difficult to work under. He admitted that he knew nothing about forest management and charged me to undertake full responsibility in this area and he would learn as we progressed. This was a comforting way for me to proceed. The new man^{xxiii} who took his place was another easterner whose experience was similarly confined to wood extraction. He too admitted to knowing nothing about forestry and did not wish to interfere with our program.

There was a steady turnover in Woodlands managers for various reasons --- I therefore found myself in the position of continually having to defend it in order to prevent the losing of the ground we had already won, and to satisfy our commitments to the Crown.

One of the innovative policies suggested by Crossley was to argue that the cost of regeneration should be treated as an operational cost rather than capitalized. As Crossley explained¹⁰⁹:

^{xxii} Gordon McNab

^{xxiii} Adrien Provencher

Over a rotation period of eighty years following harvesting, capital costs of (establishment planting) can go out of sight and such an eventuality could not be countenanced. Even forest economists had missed the point that since the stand of mature timber being harvested was put in place by natural means, its harvesting must generate the source of funds to finance its replacement. We kicked the idea around amongst ourselves about expensing these regeneration costs before approaching our Comptroller. He agreed that we had a viable argument, and the next time the tax officers appeared they agreed to it.

By the early 1960s, the silviculture program had grown to the point where full time attention was needed, and Crossley established a “section head” position in the Forestry Department, putting Gordon Jones in the position, largely to assist Crossley who retained hands-on direction over the program.

3.3 FIRST GREENHOUSE / ADVANCES IN PLANNING AND REFORESTATION: 1964-74

SILVICULTURE PLANNING

During this period, the names of two key players – Bob Carman and Steve Ferdinand – are linked to much of the history. In 1964, Crossley recruited Carman, a gold medallist University of Toronto forestry graduate then working with the Ontario Department of Lands and Forests. Carman had experience in containerized seedling growing, and Crossley had an interest in this emerging technology. When Carman left in 1968 to return to Ontario, Steve Ferdinand, who at the time was Section Head in charge of Production Layout (harvest planning, inventory, and annual operating plans), replaced him and held the position until 1974. Ferdinand was one of the Hungarian forestry students (Sopron University) who came to University of British Columbia during the 1956 revolution to complete their training there.



**BOB CARMAN, 1964 – STAFF PHOTO
WELDWOOD PHOTO COLLECTION**



**STEVE FERDINAND, 1967 – STAFF PHOTO
WELDWOOD PHOTO COLLECTION**

Initial harvesting began in areas that had adequate seed sources, and both the harvest layout and initial reforestation plan were geared toward utilizing this seed. Even though it was well known that scarification aided stocking success, most of the forest industry prior to 1970 had relied on natural seeding alone to restock a portion of their cutblocks, particularly the summer logged blocks where substantial duff disturbance had occurred during skidding. They then waited for the 7th year stocking survey to see if it met the standard. Problems arose if the standard was not met, because retreatment by seeding in the eighth year would not give them 3 year old seedlings to count in the tenth year survey. It usually took at least two years to produce a nursery seedling to plant, and so it would have not grown on the site for the required two years prior to the ten year survey.

Obviously planning needed to be done prior to the 7th year survey.

To the delight of the company foresters, the early regeneration surveys showed very encouraging results. Most of the cutovers were satisfactorily restocked. Those that were not were studied, and the spirit of adaptive management, reassessed and re-treated.

Despite the successes with natural regeneration, however, staff realized that planting would become increasingly important; first in re-treating areas not satisfactorily restocked (NSR), and second to regenerate second-pass cutovers in spruce stands in which the residual seed sources would have been removed. This led to active planning for a company greenhouse in which to grow their own planting stock. This was approved and completed in 1965 as described later.

NWP&P was ahead of the industry in developing a new approach to silviculture planning and decision making that made reforestation success more certain. This post logging survey – the Management Opportunity Survey (MOS) was designed and implemented by Silviculture Section Head Bob Carman in 1965. The MOS took place during the summer immediately following clearcutting. The survey was designed to provide information for slash disposal and regeneration treatment. A comprehensive assessment of the ecological conditions was made and recorded for each individual cut strip or block. If significantly different ecological conditions were found to exist within the same cutover area, the strips or blocks were further stratified into "Ecological Units."

Significant ecological conditions relating to reforestation were recorded¹¹⁰:

- (1) Forest cover type prior to harvesting.
- (2) Seed availability either from slash-born cones or adjacent uncut stands.
- (3) Soil moisture conditions and drainage.
- (4) Existing, or potential for vegetative competition.
- (5) Advance growth.
- (6) Slash conditions and depth of duff.
- (7) Topography and aspect.

Now the silviculturist could begin to track which treatments worked on which sites, and use the MOS data to form "prescriptions" or reforestation treatment plans for each unique cutover situation. The 'plough/drag scarify for natural' tactic was soon just one choice out of many.

Increased mechanization, and roadside delimiting in the 1980s resulted in a decoupling of harvest and reforestation. This created problems that have since been corrected through the development of an ecological classification system, and pre-harvest planning which determines the combination of harvesting systems and reforestation treatments which will result in the best conditions for successful reforestation and crop performance. The MOS continues, but as a final “check-off” following harvest to make any necessary adjustments to the original prescription.

CONTROVERSY OVER REFORESTATION EFFECTIVENESS

During Ferdinand’s tenure in the early 1970s the Company’s forest practices were publicly castigated by an organization called STOP (Save Tomorrow, Oppose Pollution) which claimed massive forest degradation and lack of reforestation. A STOP member, Arnim Zimmer travelled the FMA area taking pictures of recently harvested areas and published them in a report, complete with pictures which accused the Company, aided and abetted by the Province, of reckless and environmentally destructive practices. Fred McDougall, then Director of the Forest Management Division, dispatched Kare Hellum, then head of silviculture for the province, to relocate and examine all the photo points used by Zimmer. Hellum located and flagged every seedling within view of Zimmer’s photo points, then re-took the pictures. The images, displaying a sea of flags were used to effectively refute and discredit the accusations. In 1998, Steve Ferdinand and Bob Stevenson returned to rephotograph these sites and write a follow-up report, produced in 2007 with Bob Udell. This incident illustrates an inherent problem of perception in forestry and forest management. The time cycles from disturbance through to seedlings and growth to maturity are much longer than in agriculture, and longer than the working lives of most people.¹¹¹



ONE OF THE CONTROVERSIAL PHOTOPOINTS: BLOCK 26Z, BERLAND WORKING CIRCLE COMPARTMENT 8 IN 1972 (LEFT) WITH HELLUM’S SEEDLING MARKERS AND (RIGHT) IN 2005)

FOOTHILLS RESEARCH INSTITUTE

THE EVOLUTION OF REFORESTATION TECHNIQUES – DIRECT SEEDING

It was recognized from the outset that it would not be possible to obtain satisfactory natural regeneration on all of the areas being harvested. Experiments began in 1960 into the development of seeding and planting techniques which would give satisfactory results on the Forest Management Area. Early trials of spot seeding were largely unsuccessful due to losses to rodents and inadequate site preparation, and broadcast seeding using hand operated Cyclone Seeders on scarified blocks gave varied results generally related to amount of mineral soil exposure, slope aspect and soil moisture.

With the advent of blading in 1965 and the availability of a helicopter, the Company purchased a Brome Seeder and carried out its first aerial seeding in 1966

While this seeder was not too reliable, it showed definite possibilities as a technique and between 1966 and 1978 several thousand acres were treated with this system using a rented aerial seeder with generally quite good – but unpredictable - results. The seed losses to rodents was compensated for by applying extra seed, up to 130,000 viable seeds per acre, rather than treating the seed with repellents. The Company voluntarily discontinued use of Endrin as a rodent repellent when it discovered a high mammalian toxicity.

Planting techniques had by this time improved to the point where very reliable results were being obtained. With the problems of obtaining sufficient white spruce seed for aerial application, and the uncertainty of success, direct seeding was curtailed in 1978. Direct seeding was later attempted on specially site prepared areas with a very high mineral soil exposure created by blading, but again the results were unacceptable and the practice discontinued.

THE EVOLUTION OF REFORESTATION TECHNIQUES- PLANTING, AND THE DEVELOPMENT OF CONTAINERIZED SEEDLING TECHNIQUES

The Provincial Tree Nursery at Oliver^{xxiv} began growing tree seedlings for the forest industry in the late 1950s. The initial growth results of this planting stock were less than impressive. Winter kill, poor rooting, browsing by hares and small, flimsy stock were among the problems scientists were working on at the time. The soil at Oliver was a rich clay, well suited to growing grain. However, conifer seedlings did not compete well with grass and weeds in those heavy and difficult to maintain seedbeds. Disenchanted with the results of this bareroot stock, Company investigations commenced in 1962 into growing seedlings in containers, starting with Walters “Bullet.” This was a radical idea at the time -- to grow seedlings in a bullet-shaped plastic container that conceivably could be “shot” into the ground or dropped by aircraft. It did not live up to its expectations, but did launch a long succession of trials with a great variety of containers.

In 1964 Bob Carman was hired to head the silviculture program. As mentioned earlier, he had been recruited partly because of his expertise in containerized seedling production and Crossley had an interest in this emerging technology. At the time, bare-root stock from the Provincial Tree Nursery at Oliver was of questionable quality and the Company was seeking better seedlings. The Province at the time provided “free” planting stock to industry through a negotiated agreement, and agreed that if the Company wished to grow its own trees it would also be reimbursed for that cost. This approval cleared the way for the Company to construct its own greenhouse.

Carman put his mark on the program during his short tenure (1964-68), including:

- a. Designing and implementing the post-harvest silviculture prescription program, the Management Opportunity Survey
- b. Designing and building the first containerized seedling greenhouse in Alberta. This started operations in 1965, producing 250,000 seedlings the first year in “Ontario Tubes” - split plastic tubes $\frac{3}{4}$ ” and $\frac{1}{2}$ ” in diameter (25 cubic centimetres volume). The first greenhouse was 73 square

^{xxiv} Site of the Alberta Hospital on the north-easterly outskirts of Edmonton. The nursery was established in 1934 by the AFS to grow planting stock for windbreaks and shelterbelts. Forest seedlings were grown starting around 1956. This nursery was replaced in 1986 by a new one at Smoky Lake.

meters, mylar on wood frame. Subsequent additions up to 1973 added 220 square metres more space, with the covering material changed to fibreglass.

- c. Installing a number of research trials to examine container seedling culture, density reduction in overstocked fire origin pine stands, and other silviculture challenges.

The Ontario type of split plastic tube looked like empty cigarette tubes or giant straws cut into ten cm lengths. Either one half inch or three quarter inch diameter, they were split down one side, the theory being that pressure from the roots would force the tube to open and break it, allowing the roots to emerge unimpeded. This seldom happened. However, it was readily adaptable to mechanization both in the greenhouse and in the field. Between 1965 and 1971 more than 6 million tubelings were grown in the nursery and planted on the Forest Management Area. These tubelings were planted with a dibble^{xxv} on a variety of sites and seedbed conditions from untreated and deep duff areas to scarified upland sites.

After 5 years of operational planting, Ferdinand reported¹¹² in 1971 that:

The present seedling production facilities have an annual capacity of 1.5 million 10 week-old seedlings in the 3/4 inch containers. The actual net production depends on the culturing success which has been around 90 percent for the last four years. The seedlings are produced in weekly batches of 100,000 to 110,000. The number of batches that can normally be produced is fourteen. With over-wintering the productive capacity can be increased by 20 to 25 percent.

Ferdinand also reported average planting production rates of 1,655 seedlings per man-day during 1970 at a 9 by 9 feet spacing. The production of the best crew averaged 2,156 seedlings per man per day for a five-week period. The planters were paid piece work rates which were set between 1.4 and 2.2 cents per tree, depending on the planting site.¹¹³

Monitoring of survival and growth on the container planted areas indicated that the average first-year survival was in the 70 to 80 percent range for both lodgepole pine and white spruce. By the third year, survival declined to around 60 percent on the majority of the planted areas.

Routine regeneration surveys completed in the fall of 1970 on 3,100 acres in the 1966 and 1967 plantations indicated that 73 percent of the 3,100 acres were adequately restocked. The remaining 27 percent required further treatment. Ferdinand observed as an understatement, "While no accurate yardstick is available at present to precisely evaluate initial growth performance on the plantations, observations suggest that there is room for improvement."

After five years experience with container planting, expectations regarding establishment and initial growth following planting appeared to have been somewhat optimistic. Physical restriction on lateral root development and the small rooting volume afforded by the 3/4 inch containers were the most important limiting factors for lodgepole pine and white spruce. This problem was made the worse by the containers being planted in the ground along with the seedling contained within them. Subsequent investigations showed that the Ontario tubelings planted in wet seepage sites (e.g. Athabasca XIII) fared

^{xxv} The dibble was a planting tool for the Ontario tubes. It had a T handle on about a 1 m rod. At the bottom end was a 10 cm long solid shaft a bit larger than the tube, above that was welded a cross piece for stepping on to drive the shaft into the ground. The tubing was pushed into the punched hole and the planter would then "kick" the hole closed.

much better both in survival and growth rates. One hypothesis suggested that the container was preventing surface moisture from reaching the seedlings' roots, perhaps more damaging than restricting lateral root development.



**"ONTARIO TUBES" GROWING IN FIRST FORESTRY GREENHOUSE, LATE 1960S
WELDWOOD PHOTO COLLECTION**

The shortcomings in the container planting system were directly related to insufficient basic knowledge of the physiological requirements of young seedlings. The gap in basic research into the physiology of juvenile growth was gradually being closed, mostly by federal CFS research efforts. The Company, meanwhile, had acquired valuable experience in rearing and planting techniques. As a first step towards improvement, Ferdinand prepared initial specifications for greenhouse culturing, seedling quality and field performance in cooperation with members of the Canadian Forestry Service research team. The desired improvements were to be accomplished through the following modifications¹¹⁴:

1. Increase the size of container to 1 inch diameter x 4 inches in length (Estimated rooting volume 2.3 cu. in.)
2. Increase nursery period to 14 weeks for pine and longer if necessary for spruce.
3. Abandon the use of high-nitrogen fertilizers and replace with one of low nitrogen content.
4. Reduce frequency of watering, especially during the last 3 weeks in the nursery.
5. Remove containers during field planting and plant seedlings as bareroot plugs.

The modifications were expected to produce relatively large, hardy, and well-balanced seedlings.

Perhaps the most important change proposed in 1971 was the discarding of containers during the planting operation. This would be difficult to do, but it would allow the roots to penetrate into the surrounding soil immediately after planting. But a change in container was also coming.

Ferdinand was aware of two systems that were designed to plant a plug without the container, the British Columbia Styro-block developed at the Canadian Forest Service Research Laboratory in Victoria, B. C. and a folding container unit marketed by Spencer-Lemaire Industries of Edmonton. Both containers offered similar environments for culturing.

Working with Hank Spencer of Spencer Lemaire Industries, he designed what became the “Ferdinand Roottrainer” container system and began using it in 1972 at the greenhouse. Unlike the Ontario Tubes, the seedlings were taken out of the roottrainers before planting. And instead of the “dibble” used for the former, the Pottiputki Finnish planting tool was used, which had both ergonomic and site advantages. The Pottiputki is a device used in Scandinavia where seedlings are fed into a tube at the top and a foot pedal and lever mechanism at the bottom creates a planting hole, inserts the seedling and closes the hole. The planter does not have to bend over to plant a tree! These seedlings were also more robust than the earlier ones, each cavity providing 40 cubic centimetres of growing space, with the seedling removed from the container before planting. Ferdinand reported:

For logistical reasons we have decided to adopt the 'Spencer' type container for operational use. With minor modifications in the existing planting equipment and technique, speed of planting should not be significantly reduced.¹¹⁵

A series of renovations and additions had by this time increased the capacity of the greenhouses to approximately two million seedlings per year.



FORESTRY GREENHOUSE, 1972, WITH SPENCER-LEMAIRE “ROOTTRAINER” CONTAINERS IN THE NURSERY FIELD
WELDWOOD PHOTO COLLECTION

EARLY INTENSIVE SILVICULTURE AND TREE IMPROVEMENT

In 1970, Crossley and his team produced a comprehensive report on a recommended program of intensive management on the FMA area¹¹⁶. For years, they had been installing trials and experimenting with ways to improve the productivity of regenerated stands. In addition, they had identified and catalogued a number of “plus trees” and established two seed production areas, in pine and white spruce.

With the signing of the new Agreement in 1968, which virtually doubled the size of the FMA area and promised the construction of much expanded facilities in Hinton, they believed the time was ripe for such a move. Crossley had been successful in introducing a new clause in the forest management agreement which allowed the Company, at its option to change from the current stumpage system in which charges for wood harvested were based on the volume actually cut, to a “ground rent” system in which the charge would be based on the natural productivity of the land, regardless of how much volume was cut.

The summary (Table 1) of the report, compared to today’s FMA and wood supply status is enlightening. It illustrates the vision of the authors and how their recommendations are reflected in current practices.

Sadly, the promised expansion did not follow. By 1972 the expanded area was taken back by the Crown and with it went the plans for an intensive management program on the FMA area.

Despite that, in 1976 Chief Forester Jack Wright was finally able to convince the Company to hire a tree improvement forester. Peter Sziklai, a recent UBC forestry graduate and son of Professor Oscar Sziklai of the original Sopron faculty at UBC, took the job. Among other things, he selected parent stock and installed a number of provenance trials on the Hinton FMA area. Eight seed zones were selected and lodgepole pine collected from these better trees in each seed zone was placed in each to test its transferability. Fortunately for his successors, he kept meticulous records of the parent stock and their locations. Of six remaining provenance test sites, two have maintained family identities. Some of the trees on these plots were found to exhibit exceptional growth. The analysis of remeasurement results in the 1990s has set the stage for the Weldwood Elite Pine Population (WEPP) breeding program, with selected trees now planted at the David Presslee Seed Orchard near Edson. Sziklai left in 1981 amid tough times for the industry. However, he left a legacy of well-designed trials and meticulous records. Attempts to find a suitable replacement proved fruitless, and the position was left vacant until Diane Renaud took the job in 1996.



DIANE RENAUD, 2000
WELDWOOD PHOTO COLLECTION

As Jack Wright noted¹¹⁷, this period from around 1972 to 1982 was one of great advances in reforestation trials and accomplishments as well as a peak period in tree and stand improvement.

“In order to take advantage of the inherent capacity of the lands under lease to produce raw material far in excess of what it produces in its wild state, and by so doing guarantee a perpetual supply of wood in spite of unpredictable drain to other users of land, and to realize the opportunity of paying a fixed rent rather than stumpage fees, the following recommendations are made:” D.I. Crossley 1970

Report Recommendation 1970	2000 Status
1. Minimize outside wood purchase to reach AAC earlier, thereby moving to fixed ground rent	FMA area at full AAC, supplying approximately 2/3 of needed fibre, remainder purchased. Intensive management program in development
2. Investigate the use of dead and down material from harvest and fire killed stands	Dead wood and fire killed wood now used in mill production
3. Investigate use of smaller size classes in harvesting systems	Utilization now to a 10/8 standard ^{xxvi} , bush chipping of small diameter stands
4. Establish additional seed production areas to encompass varying land elevations	Seed production areas abandoned. Tree improvement program to supply spruce seed.
5. Investigate practical methods of cleaning dense pine regeneration stands	Techniques proven, program suspended in late 1980s, starting again in 2000 with ramp up to full operational status by 2008
6. Immediately initiate genetic improvement programs	Provenance trials in late 1970s. Full tree improvement program underway 1996. Elite pine seed orchard established near Edson, and Company is partner in Hualien Seed Orchard near Grande Prairie..
7. Consider forest fertilization following CFS trial evaluations	Fertilization still being studied, potential is proven and implementation is planned. Methodology for definition of suitable areas being developed.
8. When small material is usable, consider use of harvest thinnings.	Commercial thinning trials underway. Benefits of CT have been demonstrated in net yield increase, plus value of product. First operational CT begins in 2001.

TABLE 3-1 1970 INTENSIFICATION OF MANAGEMENT PROPOSAL AND 2000 FMA STATUS

^{xxvi} The current utilization standard at the time was 15/10, indicating that all trees on a cutting area 15 cm and larger at the stump would be cut, and all felled trees would be utilized to a 10 cm diameter top. The 10/8 standard would have improved utilization well beyond that at both a tree and stand level. No other operation in Alberta is currently at 10/8 standard.

3.4 EXPANSION AND MATURATION OF THE SILVICULTURE PROGRAM: 1974-1986

GREENHOUSE EXPANSION 1980

By the early 1970s records show a gradual increase in planting, from one million trees in 1974 to two and one half million by the early 1980s. See Figure 1. There it remained more or less stable until the expansion of operations late in the decade. The expanded program was a function of:

- a. the transition from first pass harvest to second pass, with reduced natural seed in spruce types
- b. after close to 20 years operations, much of the “old growth” area, where hardwoods had long since ceased to be represented, had been harvested and operations were moving into younger areas where rapid reforestation and growth was critical to cope with competing brush and hardwood competition.
- c. the use of feller/bunchers and roadside delimiting was on the rise, with a resulting loss of slash-borne seed for natural regeneration

University students, recruited each year, planted the trees during the period May to August.

Steve Ferdinand left the Company in 1974 to join the Alberta Forest Service and was replaced by Bill Mattes. Mattes, a graduate of Freiberg University in Germany, had been with the Company since 1970 working with Wright in inventory and management and with Ferdinand in silviculture. In 1979, tree improvement forester Peter Sziklai was charged with constructing a new greenhouse to replace the earlier one. This came shortly after the retirement in 1979 of Jean Bourbeau, who had been the greenhouse manager since it was first built in 1965. The old greenhouse had now reached the limits of what it could contribute to the planting program, growing three crops of trees, close to 2 million in total each year. The new greenhouse started production in 1980, producing 2.5 million trees, although the official opening ceremonies were delayed until July 17, 1981.

Two gutter-connected IBG Glass-Acre 300 houses were divided into four units, each able to grow 250,000 trees at a charge, or three million per year (three crops) in much improved growing conditions. It was designed to take advantage of the mechanization potential associated with the container system e.g. vacuum seeding, tray filling, vibration packing, etc. The design also allowed for the addition of a third gutter-connected greenhouse at a later date, to increase capacity to 4.5 million trees, using the same production facilities. By 1984 nearly 20 million seedlings, grown in rootainers, had been planted, for the most part with the Pottiputki planting tube.

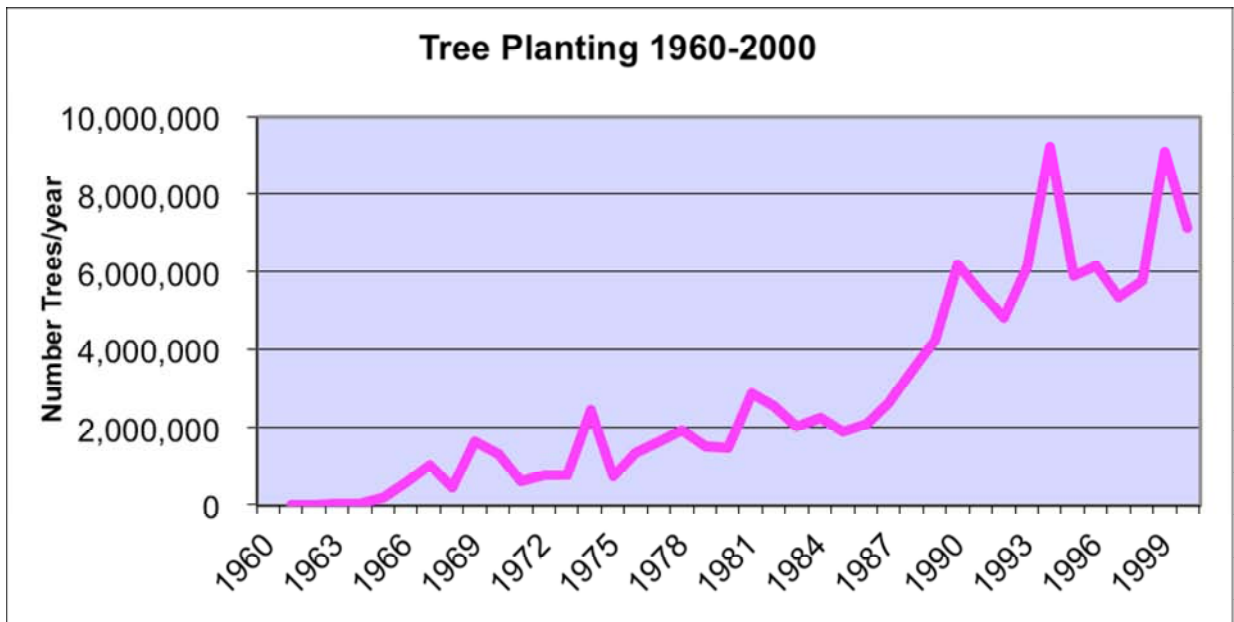


FIGURE 3-1 TREES PLANTED BY YEAR, 1960-2000

Jack Wright stated in 1984¹¹⁸,

Trials with mechanical tree planting machines at Hinton have convinced us that, given good site preparation, planting production per person using a Pottiputki is almost as high as with a planting machine, while the quality of planting and site selection is vastly superior to machine planting.

Since there is no shortage of high quality tree planters when container grown seedlings are involved, a longer planting season is available than a machine could have. Thus further work on development of mechanical tree planters by Government agencies would appear to be a waste of taxpayer's money.

Direct seeding had been discontinued as a regeneration technique during the early 1990s. The three main reasons were that supply of high-quality seed was limited and direct seeding required much greater numbers of seed. Second was that results were erratic, through a combination of micro-site availability and predation by birds and small mammals. Third was the slow establishment and early growth, especially as related to competing vegetation. As Udell¹¹⁹ commented, "We no longer can afford to await the results and then plant the failed areas."

The role of planting climbed steadily as its success became more apparent. (Table 2). The 50 millionth seedling was planted in 1991 and the 100 millionth in 1999.



NEW GREENHOUSE, 1981

WELDWOOD PHOTO COLLECTION

Silviculture Era	Trees Planted	Area Harvested	Ave. # Planted/yr.	Description
1955-64	95,792	24,991	9,579	Early days in Forestry. Heavy reliance on natural regeneration following scarification
1964-74	7,366,049	35,620	736,605	First greenhouse, major advances in planning and reforestation. Full time silviculture manager
1974-86	24,702,671	41,061	1,900,205	New greenhouse. Program expands and matures.
1986-93	32,869,668	26,309	4,695,667	Program suffered from loss of direction and disconnect between logging and reforestation.
1993-2000	48,550,863	45,254	6,935,838	Major program review. Ecological site classification a platform for joint harvest/silviculture planning. Beginnings of intensive management program.
Total	113,585,043	173,235		

TABLE 3-2 TREE PLANTING BY ERA: 1955-2000

PREPARING THE GROUND FOR PLANTING

At the same time that improvements were being made in the culturing of planting stock, advancements in site preparation for planting were being made.

While the container grown seedlings generally performed well on most scarified and bladed areas, extremely dry and exposed scarified sites had unacceptable seedling survival. The other problem area was where tough sod made hand scalping with mattocks too laborious and ineffective. In 1975, Company foresters saw a Bracke Cultivator demonstrated at Sault Ste. Marie, Ontario, and it appeared likely that this machine could provide the answer for these difficult planting sites. Udell, recently returned to the Company, reported that his experience with the Bracke Cultivator in Fort Frances had also been positive and he thought it might work well in the Camp 1 area.

The first Bracke was acquired in 1976. Not only did the unit pay for itself in the first year in reduced planting costs due to higher production, but survival of the planted seedlings was in excess of 90%. During 1976-78 a variety of towing units were tried including the Clark 668 Skidder, Timberjack 240D, FMC Tracked Forwarder and a Caterpillar D5 low pressure tractor. In 1979 the Company purchased its second Bracke and two Timberjack 240D Skidders and approximately 85% of planting sites were now pre-treated with these units.



**BRACKE CULTIVATOR DEMONSTRATION: GREENHOUSE OPENING 1981
WELWOOD PHOTO COLLECTION**

Areas of heavy competition from hardwoods remained a problem in terms of adequate pre-treatment. In 1979 St. Regis purchased a Cazes & Hepner (C&H) Plough to prepare approximately 10% of planting sites. This unit was mounted on a modified Komatsu D65P Tractor. The C & H plough stripped away the organic soil down to the bare mineral soil, thereby eliminating all competition growing on the site. Trees were planted down this strip, usually on the transition zone between the bared soil and the undisturbed soil so they enjoyed a period of reduced competition during which they could establish and grow. That was the theory. The plan for these areas of heavy competition from hardwoods was to follow up, 3 to 5 years after planting, with an aerial application of herbicide to permit the planted seedlings to maintain their growth potential. The proposed use of herbicides created a major

controversy, as described later. The practice now is to identify high-competition sites in advance of logging and plant them with large, fast-growing stock immediately after logging.



**C&H PLOUGH PREPARING PLANTING SITES, MCLEOD WORKING CIRCLE, 1970S
WELDWOOD PHOTO COLLECTION**

In 1980 deep duff blading was replaced by the Craig-Simpson rear mounted ripper plough. This could be operated during the early winter months as soon as there was sufficient frost to support the tractor and before the snow accumulation was too deep. This method not only extended the season, but also reduced the width of the exposed path and consequently the size of the intervening windrows. Some problems remained in some deep duff sites, where the ploughs did not expose sufficient mineral soil.

Where natural regeneration to lodgepole pine was the objective, anchor chains were mounted on the hitch on either side of the plough and dragged behind to break up the slash and distribute the cones into the furrow. By using a large tractor the Company could mount two ploughs on a “parallelogram hitch” with about 7 ft. spacing between to double the productivity of the machine. Combinations of single and double ploughs could be used depending on the amount of slash and steepness of terrain. This equipment was also used to treat some upland pine sites, which were inaccessible during the frost-free period.

JUVENILE SPACING PROGRAM 1974-1987

Juvenile spacing is considered the first phase of thinning since it removes very young stems. It is also called pre-commercial thinning (PCT) because the stems are too small to be sold. One of the major benefits is that it is the first chance to remove infected and defective trees. Another major advantage is to reduce the number of stems to a reasonable number and thus prevent stagnation of growth. It also ‘sets up’ the stand for a commercial thinning at an earlier date than would otherwise be possible.

Commercial thinning is done at a later stage in the tree’s development when the trees cut can be utilized for a particular product. It can increase the total wood volume obtained from a stand, because the trees that would naturally die can be salvaged before they fall over.

The ability of lodgepole pine to regenerate and survive in excessively dense stands is well known. Young stands originating from wild fire with densities exceeding one million stems per hectare have been observed. These result in dense stands that survive but grow very slowly for many years regardless of site quality. Excessive stand densities reduce the average stand height, average stand diameter, total merchantable volume and in extreme cases result in stand stagnation. Although stands originating from logging have somewhat lower densities (1,500-20,000 stems per hectare), similar impacts can occur at the higher densities.

Recognizing the problem that overstocked stands presented, in 1962 the Company began juvenile spacing trials in the Gregg Burn. Techniques attempted included: hand pulling the trees; thinning them with brush axes; running light prescribed fires through them; applying herbicides to effect selective killing of the trees; using bulldozers to thin them in strips, and finally thinning with clearing saws—which became the preferred method of the operational tending programs. The initial objective was to prevent stand stagnation; therefore, all stands exceeding 4900 stems per hectare (sph) were targeted and spaced down to 2500 sph.



**SPACING WITH HUSQVARNA CLEARING SAW, 1981
WELWOOD PHOTO COLLECTION**

By the end of 1976, thinning operations ceased in the Gregg Burn. Extremely high stand densities, and heavy slash resulted in extremely high costs, which were averaging over \$1000 per hectare (1976 dollars). At the time operations were suspended, only 125 hectares of the 8,000 hectare burn had been treated.

Efforts switched to the stands that had regenerated following logging, where worker productivity was dramatically higher, and the impacts on growth and yield per dollar expended were spread over a much larger area. Many of these areas had pre-treatment densities of 10-20,000 stems per hectare and were spaced to 1800 to 2500 sph. Target densities were increased by 10% where western gall rust, a fungal disease of pine, was present.

This operational thinning program continued on a small scale, using a crew of students each summer, later a full time IWA crew (1984-87) and lasted until Wright's retirement in 1987. The program had three prime goals:

1. Improve growing conditions for overstocked regenerated pine
2. Improve final crop yields
3. Set up the spaced areas for a future commercial thinning which might otherwise not be practical in the absence of early spacing control

Jack Wright, asked to review this chapter, expressed his philosophy as follows:

In future, final crops on average to better sites should be high quality sawlog trees. The pulpmill should be running on wood obtained from thinnings, small trees or poor sites, and by-product chips. To accomplish this, average and better sites need proper early spacing so commercial thinning (CT) can be carried out 20 years before final harvest. Without proper juvenile spacing, CT is not possible.

It is fair to point out that this view is not universally shared. Researchers Ken Mitchell and Jim Gaudie of the British Columbia Ministry of Forests Research Branch, experts in forest growth and yield and the developers of the Tree and Stand Simulator Model (TASS), contend that – at stocking densities produced by reforestation – juvenile spacing has no positive effect on final crop yields. They further observe that the risks associated with such activities may in fact reduce final crop yields.¹²⁰

By 1989, 2630 hectares of regenerated cutovers had been precommercially treated. At this time a review was conducted of the juvenile spacing program. Mortality problems were observed on some of the earlier thinnings, particularly high quality sites.

Meanwhile – and consistent with Mitchell and Gaudie's observations - unthinned stands on many sites appeared to be growing freely with no need for spacing. The impacts of thinning on growth and yield were poorly understood and there did not appear to be a professional consensus on the contribution of this practice to allowable cuts. Although it was clear that the treatment would increase the average diameter and volume of a stand and therefore its value for sawlogs, there was concern that overall volume production per hectare might suffer. As can be seen later, these and other questions became part of the enhanced forest management review of the late 1990s. In addition there was the need to redirect limited resources into cleaning hardwood competition – which was clearly having major impacts on softwood survival and growth - from overtopped conifer regeneration.

Upon completion of the review, the juvenile spacing program was suspended in favour of cleaning hardwoods from areas regenerated to conifers. This brushing program continues today with about 2,500 hectares being treated annually.

As will be seen later, however, a review of intensive management options conducted for the Company by Dr. Stan Navratil in the 1990s shows beyond doubt that juvenile spacing will be a cornerstone of any

intensive management program in lodgepole pine. Without question, this silviculture application achieves the goals identified by Wright, but it must be applied on a site-specific, not a comprehensive, basis.

FAILED ATTEMPT TO INTRODUCE HERBICIDE USE: 1986

Deciduous trees such as poplar and aspen can establish themselves aggressively on cutovers, even in old growth stands where the hardwood component had long since disappeared. On many sites hardwood competition arising from the deciduous component of stands became an issue. Manual cleaning of the older plantation and seeded areas was deemed prohibitively expensive, and would certainly cause damage to the 'crop trees' that were to be made 'free to grow'. Use of herbicides was a logical choice, however, Fred McDougall, then Deputy Minister of Forestry, Lands and Wildlife, was adamant that herbicides were not to be used without sufficient scientific knowledge and support of the public.

In 1986, Weldwood proposed a series of small herbicide trials testing the newly approved forestry herbicide Roundup as means of vegetation control. One permit was approved and actioned for a block up the Lynx Creek Road. However, the others ran into a firestorm of controversy when a local coalition became aware of the projects through public notices the Company put in the paper. The coalition went to the press and mounted a very public action against the plans. At the same time, notices were up around town advising that roadways and parks were being sprayed, but no one paid much attention.

A provincial election was underway at the time, and Premier Don Getty was at a campaign meeting in Edson when a member of the coalition asked what he proposed to do about this issue. He replied that as long as the public was uncomfortable with the use of herbicides he would not allow their use in forestry.

It became obvious that even experimental use would provoke a backlash in the Hinton area from this well organized group. Meanwhile, other companies were successfully applying for and receiving permits for both small and large-scale experiments. The coalition tried to spawn other resistance cells in these areas, particularly Whitecourt, to little avail.

The Company decided that the best course of action would be to discontinue its efforts and dampen down the controversy, which would allow the rest of the industry to prove the merit, efficacy and environmental acceptability of these herbicides. This was done, and herbicide use was introduced elsewhere in an orderly and publicly supported fashion. Such use is gaining momentum in Alberta as an operational practice.¹²¹

CHANGING REFORESTATION STANDARDS

In the late 70s, the Forestry Department at Hinton initiated a program whereby every staff member from Jack Wright (the Chief Forester) down was required to conduct regeneration surveys. As Udell said "the philosophy was ... we might be losing connectivity to what was going on in the field ... we weren't getting the right understanding of the linkages between silviculture treatment and reforestation success."¹²²

In 1985 the Province conducted a Juvenile Stand Survey (JSS) on a provincial sample of cutblocks harvested from 1966 to 1974, on which there had been satisfactory stocking at year 10 under the old conifer standard. Weldwood conducted similar surveys on the FMA area to ensure the Provincial results would also reflect local findings. They found that although the areas had regenerated to trees, a large percentage were no longer satisfactorily stocked to desired coniferous species, and many had severe competition problems and poor growth. It was evident that the acceptance of three-year old spruce

trees and two-year old pine trees, 10 years after harvest was no guarantee that a productive conifer forest would result.

In 1987, a joint government/industry Reforestation Technical Committee (a subcommittee of the AFPA Forest Management Committee) was formed to recommend and track new reforestation standards. Weldwood was a member. The committee formulated a new standard that was not just concerned about stocking, but also focussed on the growth rate of the tree, and its chance of growing above the competition.

In 1991, the resulting new "Free to Grow" standard for reforestation became policy in Alberta. This standard included a number of check-off surveys, leading to the final survey at year 14 wherein the reforestation must be in a free-growing state, and has remained in place up until new standards were introduced in 2000.

3.5 ORGANIZATION CHANGES IMPACT SILVICULTURE PROGRAM: 1987-1993

SILVICULTURE DUTIES REASSIGNED IN NEW DEPARTMENT, PROGRAM IMPACTED

Both Jack Wright and Bill Mattes, a European-trained forester with a profound understanding of forest renewal, retired in 1987, concurrent with the restructuring of the Hinton organization which resulted in the merging of Forestry and Woodlands departments into one Forest Resource Department under Don Laishley. Wright was replaced by Bob Udell, who headed up a new planning organization within the department, and Mattes was replaced by Bill Rugg, a University of Alberta forester who left a reforestation position in the provincial government service in Manitoba to take the new position of Silviculture Planner.

During Rugg's watch there were a number of changes, within and external to the silviculture program. Free to grow regulations were instituted in 1991 and companies responded with more aggressive silviculture, leading to an increase in planting generally. Rugg also developed the first Regenerated Stand Inventory for the Company, which was used in the 1991 forest management plan.

Operational responsibility for silviculture was given over to newly-formed Districts under three managers (Bryon Muhly, Dan Rollert, Daryl Farquharson). Each District had a silviculturist responsible for planning and implementing silviculture while overall planning co-ordination and silviculture system development remained within Udell's organization under Rugg. Change was rapid, as operations began staffing up and ramping up to address the fibre needs of the new pulpmill, which began construction in 1988. The use of a student planting crew was eliminated and planting was contracted out, with positive results in cost savings.

As noted earlier, the new organization also heralded the end of the juvenile spacing program. Or at least its suspension until quantitative information on the benefits and threshold stocking levels leading to growth repression could be determined.

The amalgamation of the operational silviculturists with the other operations people in the Districts had many positive elements, as people working together gained a mutual understanding of each others' roles and challenges. Similarly, when there were workload "surges" people could temporarily put aside their normal responsibilities and help others cope with the extra load. The theory was that such assistance would later be repaid in kind. Unfortunately, in the case of the silviculture program, this seldom happened, and the Company entered a period of substandard silvicultural performance. Several things contributed to this problem.

- a. Because of the new imperative around wood supply, silviculturists found themselves at times unable to properly conduct their post-harvest planning (MOS) surveys before treatment, and also unable to properly maintain the silviculture records
- b. This problem became worse in 1992 when Hinton Division eliminated its mainframe computer system, along with the silviculture record management system designed for it. The replacement system had not been designed, and silviculturists faced the unfamiliar task of paper entries of silviculture records
- c. Silviculture was fragmented between the planning group and the Districts, with a resulting loss of clear direction or focus
- d. The Company had always enjoyed the luxury of surplus AAC therefore AAC arguments for doing good silviculture were not apparent
- e. Reports (e.g. Udell/Dempster) describing the enhanced performance of regenerated areas were masking some of the other problems that were out there
- f. Some of the silviculturists appointed by the Districts lacked the experience to prescribe and execute the most appropriate treatment
- g. District performance was measured by log costs and deliveries, with no performance indicators for silviculture – you get what you measure

During the same period, legislation had changed with the introduction of the new “free to grow” reforestation standard which was placing even more responsibility on the shoulders of industrial silviculturists. This, combined with the expansion of harvest levels, was placing a heavy demand on professional resources for silviculture. (Table 3).

LOGGING SYSTEMS IMPACT PLANNING AND SILVICULTURE

Compounding the problems was the gradual evolution of logging systems which, by the late 1980s had largely settled on a combination of feller bunchers, full tree skidding to roadside followed by mechanical delimiting, piling and burning of debris. In-block roading became at times too intensive, with bulldozer-built roads resulting in excessive stripping of topsoil for grade construction.

This combination led to more emphasis on planting to put the new crop on the ground because:

- a. Planting was deemed failsafe in the face of limited time for planning
- b. Excessive bared area left no pine seed supply throughout much of many blocks
- c. Removal of the slash and burning at roadside was seen to remove much of the seed source for natural regeneration.

Pre – 1991 ¹			Post – 1991 ²		
Year	Treatment	Area (ha)	Year	Treatment	Area (ha)
			-3	Pre-harvest Plan	7,000
0	Harvest	2,500	0	Harvest	7,000
0	MOS ³	2,500	0	MOS	7,000
1	Site Preparation	2,500	1	Site Preparation	7,000
2	Planting	1,000	1	Planting	3,500
			2-5	Stocking Surveys	7,000
			5	Pre-stand Cleaning ⁴ Survey	9,000
			6	Stand Cleaning	2,000
8	Establishment Survey	2,500	8	Establishment Survey	7,000
			14	Performance Survey	7,000
Annual Treatment or Surveys		8,500	Annual Treatment or Surveys		50,500

Notes:

¹ Reflects pre-1991 regulations and forest management agreement (FMA) requirements

² Reflects free to grow regulations, FMA requirements and commitments in 1991 forest management plan

³ MOS = Management Opportunity Survey. A post-harvest survey to determine the final silviculture treatment prescription

⁴ Stand Cleaning = removal of competing vegetation overtopping or restricting coniferous reforestation performance.

TABLE 3-3 ANNUAL SILVICULTURE PROGRAM PRE- AND POST-EXPANSION AND THE INTRODUCTION OF FREE-TO-GROW REGULATIONS 1991

GREENHOUSE CHANGES IMPACT COST

During this same period, the Company switched the greenhouse from the use of Spencer Lemaire Roottrainers to British Columbia styroblocs, following the recommendations of Greenhouse Manager Larry Matwie. His review of the program showed opportunities for cost savings with no loss of quality through such a conversion. Also, he linked a series of repetitive motion injuries in the greenhouse to problems with handling the Spencer Lemaire trays and “books.” This changeover was consistent with the industry trend at the time, but was not embraced by all, most notably the retired Chief Forester Jack Wright. The conversion to styroblocs resulted in improved seedling size and performance, as suggested, but the cost savings were not realized. The larger growth area for each seedling reduced the greenhouse capacity substantially, thereby increasing cost per seedling. However, it is fair to note that the styrobloc is now the industry standard throughout Western Canada, producing quality seedlings.

3.6 A RENEWED COMMITMENT 1992-96

EXPERT REVIEW OF SILVICULTURE PROGRAM 1992-1993

In the early 1990s the Alberta Forest Service began to criticize the Company for excessive site degradation through rutting and stripping, issuing some penalties. Meanwhile, the AFPA and the AFS were developing guidelines for allowable site disturbance through forestry operations. To establish the scientific basis for addressing the issue, the Company worked with Dr. Dave McNabb, a forest soils scientist with the Alberta Research Council to set up a number of research trials on compaction and decommissioning roads after harvest through such treatments as deep ripping.

Dr. Hamish Kimmins, the noted forest ecologist at the University of British Columbia, was asked to visit the operations and give his opinion on the issue. His report¹²³, based on a two day field trip May 14 and 15, 1992 offered a number of suggestions for improvement, including:

- a. Identifying potential problem areas before harvest, including the use of vegetation indicators^{xxvii}
- b. Better training of equipment operators
- c. Restricting the size of interior block roads
- d. Careful execution of remedial work to correct rutting
- e. Prompter regeneration following harvest
- f. More use of planting for reforestation
- g. Use of higher quality, and larger planting stock

The strong concerns he raised during his visit led to a more rigorous examination of the silviculture program. Dr. Kimmins and Lorne Brace – a member of the 1991 Expert Panel in Forestry and recently retired as a mixedwood silviculturist from the Canadian Forest Service – were hired to conduct the review. During the field trip and meetings thereafter, they advised the Company that the reforestation program was sorely deficient and was not meeting the assumptions contained in the 1991 forest management plan. Without corrective action, they warned that allowable annual cuts would inevitably decline as the quality of the resource base declined.

They submitted their report¹²⁴ in February, 1993 containing observations on Company operations, and 13 recommendations to improve them. Among the observations and recommendations:

- a. Effects of soil disturbance were speculative and needed more research
- b. Post-disturbance mitigation was often ineffective, and the disturbance should be reduced substantially in the first place
- c. The Company should formalize pre-harvest site assessments, site classification and use of indicator plants^{xxviii}

^{xxvii} Plant indicators: lower vegetation such as shrubs and herbs which provide information on the productivity of the site. For example, pine sites which have alder in the understory are of much higher productivity than those which are characterized by Labrador tea.

- d. Field training of field supervisors and equipment operators is critical
- e. “Stop Operations” guidelines should be developed and used to prevent site degradation, rather than relying on judgment calls
- f. Site preparation activities for reforestation were themselves creating problems in site disturbance
- g. Rather than bury topsoil under internal block roads, it should be removed and saved for later reclamation of the roads
- h. Managing site disturbance to the least common denominator could jeopardize long-term forest level AAC
- i. Public opinion of such site disturbance could potentially be more damaging to Company operations than any loss of productivity.
- j. Although the initial purpose of the investigation was to examine the impacts of rutting on reforestation performance, the experts noted that other issues were more pressing, for instance

Although the initial purpose of the investigation was to examine the impacts of rutting on reforestation performance, the experts noted that other issues were more pressing, for instance

- a. Planting stock used in reforestation was of inadequate size and quality
- b. Roadside processing was removing the necessary seed for natural regeneration of many cutblocks
- c. Vegetative competition was impeding seedling survival and growth

These observations were not new to the Company, as silviculturists had been pointing to these issues for some time. Kimmins and Brace also suggested the Company begin operational trials respecting the impacts of chipper residue on site productivity.^{xxix}

This report set in motion a series of decisions and events that led to the most significant period of progress in the silviculture program since Crossley’s pioneering innovations in the first era of silviculture at Hinton.

^{xxviii} This recommendation echoes an earlier soils-based site classification report by Dumanski and Wright (1973) which recommended that the Company adopt a site classification system making more effective use of indicator plants and soil/ moisture characteristics for silviculture planning.

^{xxix} In the early 1990s the Company introduced remote chipping into the matrix of harvest systems. Whole trees were skidded to roadside, delimbed and chipped there. The residue from the chipping operation was then spread back over the cutblock using a modified machine comparable to a large manure spreader.



BUSH CHIPPING OPERATION, MCLEOD COMPARTMENT 7, 1993. FULL TREES WERE CHIPPED, THE BRANCHES, BARK AND NEEDLES SEPARATED FROM THE WOOD CHIPS WHICH WERE THEN BLOWN INTO VANS FOR TRANSPORT TO THE MILL. THE CHIPPED-UP BRANCHES, BARK AND NEEDLES WERE LOADED INTO A MACHINE SIMILAR TO A MANURE SPREADER, BUT MUCH LARGER, AND SPREAD ACROSS THE CUTOVER AREA.

WELDWOOD PHOTO COLLECTION

A RENEWED SILVICULTURE PROGRAM - THE "CROSSROADS REPORT" NOVEMBER 1, 1993¹²⁵

... we went to Bob Udell and said, "Bob, we've got some real concerns in the woods about the reforestation program. We'd like to have a field day where we go out, look at what's going on, and discuss what we think are some of the problems." We showed him lodgepole pine that was two meters tall and four or five years old, and then we showed him other regeneration that was the same age and it was only a metre or a metre and a half. I felt we were doing something to impair those smaller trees. Bob was quite disturbed because AAC assumptions had been based on these higher-performing trees. We prepared a one-pager and met with the managers. Don Laishley said, "Outline it in a more businesslike case," and the result was the Crossroads Report.¹²⁶ David Presslee¹²⁷ 1997

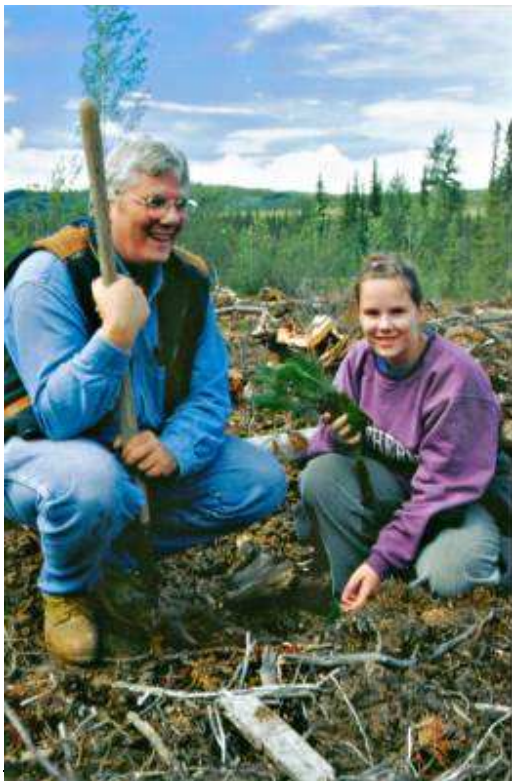
The Kimmins/Brace wakeup call was heeded, and a task force from planning and operations set to work to recommend necessary changes to bring the forestry program up to the expectations of the forest management plan. Of equal import, they wanted to set it back on the course initially charted by Crossley, and his successors. The days were long gone when an excess of allowable cut over wood supply needs would compensate for any slippage in the silviculture program. Any practice that was out of line with forest management plan assumptions needed correction, and quickly.

Twenty five recommendations delved into areas of silviculture management and forest management plan assumptions. The essence of the report can be summarized in eight sections.

- a. Adaptive Management. Put the silviculture program into an adaptive management framework with explicit planning, assessment, control and reporting procedures. In this way, failure of the program to meet required benchmarks would be detected and could be corrected.
- b. Pre-harvest Planning. Harvest and silviculture planning should be combined in an ecologically based pre-harvest planning process.
- c. Crop Protection. A vegetation management program should be put in place to not only meet regulatory commitments but also to preserve the softwood landbase.

- d. Quality Control. A quality control program should be established to ensure all treatments were done to a high standard so that maximum benefit would be achieved.
- e. Seedling Supply. Weldwood should take control of its own seedling^{xxx} supply, through discussions with the Province. The Company greenhouse needed to improve its performance to – at a minimum - come up to the industry standard in Alberta.
- f. Backlog Reforestation. The Company should consider reforesting 4,000 hectares identified as not-sufficiently regenerated in the regenerated stand inventory conducted for the forest management plan.
- g. Tree Improvement. The Company should immediately get back into the tree improvement program. Benefits included allowable cut at a cost per cubic metre less than purchased wood, plus a guaranteed supply of quality seed.
- h. Forest Stewardship. A local policy for stewardship with goals, objectives and standards of performance was recommended

The report included a five year program with attendant costs in excess of \$1 million annually. It was accepted and implementation began shortly thereafter. By this time, Bryon Muhly was in charge of all forest operations as Forest Operations Manager, and he and Udell recommended the consolidation of silviculture under one manager. This in effect returned silviculture to the organizational structure in place from the early 1960s until 1987, and the structure recommended by Wright and Clark in their proposed (1985) reorganization of the Woodlands and Forestry Departments into one.



**DAVE PRESSLEE AND DAUGHTER CAREY
100 MILLIONTH TREE PLANTING 1999**

The entire silviculture group was pulled out of District Operations and Forest Planning. David Presslee, who had joined the Company in 1992, was by now District Manager for the Marlboro Working Circle, and he accepted responsibility to also manage the full silviculture program, setting out to bring it back into focus. By 1996 he became Forestry Manager with responsibility for all aspects of silviculture, as well as the forest management and wildlife programs. Presslee, who joined the company in 1992 was raised in northern BC and Alberta, graduated from NAIT in Forest Technology, worked with forest industry in BC and Alberta and developed a particular interest in silviculture. While working, he also studied for his R.P.F., becoming a

^{xxx} At the time, the Company identified its seedling needs by species and seed zones, and the Province directed production to various nurseries including its own Smoky Lake facility.

Registered Professional Forester^{xxxii} in BC in 1983 and Alberta in 1994. In 1994 he set about to implement the recommended silviculture changes from the Crossroads report and did so very successfully. Virtually every recommendation was acted on with impressive results in terms of both planning and execution of a very aggressive and effective program. For example:

- a. Foothills Model Forest developed an ecosite guide for west central Alberta, with Weldwood's support and participation.^{xxxii} This guide was used to begin to classify the entire FMA area, with completion scheduled for 2003.
- b. Silviculture and harvest planning were done together, using the ecological classification to inform the decision on harvest and reforestation systems used.
- c. The 4000 ha backlog of NSR area was examined and, where appropriate, reforested
- d. Burning of roadside slash was now only done when it was so prescribed for silviculture purposes, e.g. removing slash to improve planting chance, done on less than 15% of the blocks harvested
- e. Fox Creek Development worked under contract to manually clean backlog cutblocks of overtopping hardwood competition. In the six years (1994-2000) after this program began, 11,550 ha of pre- 1991^{xxxiii} and 3790 ha of post- 1991 areas were tended. This program kept a 20 person aboriginal crew working for eight months each year
- f. Following changes to the forest management agreement in 1995^{xxxiv}, the Company now supplied its own nursery stock at its own cost. A rigorous quality control system was developed and applied to contract as well as Company growing stock.
- g. Hinton Division set forward a new stewardship policy in 1999.

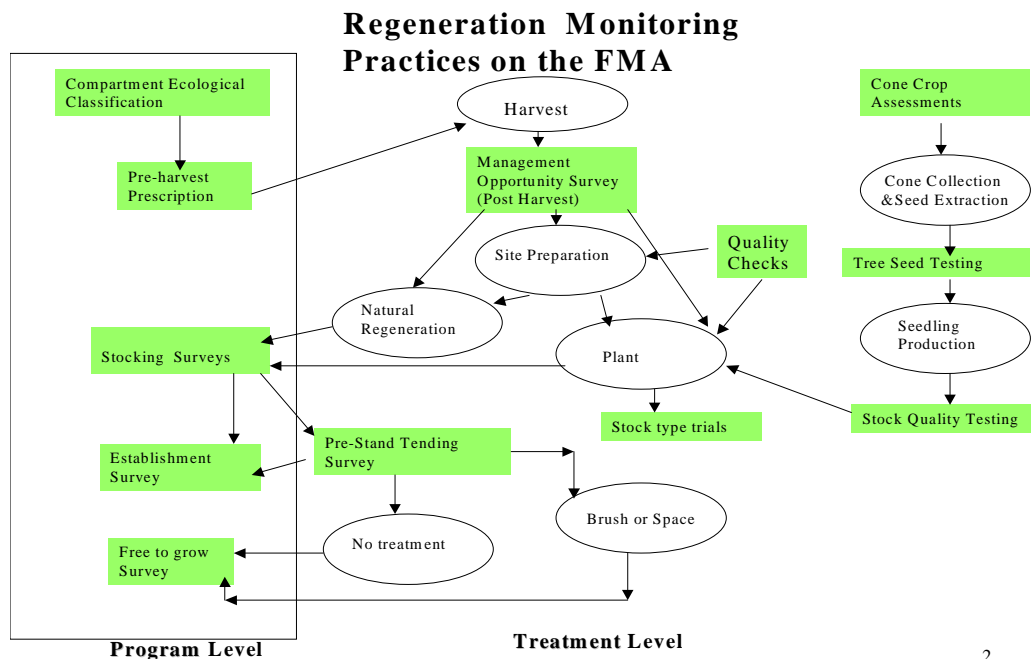
The Silviculture Program incorporated a monitoring component to ensure that the proper treatments were being applied in a timely manner, illustrated in Figure 2.

^{xxxii} The educational requirements for the R.P.F. designation are typically obtained through a university degree in forestry. The BC association also authorizes a very rigorous self-study "Pupil" program, successful completion of which is recognized as equivalent to a B.Sc. degree. Presslee's achievement is a credit to his determination and capabilities.

^{xxxiii} As recommended originally by Wright, J. C.; Dumanski, J.; Lindsay, J. D. 15 July 1973. Evaluating the productivity of pine forests in the Hinton-Edson area, Alberta, from soil survey maps. Corns had produced an earlier guide which the Forestry Department asked to be adapted to the Hinton FMA area, but which had not been done until this project.

^{xxxiii} Industry keeps track of its cleaning program before and after 1991, the year free-to-grow reforestation standards were introduced in Alberta.

^{xxxiv} In 1993, as part of its cost cutting, the province eliminated free seedlings for volume-based tenure holders in Alberta, and commenced negotiations with FMA holders to remove free/subsidized seedlings from their Agreements.



2

FIGURE 3-2 REGENERATION MONITORING PRACTICES ON THE FMA, 2000

THE 1995 TREE IMPROVEMENT PROPOSAL¹²⁸

Weldwood’s Board of Directors directed the Company (October 28, 1994 Board Meeting) to review the benefits and costs of tree improvement with a view to putting such a program in place.

The same players who produced the Crossroads Report reconvened to examine the issue of tree improvement at Hinton, and reported back in January, 1995. This report reviewed the history of tree improvement at Hinton. It noted that the tree improvement program at Hinton had suffered in the past due to lack of a continuing commitment.

The committee, in its 13 recommendations, strongly recommended the implementation of a comprehensive tree improvement program, estimated to cost \$400 thousand per year. It suggested that a tree improvement program held the potential to increase the AAC substantially, at a per-metre cost less than that of purchased wood. Gains would increase in the second rotation by up to 400,000 metres per-year.

The need for outside help and buy-in was highlighted. First, the committee recommended that the Company cooperate with the provincial government to develop an agreement on technical and regulatory procedures to enable tree improvement programs. Partnerships with other companies of like mind were recommended. It emphasized the need for a positive and factual public information program around the program. The report also suggested bringing forestry specialists from Champion’s technical centre at Greenville North Carolina to help develop the program.

Again, the report was embraced by the Company, and immediate steps were taken to implement it. A new Tree Improvement Specialist position was established, and Diane Renaud took over the position in 1996. She moved quickly to build and implement a comprehensive tree improvement program addressing the technical recommendations in the report.

ENHANCED SILVICULTURE PROPOSAL: JANUARY 1996¹²⁹

... we did a 'threat and opportunities' assessment for our annual allowable cut in the Hinton forest management area. There were numerous potential threats coming at us from the environmental side but the biggest one was that fibre supply was fully allocated. After we did the analysis, we saw that there would probably be a shortfall down the road of about 300,000 cubic metres. Could enhanced forest management satisfy that shortfall? Among a number of the opportunities we looked at, one was improving utilization; the second one was improving forest management practice. David Presslee¹³⁰ 1997

With basic silviculture and tree improvement programs beginning to build momentum, a Forest Resource Department task force turned its attention to the opportunities available from intensive forest management. The need for such a program was evident as the Company faced continuing pressure that could reduce the area of the landbase available for management and therefore the AAC. Loss of landbase to other uses, increasing stewardship initiatives, fears of protected areas strategies and the impacts of pending endangered species legislation all contributed to growing unease at the sustainability of the AAC with status quo management.

In this discussion the terms "intensive" and "enhanced" forest management are used. Intensive forest management is the more specific term. It applies to cultural treatments that might be done to forest stands to increase their productivity. These include prompt regeneration, weeding, spacing and thinnings, fertilization and tree improvement. Enhanced forest management includes all the elements of intensive treatments, and adds other practices that could also result in an increased supply of wood from a forest. These include consideration of fuller utilization of individual trees, i.e. smaller stump and top diameters, previously non-commercial species, and previously non-commercial stands.

With the assistance of technical specialists David Todd (Tree Improvement) and Jim Gent (Soils and Nutrition) of Champion, the committee reported back with nine recommendations for intensive management. In presenting its recommendations, the committee used a table to illustrate the three levels of silviculture practice related to impacts on allowable annual cuts. (Table 4).

Again, the committee noted the need to ensure a policy framework was developed in Alberta to ensure that investments in intensive silviculture would reap benefits to the Company. Issues of land use zoning, security of investment and how the yield gains of intensive silviculture could be captured in the allowable cut calculation were noted. Long term commitment in funds and manpower were stressed, along with the need to develop technically defensible yield estimates for allowable cut determination. It recommended the use of qualified consultants to help develop the program, along with the research and monitoring necessary to define the benefits. Preliminary estimates of yield increases associated with various types of treatment were offered.

Interestingly, although the report was developed by an independent process and using different staff, its recommendations were remarkably consistent with those in Crossley's initial 1970 report. The reason this report was embraced and his was rejected can largely be attributed to the different environments surrounding wood supply. Until the ECA^{xxxv} report of 1979, government policy supported full allocation

^{xxxv} 1979 Report on the environmental effects of forestry operations in Alberta. Report and recommendations. Study of the Environment Council of Alberta, of which D.I. Crossley was a member. Study was precipitated by environmental concerns in the early 1970s.

of sufficient wood supplies to feed all FMA area-dependent manufacturing facilities. But that report recommended that more efficient use of wood processing by-product would be gained, and better environmental stewardship would result if industry was granted less than its full needs. The 1988 FMA was negotiated in that context, with only approximately 2/3 of the required wood supply as the outcome.

The report was accepted, and plans began to implement the proposals. Dr. Stan Navratil, then a senior research scientist at the Canadian Forest Service’s Northern Forestry Centre, agreed to serve the Company in an advisory capacity to define the appropriate intensive management program. Next he was to design and oversee the installation of a system of research trials to provide the necessary definition and validation of the forecasts of yield improvement. Dr. Navratil is a Czechoslovakian-educated forester with a strong interest in forest ecology. He came to Canada in 1968 when his country was invaded, worked as a forest research scientist in Ontario, professor for 11 years at Lakehead University, head of the Research Branch of the Alberta Forest Service, then became a senior research forester with the Canadian Forest Service in Edmonton.

Level	Purpose and AAC Impact	Treatment
Regulatory	<ol style="list-style-type: none"> 1. ForestCare Level 1 Certification (currently accepted practice) 2. To meet legislated minimums 3. Likely will not sustain AAC 	<ul style="list-style-type: none"> - Post-harvest assessments (MOS) - Site preparation within two years - Planting or natural regeneration to achieve minimum stocking - Weeding to minimum “free to grow” standard
Basic	<ol style="list-style-type: none"> 1. To ForestCare Level 2 Certification (forestcare level) 2. To meet 1991 FMP assumptions 3. Ensure AAC is sustained 	<ul style="list-style-type: none"> - Pre-harvest planning - Prompt regeneration - Full stocking - Backlog reforestation - Early brushing and weeding
Intensive	<ol style="list-style-type: none"> 1. ForestCare Level 3 Certification (Alberta state of the art) 2. To increase AAC on FMA area 3. Significant increase in AAC 	<ul style="list-style-type: none"> - Tree improvement - Juvenile spacing - Innovative silviculture systems - Commercial thinning - Fertilization - Fertilization and thinning - Plantations of exotic species

TABLE 3-4 LEVELS OF SILVICULTURE PRACTICE BASED ON IMPACT ON ALLOWABLE ANNUAL CUT AND THE CRITERIA FOR FORESTCARE CERTIFICATION

3.7 SILVICULTURE IN THE 1990s

THE FOREST POLICY ENVIRONMENT

Reforestation Standards

The original conifer standard required a single regeneration survey in the seventh year following harvest. If the area had sufficient stocking it was deemed to have met the standard and no follow up survey was required to determine whether or not it was free of competition and the seedlings were growing. If it was not satisfactorily restocked (NSR) follow-up treatment and another survey was then required. In 1991 this was replaced by the new Free-to-Grow Standard covering conifers, hardwoods

and mixedwoods, developed through discussions involving members of the AFPA and the province.

This standard required three check-offs over a 14-year establishment period; the establishment survey (4-8 years), the (growth) performance survey (8-14 years) and the free-to-grow check off at 14 years. This new standard had major implications for site preparation techniques, planting stock quality, follow-up tending practices, and the need to integrate harvest and silviculture planning.

Because much of the regeneration that would be subject this new standard was already in the ground, industry expressed strong concern about its ability to meet the standard on these areas for which it had already met its regulatory obligation. The Province, to encourage and support this change, agreed to accept responsibility for “free to grow” on all pre-1991 reforestation which could be considered SR under the old standard. This commitment was never fulfilled, however, as the province was soon to enter a period of budgetary restraint and manpower reduction which continues to the present. Industry has largely taken over these areas itself, many companies using Forest Resource Improvement Program funding to treat the pre-1991 areas for competition control.

The 1991 standards were reviewed in 1995 and refined in 2000 as noted later.

The Alberta Forest Conservation Strategy: The Alberta Forest Legacy Framework

In the early 1990s, following a recommendation of the Expert Panel of which Udell was a member, the Alberta government began the lengthy multi-stakeholder process of developing a Forest Conservation Strategy. This culminated with a report in 1996, which, among other things, recommended a “triad” approach to forest landscape management consisting of a network of protected areas, extensively managed areas and intensively managed areas. This concept was embedded in the Forest Legacy Framework which was the province’s response to the AFCS report.

The Jacques Report

In 1996 the government of Alberta asked MLA Wayne Jacques to chair a task force to examine potential changes to the system of granting and renewing forest management agreements in Alberta. In so doing, he consulted widely with stakeholders including the pulp and paper community in Alberta, representing most of the FMA holders at the time. Udell and Bob Ruault of Alberta Pacific Forest Industries were assigned to work with Jacques and his other MLA committee members (Gary Friedel, Dave Coutts) to come up with recommendations that the industry could live with.

The final report which was accepted by the Standing Policy Committee and the Minister included a strong recommendation that forest industry in Alberta be encouraged to practice intensive management.

A Policy Framework for Enhanced Forest Management in Alberta: 1997

The Forest Legacy Framework and the Jacques Report both cited the intensive management imperative for Alberta. But current Alberta regulation and policy, while offering no barriers to intensive management did not provide sufficient comfort that those choosing to implement it would stand to benefit from their choice.

Udell and Trevor Wakelin (Millar Western Forest Industries) raised this issue with the AFPA Forest Management Committee as well as with ADM Cliff Henderson and Director of the Forest Management Division Dennis Quintilio. The forest planning subcommittee of the FMC was assigned to work with the province to build the case for necessary policy and regulation change.

Udell and Wakelin co-chaired this committee which included technical experts such as Hugh Loughheed of Weldwood and Daryl Price of the Alberta Land and Forest Service. The report was presented to Minister Ty Lund in February 1997¹³¹, who accepted it and recommended that it go forward to the Standing Policy Committee. Udell and Wakelin complied with this suggestion and presented it to the SPC that spring. They were encouraged to carry on with the project and work with the regulators to make the necessary changes to policy and regulation to support the implementation of enhanced forest management (EFM) in Alberta.

The overall result was formation of an industry-government task force chaired by Udell and Doug Sklar, recently appointed head of the Forest Management Division. The task force met over the next several months, and in the fall of 1999 produced two reports which were accepted by the industry and the province, and now represent Alberta policy on the implementation of enhanced forest management.

The policy framework report describes the fundamental goals of enhanced forest management, including the desire to increase wood supply and quality while continuing to conserve other values and the ecological integrity of the forests. It imposes the requirement to link growth and yield forecasts to defensible science, and to monitor and report on the actual growth relative to the forecasts used in developing allowable cut impacts. Variances must be addressed in management plans as appropriate.

The technical protocols provide the details of how the framework principles will be addressed, including requirements for forecasting, establishing crop performance standards, monitoring and evaluation, and the allocation of benefits in the case of overlapping tenures.

RESEARCH AND DEVELOPMENT

We decided that we should retain a highly respected consultant or retired scientific person to provide us with some guidance on what are reasonable yield estimates and what process we should go through to actually quantify the potential yield gains for various treatments. We hired Dr. Stan Navratil who began a review of all the scientific literature on white spruce, lodgepole pine, management and what we could expect out of improving yield. The key areas on which we focused were density management, nutrition fertilization and also we were looking at combination treatments of density management and nutrition. We focused on the opportunities that the existing growing stock presented - the natural stands already there and the managed stands that we were actually creating today.

David Presslee¹³² 1997

Background

Dr. Navratil, working with David Presslee, Sean Curry and Thomas Braun, began designing and installing a number of research trials on the Weldwood FMA area. These trials examined a number of hypotheses relative to intensive forest management including the treatment of both fire origin and regenerated stands. Champion specialists including Dr. Bob Kellison, Director of Forest Technology, Dr. Jim Gent, soils and nutrition specialist and David Todd, tree improvement specialist participated in semi-annual reviews of the ongoing program.



STAN NAVRATIL
WELDWOOD PHOTO COLLECTION

In addition, the Company sought to locate and remeasure growth and yield and silviculture research trials established in Alberta since the 1940s – mainly by the Canadian Forestry Service and Alberta Forest Service. Both agencies had reduced their respective research programs, and Weldwood received permission to use previous measurements as well as remeasure any plots needed.

Some of these research trials are legendary in Alberta, including a 1941 commercial thinning trial by German prisoners of war at Kananaskis, Alberta and a 1950 follow-up operational trial by CFS researcher Crossley in the same area. Crossley, who later (1955) left the CFS to become the first Chief Forester at Hinton, also established a series of lodgepole pine management studies at Strachan in 1951. Stan Lux, a NAIT forestry graduate and silvicultural research technician with the Canadian Forest Service proved invaluable in digging out the records and locating the old maps for the majority of the trials revisited.

One trial was also remeasured in British Columbia with permission from the BC Ministry of Forests.

Remeasurement of these historic trials gave Weldwood a quick start on its investigations into the potential benefits and gains of intensive management. So remarkable were some of the findings, that the Company and the Canadian Forest Service agreed to jointly publish a series of reports on them.¹³³

For example, German prisoner of war volunteers did a commercial thinning in 1941 near the old Kananaskis prison camp, later the site of the Canadian Forest Service Kananaskis Research Station. This was a heavy thinning in a 77 year old lodgepole pine stand, removing about seventy percent of the total volume, reducing density from 7166 to 1710 trees per ha. CFS scientists established research plots in this stand in 1949, eight years after the thinnings. Conventional scientific opinion at the time, and to some extent even now, held that such thinning would have little impact on growth and yield since the stand was so close to “rotation age”. But 22 years after thinning, at age 99, the cumulative total volume (remaining standing timber plus volume removed in thinning) exceeded the “control” or untouched plot by 111 m³ per ha. By age 135, this gap had risen to 200 m³ per ha. The cumulative volume in the “thinned” stand had surpassed the volume production in the “control stand” by the time of the first measurement, eight years after thinning. As Udell noted: “Based on this trial and other reports, we can conclude that thinning will stimulate the growth of late-rotation, low-merchantability lodgepole pine stands and will produce net yield gains and volume/sawlog grade improvement.”¹³⁴

This work and Dr. Navratil’s work were leading to even more questions to be addressed. And the Company was collaborating with a number of other companies, scientists and the Model Forest to pursue them in a series of research trials and reports.

Foothills Growth and Yield Association

Growth and yield research requires considerable investment of time, money and technical expertise. Furthermore, validation and confidence is reinforced by the replication of the results elsewhere. Early attempts to form a growth and yield cooperative to pursue this need foundered when a champion to advance the process could not be found.

In 1998 a unique opportunity arose when the Model Forest was asked to accept a large (\$3.2 million) research grant from the Environmental Enhancement Trust Fund to be used for research on a broad range of forest industry interests. Udell suggested that seed money to establish a pine growth and yield cooperative could serve the industry well, and the Board of the model forest accepted the recommendation.

Dr. Dick Dempster accepted a contract to serve as the Director of the program for a two year period. Dr. Dempster is a United Kingdom-educated forest scientist with particular strengths in forest ecology and management. He was a professor at the University of Alberta before becoming a forest consultant. He and Udell set out to recruit other companies to join the initiative. To whet their appetite, Weldwood hosted a tour of the historic growth and yield trials in the foothills of Alberta, led by Dr. Navratil.



PARTICIPANTS IN THE 1999 FIELD TOUR OF GROWTH AND YIELD INSTALLATIONS – AT THE MUTTART FOREST, NOJACK

BOB UDELL PHOTO

By late 1999, nine companies had agreed to join the Foothills Growth and Yield Association as full members and the Alberta Land and Forest Service accepted membership in an advisory capacity. Field trials were designed and the first set of trials were installed in 2000.

ECOLOGICAL SITE CLASSIFICATION

In the winter of 1992-93 Presslee and his colleagues looked at the requirements for doing Pre-harvest Prescriptions (PHPs) for regeneration and silviculture. It was clear that PHPs had to be based on an ecological land classification; the question was whether to do this as needed on individual blocks or to do an overall classification of landscapes. As Presslee¹³⁵ explained:

Types tended to be fairly large and contiguous and travelled through larger areas whereas cut blocks were arbitrarily laid out. We wanted to classify landscapes because we were going into more of a landscape type of forestry. We felt that we needed an ecological map of the landscape, or the compartment, in which we were planning to consider all the resource values.

In a 1993 trial using the Corns and Annis¹³⁶ guide for the ecological classification, they classified Athabasca 24, and used it as a test case for joint harvest and silviculture planning. They were pleased with the results, and the cost-effectiveness of the approach. A landscape approach to the use of this classification as the foundation for all future planning appeared to be reasonable and desirable. Presslee¹³⁷ explained, "We felt it was more economically efficient to do landscapes -- and it was what we really wanted to do anyway because it matched other things that we wanted to do."

The trial also showed a few deficiencies in the system. However, as Presslee¹³⁸ noted:

Fortunately for us, at the same time the AFS were developing a guide to northern Alberta with John Beckingham, Harry Archibald and Ian Corns^{xxxvi}. I had been asked to give a presentation at a workshop in Prince Albert on the benefits of ecological classification. It was there I met John Beckingham and I thought we should try to hitch our wagon to him. I said to him, "You know, we're thinking about upgrading the Corn and Annis guide for our Weldwood FMA area, are you interested?" Of course he was, and recognized the opportunity. Not only would we get a new guide, we'd get a guide that was consistent with whatever was going to happen in other parts of the province, so we started off in 1994.

Their prototype systems were tested, refined and extended in 1995, and by 1996 the final report, "Field Guide to the Ecosites of West-central Alberta" was produced.¹³⁹ Following this, the Company engaged primary author Beckingham to develop a field guide for Weldwood planners which would help them link the 1996 ecosite guide to technical elements of forest planning such as yield classes and productivity forecasting. This was an expensive undertaking but, as Presslee¹⁴⁰ explained, the timing was right:

The market was getting hot and the focus on sustainability and stewardship was all there, I think to try to start something like that today would be a little more difficult with the poor markets, so we hit the timing just right. Now this year (1997), it's operational and it's just part of the whole game, we inventory the compartment for timber and we inventory for ecology before we start planning it and this year we're not only doing the compartments that are in the five year plan, we're doing the entire Caribou Range. Ecological classification is key to our business now.

^{xxxvi} John Beckingham, Research Scientist, Harry Archibald, Management Forester with Land & Forest Service, Ian Corns, Forest Ecology Research Scientist with Canadian Forest Service in Edmonton.

ZONING

Ecological land classification and recognition of the different capabilities to support tree growth led to consideration of the concept of zoning as a forest conservation strategy. Broad application of any one silvicultural prescription across the whole FMA area would have adverse consequences for regeneration as well as biological diversity. It is essential to recognize differences. As Presslee¹⁴¹ explained:

We are looking at an approach as documented in the forest conservation strategy -- that is to preserve biological diversity, you'll need three key components, or a "triad" approach as it has been called. One is that you need core protected areas, and Hinton being where it is there are huge protected areas close to us. These will be supplemented by the buffers and those types of areas that we won't log, steep slopes, to provide some additional core areas. An interesting thing to note is 38% of the land within 100 km radius of Hinton is in a protected state. The next level is you need a land base that represents the natural processes, areas on which would be making sure that the natural disturbance work we're doing and those similar types of things would be taken care of. The third land base would be the enhanced forest management land base. What this would do is to try to offset the losses in production as a result of preservation or other uses in the forest.

SILVICULTURE PLANNING

One of the key problems identified in the Crossroads report was that Forest Resources staff performance was being judged on minimizing costs in their own respective areas. For example, in harvesting to minimize logging and hauling costs to the mill, and in reforestation to growing and planting seedlings cheaply. Nobody was being evaluated on the performance of this entire cost to the maintenance of the AAC. Our performance should be judged on cost, but also the overall performance on how it delivers and maintains the AAC. You could have a very, very efficient harvesting system that was transferring costs to silviculture. We found that by spending 50 cents a cubic metre more for wood from trees cut by stumpside processing, we could save \$3.00 on the silviculture side. Now, silviculture Pre-Harvest Prescriptions decide if we're going to stumpside or roadside processing, whether we're going to clearcut or partial cut, retain understory or not, to use short wood, tree length or full tree -- all those things are decided pre-harvest. The silvicultural plan and the harvesting plan are prepared together.

David Presslee¹⁴² 1997

In 2000, planners were preparing detailed harvest plans for complete operating compartments before operations commenced. A team consisting of a planner, a silviculturist, and a biologist took into account a wide range of factors – including public input arising from public notices – in preparing detailed and co-ordinated plans. These plans encompassed block design, road systems, watercourse crossings and stream protection, wildlife conservation, harvest systems and reforestation strategies. They were prepared within the context of detailed information gathered for the compartment, including and of particular importance the ecological classification.

An impressive range of silvicultural harvesting systems had been developed. These included a number of variations of shelterwood, thinning and clearcutting systems, among others. These could be selected or modified according the Pre-Harvest Prescription (PHP) for each site and in consideration of what kind

of future forest was desired to meet management objectives. Dr. Stan Navratil described examples of future forest projections¹⁴³. One such site specific option example is illustrated in Figure 3.

However, most forest types still lend themselves to clearcutting and most of the alternative systems were infrequently used. They were, however to be applied in circumstances where a) the clearcutting system does not work (e.g. many riparian stands, or b) where other values preclude clearcutting (e.g. wildlife, aesthetics, etc.) but where the alternative system would still foster successful reforestation to at least the minimum Alberta standard.

As a follow-up to the Pre-Harvest Prescription done for each block, a Management Opportunity Survey was also done by the responsible silviculturist before the final prescription and reforestation was implemented.

All harvested blocks were treated for reforestation within two years of harvest, but most were completed within the first year.

Table 3 shows how silvicultural activities had increased after 1991 and the introduction of free-to-grow regulations, plus the Company's commitment to a more in-depth silviculture program. By the late 1990s the level of harvest had gradually increased as the two mills worked through their growing pains and achieved a more consistent level of performance, which included some enhancements. This resulted in an increased workload on the silviculture planners and program supervisors. Over the next several years, the Company would continue to define its direction in enhanced forest management, with the plan to set forward that commitment in the 2008 forest management plan and, if deemed acceptable, implemented. This could again increase the number of hectares treated or surveyed on an annual basis from 67,700 to 82,300 with no increase in the actual area harvested annually. David Presslee prepared a scenario reflecting this type of increase as shown in Table 5.

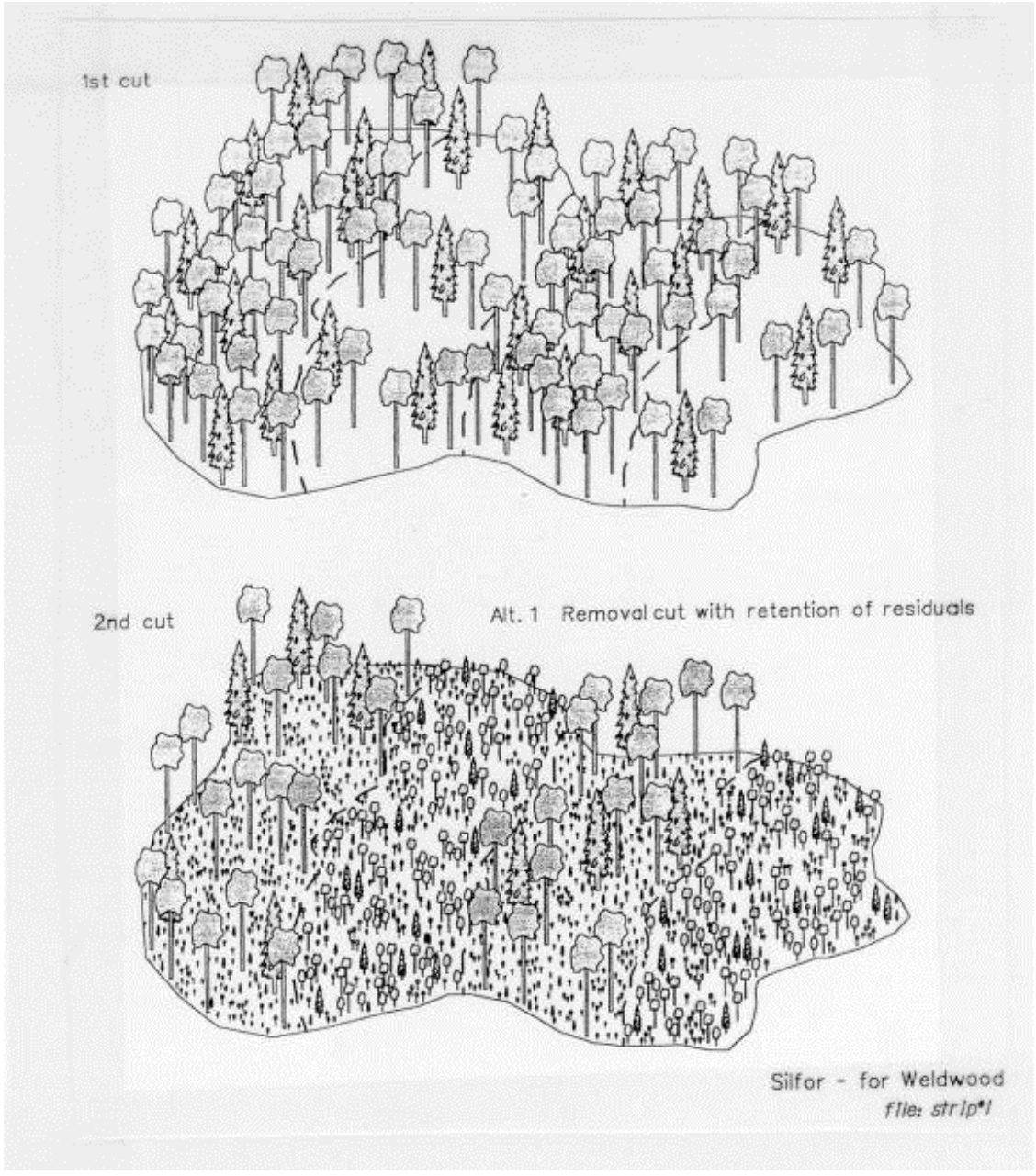


FIGURE 3-3 EXAMPLE OF ALTERNATIVE SILVICULTURE -- APPLICATION OF TWO-CUT STRIP SHELTERWOOD WITH RETENTION OF RESIDUALS AFTER REMOVAL CUT IN ASPEN-LEADING MIXEDWOODS. SOURCE: NAVRATIL/SILFOR 1999.

TABLE 3-5 ANNUAL SILVICULTURE PROGRAM 1999 TO 2008, BEYOND 2008^{xxxvii}

1999-2008			2008 and Ongoing		
Year	Treatment	Area	Year	Treatment	Area
-3	Pre-harvest Plan	8,100	-3	Pre-harvest Plan	8,100
0	Harvest	8,100	0	Harvest	8,100
0	MOS ¹	8,100	0	MOS	8,100
1	Site Preparation	8,100	1	Site Preparation	8,100
2	Planting	4,000	2	Planting	4,000
5	Stocking Surveys	8,100	5	Stocking Surveys	8,100
5	Pre-Stand Cleaning Survey ²	3,000	5	Pre-Stand Cleaning Survey ³	8,100
6	Stand Cleaning	3,000	6	Stand Cleaning	3,000
8	Establishment Survey	8,100	8	Establishment Survey	8,100
14	Performance Survey	8,100	15	Performance Survey	8,100
16	Precommercial Thinning	1000	16	Precommercial Thinning	3,000
			45	Pre-thinning Survey	2,500
			50	Commercial Thinning	2,500
			52	Fertilization	2,500
Annual Program		67,700	Annual Program		82,300

Notes:

¹ MOS = Management Opportunity Survey. A post-harvest survey to determine the final silviculture treatment prescription

² Stand Cleaning = removal of competing vegetation overtopping or restricting coniferous reforestation performance. Current efforts focused on backlog elimination.

³ After 2008, stand cleaning backlog will be eliminated, program ongoing.

^{xxxvii} David Presslee's view of where the program would be going in future.

SEEDLING QUALITY AND SUPPLY

In the spirit of 'adaptive management' the Company reassessed its forest nursery operation in 1993. Despite the state-of-the-art practices put into place when the new Company nursery was opened in 1981, problems had begun to emerge. David Presslee deduced there were some problems with the performance of some of the planting stock. As he explained, "When I first got here I looked at a number of the pine plantations, and I thought there was something wrong -- these trees weren't all growing well." He also found areas where spruce was really performing well, and others not so well." His evaluation of the differences in performance, conducted with Diane Renaud, convinced them that it largely stemmed from problems in growing the seedlings in the nursery. As Presslee¹⁴⁴ commented about the 1993 Crossroads Report, "... our own nursery was part of the problem, it had to be upgraded and the cultural regime had to become more modern and more effective."

In his view there had been two major factors. One was that when Jack Wright and Bill Mattes retired their knowledge had not been passed on to the next generation of silviculturists, exacerbated by a concurrent reorganization within the Company. The second was related to pressures to increase seedling production to meet the growing requests for planting stock. As he explained in his 1997 interview:¹⁴⁵

We had to change the cultural regimes. The year before, they had produced four crops. This was really disturbing because of the poor quality of the fourth crop. We had to make a choice on what type of regime we would have. We decided that we'd do just two crops -- a one-year crop that would be over wintered in freezer storage, and a spring crop that we'd hot lift and put out in the summertime. In addition, we also made changes to the nutritional and cultural regimes, but the biggest need was reduce the number of crops.

First we worked on computerization of the nursery. The vents and the heating systems and lights and everything would be controlled by computers. Second, we looked at how we were storing trees outside on the ground. We had been just placing the trays on the ground and seedlings were actually growing into the ground. So, when we lifted the containers we were ripping the roots out. As an interim measure we put 2 x 4's under them, to air prune the roots. Third, we wanted to extend the growing life of the second crop which was seeded in May. We wanted to move it ahead a couple of weeks. This was risky as it could be killed by frost. To address this concern, we built new shelter houses, linked them to the computerization as well. That was to extend the growing season and take the risk out of it.

Finally, the biggest change in the nursery, it began producing a product that was being ordered by silviculturists. It was producing a product that was linked into the whole system, not just producing seedlings that somebody else plants. We were trying to produce something that would perform as part of our entire system.

As a result, they were able to produce robust seedlings that were ready to grow when planted. The reduction in production capacity to two crops per year left a shortfall that could be met by the commercial forest nurseries that had become established in the meantime. At the same time, planting stock-rearing technology had progressed by leaps and bounds since the early 1990s. Today, quality seedling requirements can not only be obtained from outside nurseries, but Weldwood foresters are able to order and use a variety of seedling types best suited to the various planting site conditions. For example, where competing vegetation will be present on site with the planted seedlings, foresters will use larger (thicker and taller) seedlings that can better compete for the limited site resources.

When the government decided in 1993 to end the provision of 'free seedlings' to the industry, it also gave up its authority to direct industry's purchases to particular nurseries. The Company found that it could obtain its full seedling requirements in the private sector, and in June 1999 it announced the closure of its precedent-setting nursery. By this time Company foresters had developed the seedling specifications clearly needed to ensure survival and growth. In the 35 years since operations began, over sixty million trees had been grown in the Company's own nurseries. A history of nursery production is illustrated in Table 6. The Company press release provides a fitting epitaph¹⁴⁶:

Weldwood of Canada announced today that it will cease the production of tree seedlings at its Hinton Reforestation Centre following the completion of the current crop. While demand for seedlings remains high, the facility can no longer supply high quality seedlings at a cost that is competitive with private nurseries elsewhere in Alberta. No jobs will be lost as a result of this closure, as IWA staff currently employed at the nursery will be offered positions elsewhere in the Company.

Weldwood's first nursery at Hinton was constructed in 1965, when Company foresters were unable to acquire quality seedlings from established nurseries in Alberta. As the first, and currently only remaining, forest industry greenhouse in Alberta, it pioneered the development of containerized seedlings for forest plantations. The present nursery, built in 1982, is now nearing the end of its functional life without a substantial infusion of capital.

In the mid 1990s the Alberta Government privatized nursery production in Alberta and sold its nursery at Smokey Lake. The resulting expansion of the private nursery industry in the province led to intense competition in both quality and costs for seedlings. This has removed the need for a Company nursery facility. Purchases from private nurseries already represent over 70% of current seedling requirements.

Weldwood's commitment to sustainable forest management remains firm, and the planting program integral to this commitment will continue. In 1999, Weldwood Hinton Division plans to plant approximately 9 million seedlings, including its 100 millionth tree.

TABLE 3-6 HISTORY OF NURSERY PRODUCTION FOR THE HINTON FOREST 1955-2005

Year	Trees planted (000s)	Grown by Company	Grown by province	Grown by Company contractors	Logging/site preparation method	Other notes
1955-1964	96		96		- Horse logging. Scarify for natural regeneration. - Fill in plant.	All seedlings provided free by province. Company builds greenhouse 1965. If Company grows its own trees, province pays for seedlings at a cost equivalent to government costs.
1965	198	198				
1966	570	570				
1967	1,011	1,011				
1968	455	455				
1969	1,638	1,638			Hand felling. Mechanical skidding. Scarify for natural regeneration. Survey in 7 years; plant NSR before year 10.	Des Crossley retires in 1975.
1970	1,312	1,312				
1971	624	624				
1972	774	774				
1973	784	784				
1974	2,441	2,441				
1975	728	728				
1976	1,357	1,357				
1977	1,634	1,634				
1978	1,923	1,923				
1979	1,502	1,502				
1980	1,481	1,481				
1981	2,854	2,854	New greenhouse			
1982	2,525	2,525				
1983	2,018	1,485	533			
1984	2,251	2,251				
1984	1,906	1,602	304			
1986	2,084	1,915	169			
1987	2,620	2,375	245			
1988	3,456	1,490	1,966		Major emphasis on feller bunchers, roadside delimiting. Removal of seed from blocks forces major increase in planting. - Problems with site and planting stock quality.	Operations increase for new mill. Government pays \$0.095 per tree for first 3 million grown by Company; remainder provided free of charge from government-selected nurseries.
1989	4,221	2,903	992	326		
1990	6,178	2,205	1,688	2,285		
1991	5,440	3,085	819	1,536		
1992	4,794	347	4,447			
1993	6,161	3,390	2,771			
1994	9,201	3,866		5,335		
1995	5,895	3,633		2,262		
1996	6,151	2,651		3,500		
1997	5,341	1,000		4,341		
1998	5,772	1,107		4,665		
1999	9,073	1,078		7,995		
2000	7,117			7,117		
2001	7,991			7,991		
2002	10,599			10,599		
2003	9,673			9,673		
2004	7,461			7,461		
2005	9,499			9,499		
Total	158,808	60,193	14,030	84,585		

SITE PREPARATION

Almost without exception, reforestation, whether from natural seeding or from planting, requires site preparation as a precursor to crop establishment. There is no single piece of equipment that is the answer for all of the varied conditions that are encountered in the forest and each species, stand condition, soil type, regional climate and variation in slash and duff condition provides a new challenge. By 2000, a range of site preparation tools were available to Weldwood's team (Table 7).

TABLE 3-7 SUMMARY OF SITE PREPARATION TYPES AND THEIR PRIMARY USE IN THE WELDWOOD SILVICULTURE PROGRAM

DRAG SCARIFICATION (with barrels and chains)

- used primarily for natural regeneration of stumpside delimbed lodgepole pine sites
- creates a good area for the pine seed to regenerate by exposing mineral soil and at the same time distributes the pine cones onto the mineral soil
- some planting may occur on these sites but most of the regeneration comes from pine cones left on site

DONAREN MOUNDING

- used for artificial regeneration of wet and/or cold soil sites, or sites where other vegetation will compete with the planted seedlings for limited site resources (e.g. light, moisture, nutrients)
- this treatment creates a mound - an elevated planting spot that provides warmer soil and improved drainage
- all of these sites are planted with pine and/or spruce

EXCAVATOR MOUNDING

- used for artificial regeneration of very wet sites, sensitive sites, along watercourses, sites with very significant competing vegetation or sites with slash that limits the use of the Donaren moulder
- also creates elevated mounds similar to the Donaren moulder
- all of these sites are planted with pine and/or spruce

SITE EXCAVATOR SCREEFING

- used primarily for artificial regeneration of steep slopes or blocks that only have winter access
- creates a 2-3 metre narrow strip of exposed mineral soil for a planting spot
- because this is a spot treatment, erosion potential on steep slopes is minimized because there is no continuous treatment line
- all of these sites are planted with pine and/or spruce

DISC TRENCHING

- used for both artificial and natural regeneration-creates a furrow with a raised soil berm on one side for a planting spot
- this treatment can also be used on stumpside delimbed blocks to expose soil and distribute slash for natural regeneration
- many of these sites are planted with pine and/or spruce but some are left to regenerate naturally

C&H PLOUGH

- used for both artificial and natural regeneration of blocks that are only accessible in the winter
- creates a planting spot similar to the disc trencher but is completed when the ground is frozen
- many of these sites are planted with pine and/or spruce but some are left to regenerate naturally

PLANTING AND TENDING THE NEW FOREST

... tending was an example. We didn't have a tending program and yet it was assumed that all stands were regenerated to conifer post-1981. It was assumed that it would come back conifer on an improved growth curve. While they were doing a little bit of tending with Fox Creek, there was no concerted effort to make sure that land base stayed in the conifer land base.

David Presslee¹⁴⁷ 1997

Silviculturists determined whether sites would be planted or site prepared for planting based on a number of factors considered both at the pre-harvest prescription and post-harvest MOS stages of planning. These included such factors as:

- a. Availability of natural seed in the stand, or the logging residue (lodgepole pine)
- b. Potential problems with vegetative competition – if this was believed to be a risk, sites would be planted
- c. Species of origin of the stand – natural regeneration of white spruce was no longer considered due to the periodicity of the crop
- d. Access or other limitations which influenced the type of strategy chosen

By 2000, the planting program rose and fell annually based on these factors, but averaged around six million seedlings per year. Weldwood's silviculture didn't stop when a stand of free-growing trees was established. The new forest was monitored and if necessary, tended to shape its development. There were two main treatments carried out in the juvenile stands: brushing, or cleaning; and juvenile spacing, or precommercial thinning (PCT). Each treatment follows a set of objectives that will lead to a future forest that is healthy and productive both from the standpoint of the forest products that can be produced, and for the wildlife habitat and other resource values it provides.

The rapid advancement of silviculture planning, the linkages between site characteristics and treatment, and the significant improvement of planting stock resulted in fewer areas which might need treatment on a continuing basis. The very rich sites tend to support a wide variety of plant species besides trees, and these will always need some extra help in the early stages to give trees the competitive advantage.

Brushing gets trees off to a better start by removing plants that compete with seedlings for light, water and nutrients. It was done with power brush saws, or by girdling. Herbicide use, although widely used elsewhere in Alberta, had not yet been implemented on the Weldwood FMA area.

The work itself was primarily done by a native self-help cooperative, Fox Creek Development Association, which the Company helped set up in 1972 and had used continuously since for both logging and, more recently, silviculture. The co-op employs status and non-status natives, and Métis people from the local area. Under contract, a 20 person crew manually cleaned competing hardwood species encroaching on young softwood regeneration on Weldwood's reforestation areas. The co-op has expanded its business to several other companies in the area, as well as working on the Company's recreation program.

George Callihoo who first served on the Fox Creek board of directors in 1974 was still a board member in 2000 commented¹⁴⁸:

We started this cooperative so that as many of our people as possible would have an opportunity for work to support themselves and their families. This is still our goal and for that reason we have tried to build a business in jobs that require manpower, rather than high technology machinery. Our people take pride in the quality of the work they do, and they are respected for it. We have always had a very good relationship with the Company, no matter who was in charge. No matter what happened over the years, we have always been able to meet and talk and sort things out.

INTENSIFICATION OF MANAGEMENT

In 1997, the Company struck a task force to investigate ways to prioritize, quantify and advance the implementation of the intensive management program as recommended the three pivotal reports cited earlier. The Company needed to enhance the allowable cut of the Forest Management Area to guard against a possible fibre shortage in the next century, to offset the gradual erosion of the contributing landbase, as well as to accommodate gradually increasing mill demands arising from improvements in productivity and capacity. Past Company studies had shown strong evidence that the future yield of regenerated stands would surpass that of natural stands of lodgepole pine. It was predicted that average sites of well-stocked regenerated stands at 80 years would yield 75% to 100% greater merchantable volume per hectare than that of fire-origin stands (Table 8). Much of this improved growth performance was attributed to the reduced densities that occur in regenerated versus fire originated stands.

Deciding where to get “the best bang for your buck”, became the next challenge. The attention to cost brought out the need to consider the pre-commercial thinning (PCT) program -- not in isolation but as a component of both silviculture regimes and timber and non-timber resource planning. The question was not a simple “to PCT or not to PCT” but rather where PCT is biologically and strategically justified.

David Presslee and Stan Navratil collaborated on a stand density management report¹⁴⁹ in 1997. It evaluated a spectrum of silviculture regimes with and without PCT. The regimes presented in Table 9 offered options to attain production targets to be considered within the context of other values and non-timber targets.

Presslee and Navratil understood the complexities both biologically and from a corporate investment standpoint. They pointed to the need to improve available computer models and develop new ones which can accurately forecast the growth and yield outcomes of alternative strategies. Also a strong program of research, monitoring and validation is fundamental to the implementation of any chosen strategy.

Better decision-making was also expected from the development of the site and stand stratification system. The dependency of yield gains on site and stand conditions strongly implied that an operational PCT program, or any stand density management program, would require the provision of a ranking and stratification system. As Presslee and Navratil noted:¹⁵⁰

The most decisive input into our PCT program and stand density management strategies will be motivated by the forest level analysis and planning and by the corporate strategies of the future wood flow and sortment requirements. Ultimately, the decision of whether or not and to what extent to reinstate a precommercial thinning program (PCT) will depend on its overall, forest-level impact on timber supply.

As the scope of the silviculture program expands over time, they predicted that each hectare would be visited and a variety of treatments applied over the course of the rotation – not on all hectares harvested, but with varying intensity on different parts of the landbase. (Figure 4)

TABLE 3-8 PREDICTED YIELD OF WELL-STOCKED FIRE-ORIGIN AND REGENERATED STANDS FOR LODGEPOLE PINE AT 80 YEARS—AVERAGE SITES (UDELL AND DEMPSTER 1987)¹⁵¹.

Model Used	Site Index (BHA 50)	Top Height	% increase in height	Merch. vol. (m ³ / ha)	% yield increase
Fire	13.1	18	n/a	126.2	n/a
Regenerated ¹	16.2	19.2	26	220.5	75
Regenerated ²	17.6	20.9	31.9	262.6	108

¹ 5 year intercept^{xxxviii}

² 10 year intercept where available, 5 year intercept in other cases

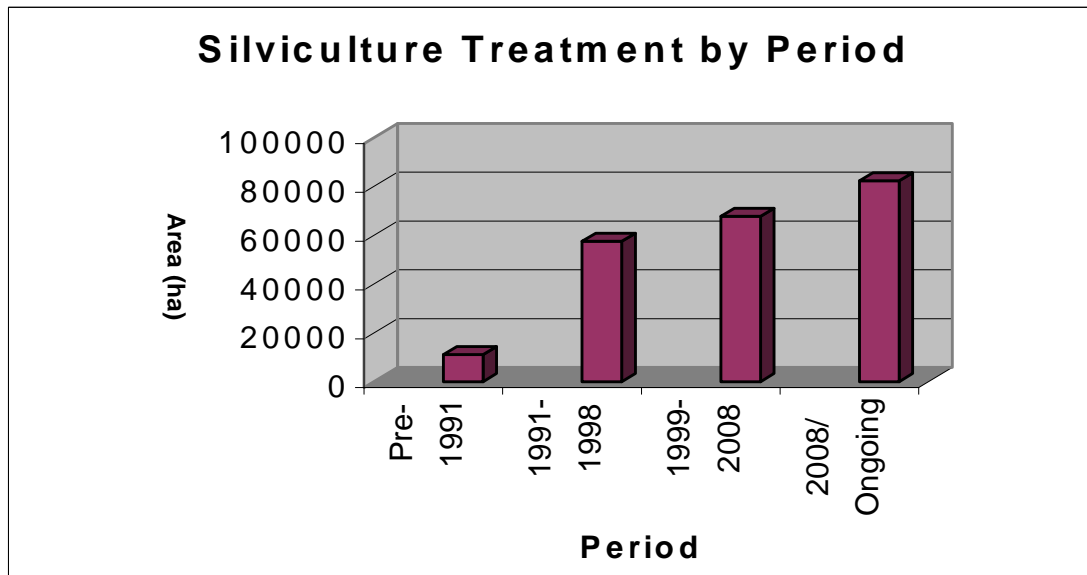


FIGURE 3-4 SILVICULTURE TREATMENT BY PERIOD

^{xxxviii} Growth Intercept = height growth above “breast height” for a period defined, either five or ten years

Silviculture regime	Age		
	Juvenile -----	Mid-rotation-----	Mature-----
1	Natural regime, no treatments	→	Harvesting
2	Plantation, no treatments	→	Harvesting
3	PCT + fertilizer + CT + fertilizer	→	Harvesting
4	PCT + fertilizer + CT	→	Harvesting
5	PCT + CT + fertilizer	→	Harvesting
6	PCT + CT	→	Harvesting
7	PCT + fertilizer	→	Harvesting
8	PCT	→	Harvesting
	No PCT regimes		
9	→ Fertilizer + CT + fertilizer	→	Harvesting
10	→ Fertilizer + CT	→	Harvesting
11	→ CT + fertilizer	→	Harvesting
12	→ CT → + (CT2)	→	Harvesting
13	→ Fertilizer	→	Harvesting
14	→ Fertilizer	→	Harvesting
Note: Relative age of harvesting and other treatments indicated by endpoints of arrows			

TABLE 3- 9 SILVICULTURE REGIME ALTERNATIVES FOR THE WORKING GROUPS OF PURE LODGEPOLE PINE, FIRE-ORIGIN AND SECOND-GROWTH STANDS

Beyond this, the Company was trying to quantify the productivity gains from a variety of silvicultural treatments. They built a conceptual model based on work at North Carolina State University. This model was built on the premise that a site has an inherent productivity, but that what it actually grows depends on specific silvicultural practices. Productivity levels are described by categories. Presslee¹⁵² explained:

A C-level category is assigned to the inherent historic natural productivity. This could be reduced to Type D, E or F levels by poor practices, for example, such as overstocking and understocking, or improper choice of species. On the other hand, production could be increased to Level B through such approaches as sound silvicultural prescriptions, density management and wise species selection. Above B level is the A level -- this enters the era of technological forestry. This would entail such prescriptions as fertilization, competition control, and those types of really intensive treatments. By selective use of appropriate treatments we should be able to capture almost the full inherent productivity of the site. There is a significant difference between the historic yield and what we believe is the potential for the site.

These differences are illustrated in Figure 5.

Growth response is compared to natural productivity, e.g. "C- Level" curve. See Table 10 for explanation of responses.

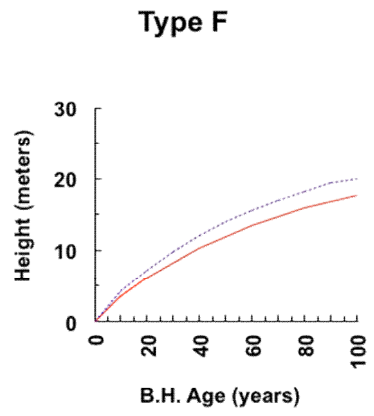
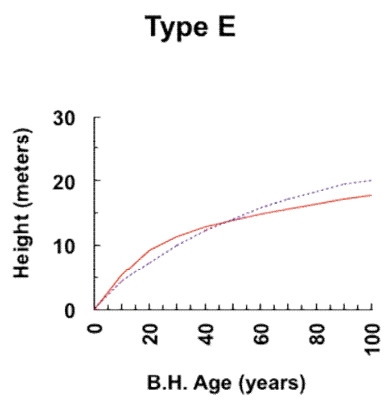
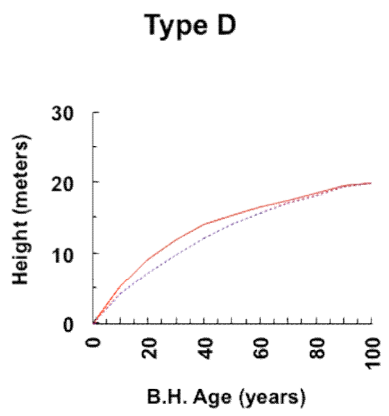
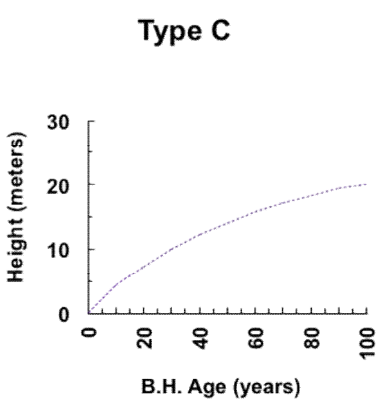
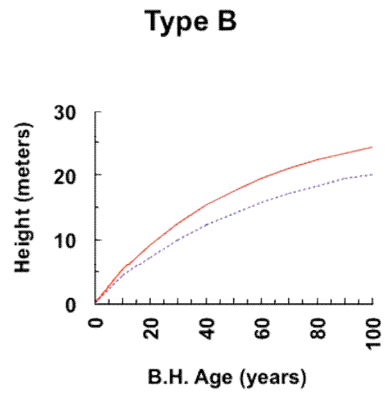
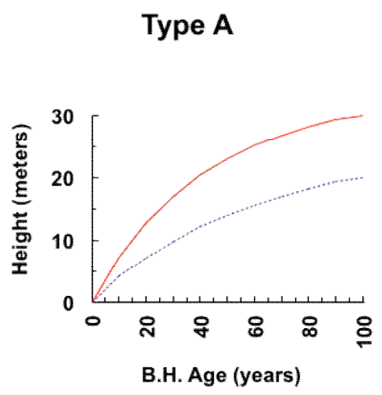


FIGURE 3-5 SIX CHARACTERISTIC PATTERNS OF RESPONSE TO SILVICULTURE MANAGEMENT BASED ON HEIGHT GROWTH

Type	Pattern of Response
A	Productivity is increased above inherent site productivity and maintained through the rotation
B	Inherent productivity of the site is captured through the rotation
C	Natural, i.e. historic site productivity (fire origin stands) is replicated and maintained through the rotation
D	Short-term productivity increases above natural productivity, but no difference by end of rotation
E	Short-term productivity increase above natural productivity, which results in a long-term productivity decrease at rotation age
F	Productivity is less than natural site productivity and stays less through rotation

TABLE 3-10 CHARACTERISTIC PATTERNS OF RESPONSE TO SILVICULTURAL TREATMENT

TREE IMPROVEMENT

Getting the best “bang for the buck” also applied to the tree improvement program. Tree breeding offers opportunities to increase the AAC significantly by improving growth and survival of planted stands over those of natural populations. Diane Renaud was the tree improvement forester responsible for this program. Raised in the Ottawa Valley in a logging family she worked in her youth as a horse logger, later graduating in forestry from Lakehead University in 1981.

A Brief Overview of the Hinton Tree Improvement Program

There are two aspects to this program, the tree breeding program and the seed orchard. Each has a distinct population, and a specific role in optimizing gain while maintaining diversity. In the breeding program, a broad-based population of carefully selected superior trees is bred together to provide a large number of offspring from which the best can be chosen to provide the breeding population for the next generation. The cycle can be continued over many generations. This breeding population is managed to maintain broad genetic diversity while improving traits such as growth rate and disease resistance. Each generation’s breeding population is carefully screened to identify the best trees to form the seed orchard for that generation.

Seed orchard trees, like most other orchard trees, are propagated by grafting. Twigs from the very best trees from the breeding population – the “elite” – are clipped off in late winter, and grafted in the spring onto seedling rootstocks. As the grafted portion grows, the rootstock branches are pruned back. These grafted trees, or “ramets” are genetically identical copies of the original selected tree. Several copies of each tree will be established in the orchard, where they can interbreed with ramets from other selected trees to produce genetically superior seed for reforestation – seed with far greater potential for rapid growth than conventional stock.

While tree improvement programs follow principles similar to those of crop or animal breeding programs, Weldwood studied their experiences to avoid possible disasters, such as have sometimes occurred. For example, disease outbreaks in crops may be a direct result of a narrow genetic base. With too few genes available for selection to combat new or previously rare diseases or insects, populations may be at great risk. In contrast to corn monocultures, where offspring of a single cross (one male

parent and one female parent) may be used to plant an entire crop, the Company's tree breeding programs maintain breeding populations often in excess of 600 parents, and orchard populations of 20 to 150. The buffering capacity conferred by these high diversity levels is particularly important for long-lived organisms, like trees, where growing conditions can change considerably over the life of individual.

History

As early as 1963, Weldwood foresters began to investigate exotic species and exotic provenances of native species through block plantings in a low-elevation arboretum. The Canadian Forest Service Petawawa Forestry Centre contributed many potentially appropriate seedlots. These plantings still retain demonstration value; however, visual inspection and measurements suggest that working with native species and provenances presents less risk than exotics, and that native trees generally display superior form, survival and growth.

Further block plantings of some exotic provenances of lodgepole pine were planted in 1973. Plantings of lodgepole and jack pine hybrids were also established in a high-elevation arboretum. The Canadian Forest Service in Petawawa contributed to seed acquisition and breeding of lodgepole and jack pine crosses in those early years.

These arboreta are places where selected trees are planted for the purpose of studying them more closely. The "lower arboretum" is a half-hectare area planted in 1963-73. Species from North America, northern Europe and Asia were planted in blocks of approximately 200 trees, as well as natural hybrids of lodgepole and jack pines. This arboretum was quite accessible and visible, and many trees were poached by Christmas tree cutters. Survival was poor for many of the species planted and attempts were made to keep them full by fill-in planting over the first few years. In the end, white spruce, black spruce, lodgepole pine and tamarack generally displayed superior form, survival and growth.

The "upper arboretum" is a 1.0 hectare area. Lodgepole pine from Fort St. James and Smithers were planted along with lodgepole pine from the FMA (different sources including some from thinned and unthinned stands). Lodgepole and jack pine crosses were planted, as well as a number of local sources of white spruce and black spruce. The highlight of this site is probably the Western gall rust resistance of local lodgepole pine sources in contrast to the heavy and repetitive infection of sources from Smithers and Fort St. James. This is also the oldest black spruce planted on the Hinton FMA and its growth on this site is quite impressive. Although very small and not statistically designed, these arboreta are visually interesting and have demonstration value.

Good quality seed has always been seen as an opportunity for improving the genetic make-up of stands on the FMA. Specific stands were frequently targeted for collections, but seed from squirrel caches were still used until 1988. Several seed production areas were reserved on the FMA from 1976 until the mid-1980s. However, the work and resources needed to maintain these young stands in production were very expensive. Since 1989 the Company has been targeting higher productivity wild stands for seed collection; cones have been collected from the ground or from helicopters, using Fandrich rakes or cone harvesters designed specifically for this purpose.



DES CROSSLEY IN WHITE SPRUCE SEED PRODUCTION AREA, 1971

WELDWOOD PHOTO COLLECTION

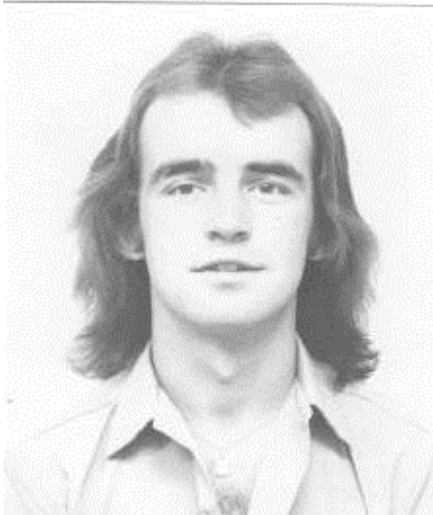
Tree breeding in Alberta began around 1975 when Dr. Narinder Dhir, a forest genetics scientist was hired by the Alberta Lands and Forest Service. He began to develop the comprehensive series of breeding programs in place today in Alberta, and still leads many of these programs.

Around the same time, Weldwood hired its first tree improvement forester, Peter Sziklai, who established seed source and family tests of lodgepole pine. The FMA was divided into eight provenance zones, based on local knowledge of lodgepole pine growth. Seed was collected from twelve parents from each of thirteen stands distributed across the eight zones. Source stands selected were of average or better than average quality, and selected parents were the best trees in their immediate neighbourhood. Selected trees were separated by at least 100 m, to minimize the possibility of relatedness.

Seedlings grown from seed collected from these parents were planted in tests on eight sites, one in each zone. Both local and Grande Prairie checklots were also included in these tests. On two of the test sites, each seedling's family identity was maintained, while on the other six, seedlings were bulked by source stand. Two sites were dropped in 1985 due to poor survival.

Data have been collected from these trials every three years, and have been carefully analyzed. Earlier examination showed no real difference among provenances (geographical source of seed), although large variation among individual families was clearly evident. In 1998, a reclassification of both source and planting sites on the basis of a recently developed ecological classification system allowed reanalysis of the data. The results confirmed local foresters' intuitions, and clearly supported the ecological reclassification. Key findings were:

- a. trees from subalpine seed sources were slower-growing than those from lower or upper foothills sources on foothills sites, but outperformed those other sources on subalpine sites;
- b. survival of subalpine seed sources was better than other sources on subalpine sites;
- c. upper foothills seed sources were good “generalists”, showing the best combination of growth and survival over all sites.



PETER SZIKLAI

STAFF PHOTO, 1976

WELDWOOD PHOTO COLLECTION

Thanks to Sziklai’s foresight Weldwood’s program is now twenty years ahead. Building on these analyses, Weldwood developed a program to produce planting stock uniquely targeting the FMAs most productive growing sites.

In 1988 Drs. Francis Yeh and Sally John were hired under an NSERC cooperative arrangement, jointly funded by the Alberta Land and Forest Service and the Alberta Forest Products Association. Dr. Yeh was professor of forest genetics at the University of Alberta, and Dr. Sally John was a research associate from British Columbia with degrees from UBC and North Carolina State. The program was based in the Department of Forest Science (now Renewable Resources) at the University of Alberta, to facilitate delivery of tree improvement benefits to the forest community. However market factors, combined with the still-prevailing feeling that “there was still more wood on the other side of the hill” limited industry enthusiasm and participation in tree improvement.

As the land base became more fully allocated, awareness of the potential of tree improvement increased. The breeding programs grew in size, complexity and breadth of involvement, and the potential benefits of cooperatives became more apparent. The Huallen Seed Orchard Company (HASOC) was formed in 1993, jointly owned by Weldwood (Hinton), Weyerhaeuser (Grande Prairie), Canfor (Grande Prairie), Millar Western (Whitecourt), Alberta Newsprint (Whitecourt), and Weyerhaeuser (Drayton Valley). The orchard occupies a half-section of prime farmland near Grande Prairie, and now has orchards from five breeding programs of lodgepole pine, white spruce, and black spruce; Seed collected from the orchard is grown to produce better trees for reforestation. Weldwood is a cooperator in two of these programs; two other cooperative programs involving Weldwood, but not under the HASOC umbrella are also underway.

Breeding program development was still under the technical direction of the Alberta Land and Forest Service, but the companies soon recognized that increasing program intensity could markedly accelerate delivery of benefits, in terms of quantity of improved seed and amount of genetic gain.

In 1996, after 13 years with no Weldwood tree improvement forester, Diane Renaud was chosen to fill this position. Later that year, Dr Sally John was retained by Weldwood to provide technical advice in

forest genetics and tree improvement, and subsequently was also retained by HASOC and other cooperative groups to help with the breeding programs involved.

Renaud has introduced some innovative ideas to the program, such as “field grafts in a wild stand, a good stand on the FMA, a plantation, to see if we can accelerate the growth of orchard trees.” She’s also been making “elite” crosses among the very best individuals in the family trials, and stockpiling pollen for future use in the Company’s orchard – both activities can increase genetic gains.

Current programs

With help from David Todd of Champion, Renaud and Sally John developed the Weldwood Elite Pine Program (WEPP) based on the trials established by Peter Sziklai.

Detailed analyses of 19-year data collected in 1997 suggested that large gains could be achieved by establishing a seed orchard of selected trees from these trials. Families were ranked, and initial selections made. The average volume of 26 selected trees from the Athabasca test site was roughly twice that of the site average, or of the local control checklot. The best family had more than twice the average volume of the poorest family, and was almost 50% taller.

An orchard to meet the specific needs of Weldwood’s reforestation was planned, using genetic material from these trials. Fifty unrelated selections were planned, and multiple ramets of these trees were to be established in the orchard. By 2000, 46 trees had already been selected, and more than 600 grafts made.

Although the breadth of the original trials did not provide sufficient diversity to develop a breeding population that could carry the program forward for multiple generations, the planned Presslee Seed Orchard would provide significant gain in Weldwood’s plantations over the first two decades. It was expected that the best genotypes from the WEPP program would eventually be incorporated into other regional program breeding populations.

Weldwood’s tree breeding programs followed well-tested and predictable methods for enhancing and combining desirable traits over generations. They involved crossing individuals of the same species in the same way they could cross naturally. In contrast, the production of GMOs (genetically modified organisms) may involve the insertion of genes from one species into an unrelated species. Natural gene transfer could never take place in such cases; examples include insertion of an insecticidal gene from a bacterium into a crop plant, or fish genes into tomatoes. No gene insertion or genetic modification of this nature was planned in any of the Weldwood breeding programs.

Besides the WEPP program, Weldwood was involved in four cooperative programs.

The Region I white spruce program, shared with Millar Western Forest Products, Weyerhaeuser (Drayton Valley), and ANC Timber, was initiated in 1986, but moved slowly for a decade, due to infrequent cone crops on selected parents. In 1997, following transfer of program control to industry, a detailed work-plan was developed, and the program began to move ahead quickly. Orchard establishment at the HASOC orchard site began in 1998; by 1999, 40% of the trees were in place, and planting of the rest was planned for completion by 2003 or 2004. Progeny tests on five sites were planned for establishment in 2001; seed of 289 families and fifteen checklots were painstakingly hand-sown in early 2000 at PRTs Beaverlodge nursery.

The Region B2 lodgepole pine program, targeting high-elevation pine and developed with Weyerhaeuser (Grande Prairie) followed a similar trajectory. Initiated in 1976, two progeny test sites were planted in 1990, and three more in 1998; more than 600 parents are represented in these tests. Orchard establishment began in 1994 at the HASOC site, and the orchard was 50% established by 2000.

A black spruce program (Region L1) was also developed with Millar Western Forest Products and ANC Timber. Workplan development in 1997 was quickly followed by orchard establishment at Millar Western's Linaria farm in 1999; 10% of trees were established that year. Progeny tests on three sites were planned for 2002.

High elevation spruce seed crops are extremely infrequent, sparse and expensive to collect. Together with Sunpine and Weyerhaeuser (Grande Cache), a program was developed to improve seed supply for the high elevation white-Engelmann spruce areas (Region T). While not strictly a tree improvement program, since there were no plans for progeny testing or expectations of genetic gain, prospective parents were to be scrutinized for phenotypic superiority, and selected parents would be established in a seed orchard. This program began in 1997; orchard establishment was expected to begin by 2002, and by 2000 most parents had already been selected and grafted. A provenance trial, to confirm breeding region boundaries, was to be established in 2001.

Tree improvement is clearly profitable. Overall, volume gains of 3-5% per generation on black spruce and 5-8% on white spruce are expected. Depending on the management choices and the sites chosen to plant the improved trees, advances could average 15% on lodgepole pine. The challenge as Renaud saw it was "fitting within the enhanced forest management initiative, and fitting in within the whole reforestation and silviculture culture of crop planning. That's what makes tree improvement a viable business."

3.8 THE CAMP 1 STORY REVISITED

When logging began in the winter of 1955-56 loggers and camp bosses all lived in Company-built camps located in the cutting areas. The cutting areas were identified by Camp numbers; Camp 1 was the first. It was built on an attractive site with a west-facing view across Wildhorse Lake into a backdrop of the Rockies. It was also easily accessible from Highway 16 west of Hinton, and the original stretch of the highway to Jasper passed through the cutting area and within a few kilometres of the Camp itself. Since this is where logging and silviculture began and evolved, the "Camp" was of great interest.

The Camp 1 area had been known locally as "The Green Timbers". It was part of a larger area of older spruce forest that had somehow escaped the many fires that history showed had occurred during the centuries before. This may have been, in part, because of the natural fire break of Brule Lake along its western edge. Because the timber was old -- ages up to 400 years -- and growing on a wind-exposed site, the wood in the trees was cracked^{xxxix} and also contained considerable pockets of decay, as well as embedded sand. The area was avoided by lumbermen since the wood was not suitable for lumber or ties, although as early as 1909 a timber berth was established covering the whole area. And the wind-blown sand embedded in the trees made frequent saw-sharpening mandatory.

However, the timber was well suited to making wood pulp, with a very high tear strength. It is interesting that Robert Swezey had included this area in his first, but unsuccessful, application for an

^{xxxix} The larger bottom logs typically had both 'ring shake' or separation of the rings and 'checks' or cracks combined with spiral grain so sawn boards would fall apart.

FMA in 1949. The first St. Regis cruisers in 1955 were also quick to identify this as a logical block in which to begin logging.

As Crossley¹⁵³ noted, this area “west of the mill site and bordering Jasper National Park became our initial spruce camp.” The area was close to the mill, had good access, and met harvesting priorities -- cut the oldest first -- because the spruce were aged 300 to 350 years -- so it was an ideal source of mill “start-up” wood.

The operational inventory was completed and logging started in the winter of 1955-56. The operation was state-of-the-art for the era and was considered a test site for spruce harvesting and regeneration strategies.¹⁵⁴ Planning reforestation systems for harvesting to secure natural regeneration was a new concept in Canada.

The prescription was 2-pass strip-clearcutting on a 20-year cycle, removing about 50% of the timber per pass. The strips were narrow, with initial cuts and residuals each 5, 10 or 15 chains wide (100,200,300 m), testing the effective distance of windblown seedfall, and 40 chains (800 m) long. Later, an average width of 10 chains was adopted. They were laid out perpendicular to the wind to facilitate natural spruce regeneration from adjacent uncut strips following the first pass, and to minimize blowdown. Once the first-pass strips were logged, after 10 years, it was expected that they would have regenerated. At that point, in year 11, the second pass would remove the residual strips, the site would be scarified, and regeneration would be assured by planting.

Jack Wright^{xl} reports that one of his first assignments when he arrived at Hinton in 1956 was to design and lay out a shelterwood harvest system trial at Camp 1. This was done, but the contractor, Carl Luger, was unable to effectively harvest the area with all the problems of close-growing trees with intertwined crowns, standing dead snags posing imminent danger to workers, etc and this early approach was abandoned. Had today’s sophisticated harvesting machines been available then, it is interesting to contemplate how this might have changed the silvicultural harvest approach selected.

During the planning and harvesting of the Camp 1 cut there was relatively little known about the soils and sites on the FMA, so no one foresaw the potential problems posed by trying to reforest a highly calcareous site in an exposed windy environment where tree growth is naturally slow. There was also no apparent concern about public input or public reaction to strip clearcuts on this highly visible area on the main tourist route to Jasper National Park. Project originators firmly believed that foresters practicing sustained yield management would achieve the public good.^{155, 156}

The first pass on the area was horse logged, protecting advanced growth where present, resulting on a combination of strip clearcut and strip shelterwood. The plan for the strip clearcutting approach seemed to be working well. Blowdown was not a serious problem in Camp 1 and regeneration was occurring on the cutovers. Skeptics were invariably impressed when taken out and shown the numerous small seedlings that were evident once they got down on their knees and were shown what to look for.

By the mid 1960s the first-pass cuts had been surveyed and were found to have met stocking standards, though they were growing slowly, and removal of the second-pass residuals began. The second-pass was a clearcut with mechanical harvesters with little care to protect advanced growth. Everything looked acceptable. However regeneration surveys soon showed problems with second-pass stocking.

^{xl} Personal communication



**PLANTING BLOCK 168Y, CAMP 1 IN 1968, AND THE SAME BLOCK, FULLY REGENERATED IN 2005
WELDWOOD PHOTO COLLECTION**

What was not clearly realized at the time was the multiple importance of the residual strips in providing a seed source, protection from the persistent winds, and partial shade and increased moisture on the lee sides. Once they were removed, the original sites lost this protection and the individual seedlings grew slowly.

The planners recognized that the local spruce seed source would be removed with the second pass logging, but had planned to plant those cut areas quickly. They focussed on spruce, but also tried lodgepole pine, expecting it to show immediate results. Unfortunately pine was later found to be 'calciphobic' - it could not survive on those high-calcium soils. Douglas-fir did not fare much better. As well, the use of standard scarification for site preparation at that time exposed those highly calcareous soils. The result was a long delay in establishing spruce regeneration after the second pass, then slow growth of the survivors. In appearance the area looked like a huge clearcut since the growth on the first-pass sites was also slow. Over time poplar and brush pioneering species established themselves, providing some additional shelter, and the area gradually recovered. However, there was a lasting impression that no trees were coming back when, in fact, they were -- they just took awhile to make themselves obvious.

In the meantime, other developments were occurring in and around the Camp 1 area. Wildhorse Lake is a pothole-type lake so was barren of fish. Local fishermen prevailed on the Alberta government to stock it with rainbow trout, establishing a popular put-and-take fishery. As well, nearby Kinky Lake was stocked with arctic grayling. Both lakes drew large numbers of anglers, both summer and winter. A campground was built at Kinky Lake, and camping became popular at Wildhorse Lake after the logging camp itself was closed around 1960 when loggers began to commute to work from Hinton.

Trail riding became increasingly popular in the 1960s when the Overlander Lodge was built on the southwestern corner and other riding stables were set up in the Entrance-Prairie Creek area to the east. With the abundant grass in the clearcuts, this area also became a 'free-range' for horses. It was a great place for horse owners and outfitters to turn horses loose to forage during the winter, easily rounded up in the spring as needed. The grazing was not authorized. In fact, Crossley became quite concerned about the impact of horses on the struggling regeneration, through trampling, rolling and pawing for grass through the snow. These concerns led later to government allotted grazing permit areas along Highway 16 and a community grazing lease near Brule. These were all fenced so horses could be confined and managed.

Highway 16 was relocated to the south of Camp 1 and the new paved road from Edmonton drew increasing numbers of visitors past the area to Jasper. Then in the early 1970s a regional airport was constructed at the eastern end, creating more traffic and concerns about the visual appearance.

The response of wildlife to the cutting was interesting, but unfortunately not well documented.¹⁵⁷ The Green Timbers area supported a few moose that fed on willows around natural openings, and deer were found around the edges. Elk passed through on seasonal migrations in and out of Jasper between summer and winter ranges. However, the extensive conifer forest did not provide a lot of feed. All these ungulates greatly increased in numbers after about five years of harvesting. Browse and grass in the cutovers provided year-round feed, and the adjacent residual strips were both shelter and escape cover. These now-roaded areas were heavily hunted in the fall, but populations continued to increase. This changed when the second-pass logging began, and ungulate numbers declined considerably as the shelter and escape cover was removed. Scattered small populations could be found around the margins in relatively isolated areas. Then by the early 1980s trees and brush again began to provide cover and populations again increased. This time, however, in recognition of the ease of access most of the Camp 1 area has been declared as a no-hunting zone.

In the second-pass logging the Company was following the agreed-upon plan for removal of the residual blocks after 10 years. Concerns about the apparent wildlife decline with the second-pass logging led to industry-wide discussions with the Alberta Forest Service, Fish and Wildlife Division and Company to search for an alternative. Discussions led to the "Six-foot Rule." Under this system, harvesting of residual strips in areas of concern for ungulate populations would be delayed until a proportion of the regeneration reached six feet (c. 2 m) in height or greater. Although not a panacea, the rule helped from the standpoint of wildlife and visual perception. However, for the Company it necessitated additional investments in roads to make alternative harvesting areas available to maintain its wood flow. This was among the first of the many 'trade-offs' that the Company was to have to negotiate as resource conflicts began to emerge.

Crossley recalled that "the major concern wasn't how our clearcutting and concomitant harvesting patterns were affecting the management of our wild forest lands, but rather how they affect other users of the land — particularly in the case of those involved in Fish and Wildlife."¹⁵⁸

Eric Huestis recognized this concern, and as Director of the Alberta Forest Service as well as the Fish and Wildlife Division, he encouraged one of his biologists, John Stelfox, to initiate a study in 1956 on the effects of clearcutting and scarification upon wildlife.¹⁵⁹ The study focused mainly on the abundance and habitat of game species, particularly elk, moose, deer, bear and grouse, but included records of occurrence of birds, including cavity nesters, and small mammals. Objectives were to examine the four main seral (successional) stages of forest vegetation on regenerating cutblocks, - grass and forbs (1-10 years), shrubs (11-20 years), pole-sapling (15-25 years) and the immature stand stage (25-60 years) for effects upon the primary habitat requirements of food, shelter and escape cover.

Plots were placed in 1956-57 cutovers of pine, spruce and mixedwood cover types and in uncut mature adjacent forests. Crossley assisted in the selection of plots and provided protection for the sites, which he knew to be crucial in any long-term study.¹⁶⁰ From its inception up to the present time, FMA foresters including Wright, Clark and Udell have co-operated in the protection and remeasurement of the plots. In 1982 when Jim Clark, then woodlands manager, offered the FMA area as a test site for Jack Ward Thomas' approach to forestry and wildlife management, the Stelfox study was already 26 years old, and interest was sustained and increased as integrated resource management gained momentum on the FMA into the 1980s and 1990s.

Plots have been measured four times since establishment, over a period of 4 decades. John Stelfox (by now retired) made the 1996 remeasurements with the assistance of his son, Dr. Brad Stelfox.¹⁶¹ During the life of the study Stelfox changed employers, moving to the Canadian Wildlife Service in 1966, and the new employer and the Company provided ongoing support for the work.

Habitat assessments included detailed counts, heights, percent cover and biomass estimates of forbs, grasses and sedges, lichen and mosses, and trees and shrubs (browse species). Assessments also included population densities from pellet counts, and snag densities. Statistical analyses were run on habitat factors of food, shelter and escape cover as well as population and snag densities.

This project, which was 43 years old at the turn of the century, has provided a long and valuable record of the effects of clearcutting and scarification upon wildlife abundance and habitat. There is also an excellent record of plant succession in regenerating stands, which is of particular current interest to those studying plant succession in second growth forests in the Foothills Model Forest Program on the FMA.



STELFOX STUDY – GAME EXCLOSURE AND SIGNAGE AT CAMP 1, 1961
WELDWOOD PHOTO COLLECTION

How well has the area regenerated today? As David Presslee's observations suggested:¹⁶²

What they didn't recognize was that it was the shelter of the original leave strips that created the conditions that facilitated easy regeneration. Once the leave strips were gone it was a really difficult situation and, although they were ultimately successful, in their kind of trial and error approach to regenerate Camp 1 they made numerous mistakes and it may have seemed rather humbling because I know the individuals involved and they were extremely good at what they were doing. There still was this illusion that there was nothing growing there because it's a very poor harsh site - very slow growing. I came here in 1992 and it was always a concern every time the senior managers flew in to the Camp 1 airport from Vancouver. They would always say, "You

guys got to fix that Camp 1, it looks awful.” Being silviculturists, we're trained to fix things, so we saw Camp 1 as a real opportunity!

In 1994 the Company hired a reputable silviculture contractor who reported back: “Well, what are you guys talking about -- there are trees everywhere out here!” He found acceptable stocking for the most part. What was not good was that the trees were growing slowly and his assessment was that is exactly the way that forest grows out there because of the high calcareous soils and the high lime content. It caused a condition called ‘iron chlorosis’ in the seedlings. We had to wait until the trees grew out of the grassy layer. Seedlings grew very slowly to breast height, and once they got to breast height the trees took off. The second-pass cuts for the most part were just approaching breast height. His final recommendation was to wait, inventory the entire area and set some standards on performance.¹⁶³

In 1999 the Camp 1 area contained less than three percent NSR, as indicated in Table 11. These NSR sites comprised mostly higher, exposed dry west-facing sites.

Designation	Area (ha)	% of Area
S.R. - Conifer	4232	73.4
S.R. - Needs Tending	1382	24.0
N.S.R. – Needs Rehabilitation	152	2.6
Totals	5766	100.0

TABLE 3-11 REGENERATED STAND INVENTORY FOR CAMP 1 -- 1998

In retrospect, Presslee¹⁶⁴ conjectured:

... if the Camp 1 landscape had been mapped by ecological unit and current practices of pre-harvest assessment, joint silviculture and harvest planning, prescriptions and post-harvest/pre-treatment surveys had been in place, many of the technical problems with Camp 1 may have been avoided. However, these terms and procedures were yet to enter the lexicon or practice of forest management planning. The public input policy now in place would ensure significant public participation to both planning and operations including the addition of “visual landscape quality” objectives for such a highly visible corridor, and could well be a major factor in the choice of silvicultural system and the nature and timing of operations. The technical and public concerns raised by areas like Camp 1 persist to challenge FMA foresters on an ongoing basis. For example, a visual landscape inventory has been completed for the FMA area with attendant guidelines for planning and operations - including, in some cases, no harvest at all.

But, in fairness to those pioneers who designed the system in 1955 and carried it through to successful conclusion -- it was a state-of-the-art plan for the period, even with considerations for wildlife, recreation and aesthetics. It was a very early example of an integrated harvest and reforestation plan. And it was also an early example of adaptive management when regeneration problems became evident in about 15 years as the residual strips were being removed. No easy answers were immediately found, but a great deal of thought, research and planting effort were freely expended in the process of searching for alternative treatments.

3.9 SUMMARY AND CONCLUSIONS

Crossley and his successors established a culture of excellence at the Hinton operation, which today's foresters feel honour-bound to continue. The long history of silviculture is one of continual exploration and search for better and more cost effective ways to sustain the forest and all it represents to the environment, the economy and the community that depends on it.

This pattern and tradition was set forward in the first set of operating ground rules for the Company, which provided a view of adaptive forest management which preceded by more than 30 years its current definition. But the description of the proposed approach to management was uncannily close to today's understanding of adaptive management. In essence, it required both Company and government to regard the FMA area as a large pallet on which they would test their hypotheses of good forest management, gradually building a base of experience and exemplary practice through this approach.

Early attempts to implement an intensive forest management program were foiled by circumstances beyond Crossley's control, but are finally being realized as the century closes. Following a brief loss of focus in the late 1980s, the silviculture program has been revitalized and now makes its full contribution to sustaining the Company's allowable annual cut and biodiversity management program.

Dr Stan Navratil found his personal silvicultural niche with Weldwood at Hinton. In summary remarks during an interview for this project¹⁶⁵ he commented on both the challenge and satisfaction of his association with Weldwood:

I can tell you also that it was the challenge. I had to use everything what I knew and I had to go back to the original literature and use my network of contacts, be it in North America or in Europe. First, the reason for that was that I've been designing the program in many subject areas, from thinning to fertilization, to alternative silviculture systems, stand density management, so that's where I think my broad experience from Europe or experience from various research locations in Canada proved to be very valuable.

In addition to that I had to gather additional information. It was rewarding for me, researchers are always like hobbyists, getting a new piece of information, getting a new toy. We are always learning. It was challenging to provide Weldwood with the best information, not only from my own knowledge and experience but also adding to it from the literature and contacts with other experts. I think we have succeeded in developing a very diversified program for Weldwood.

In terms of my own satisfaction, if I achieved the goal -- I want to make some contribution -- well, it's for Weldwood to judge. Weldwood has now the program set up for enhanced forest management in several areas -- fertilization, thinning, alternative silviculture systems. We had only four or five years to do that and we are already at the stage of working on modified yield curves. It's quite an accomplishment.

achieved collectively with the Weldwood staff. Weldwood in this area is far ahead of any company that I know in Alberta. So I'm quite happy about it. It was the great opportunity for me, not only with respect to Weldwood and also to Alberta.

Weldwood forester Udell ends this chapter with a comment on the enduring legacy of the Silviculture program at Hinton:¹⁶⁶

This is hard to describe, but it is an inherent code of ethics passed on from one generation to the next as a kind of trust. Who could break this trust by jumping on the latest bandwagon after having received the torch from the likes of Crossley, Loomis, Wright, Presslee and all those others watching our every move?

TABLE 3-12 SILVICULTURE MANAGERS AT HINTON AND THEIR CONTRIBUTIONS

<p>1955-64 : Desmond I. (Des) Crossley</p> <ul style="list-style-type: none"> - Negotiated FMA giving industry full responsibility for silviculture - Persuaded company to treat forestry as an operational cost instead of capital investment - Pioneered use of scarifiers for natural regeneration of lodgepole pine - Alternate strip cuts for natural regeneration of white spruce - Experiments for improved silviculture practices - CFS encouraged to implement large research program on FMA
<p>1960-61: Gordon Jones</p> <ul style="list-style-type: none"> - First appointment to a designated silviculture position – a time of transition.
<p>1961-64: Desmond I. Crossley</p> <ul style="list-style-type: none"> - Focus on scarification and trials of seeding and planting - Hank Somers (silviculture technician) responsible for field operations
<p>1964-68: R.D. (Bob) Carman</p> <ul style="list-style-type: none"> - Formal post-harvest silviculture survey introduced (Management Opportunity Survey) - Design/ construction of first containerized forestry greenhouse in Alberta - Greenhouse culture experiments, other field trials
<p>1968-74: I.S. (Steve) Ferdinand</p> <ul style="list-style-type: none"> - ECA's "Shulco Report" commends company silviculture and forest management program - Developed "Ferdinand" roottrainer seedling system - Expanded original greenhouse - Zimmer Report (STOP) criticizes company practices, vigorous response discredits Zimmer - First detailed proposal for intensive forest management

1974-87: Ullrich (Bill) Mattes

- ECA report complimentary to company despite attempt by Ray Gideon to castigate forest practices
- new greenhouse built (1980)
- public controversy over proposed herbicide program
- championed early planting to address vegetative competition
- precommercial thinning program instituted
- tree improvement forester hired, resigns and not replaced

1987-93: William (Bill) Rugg

- developed regeneration stand inventory (1990)
- trials on soil compaction and remediation begun
- planting system changed from summer students to contractors
- precommercial thinning suspended
- operational silviculture program to Districts
- greenhouse switches to styroblocks from Spencer Lemaires
- Kimmins/ Brace review of silviculture program identifies problems
- "Crossroads" report recommending necessary changes
- silviculture research under model forest program

1994-2000: David Presslee

- report on Tree Improvement/ new program/ TI forester Diane Renaud
- silviculture planning and operations returned to control of manager
- rigor restored to program
- ecological classification for west central Alberta developed
- ecological classification of FMA area implemented
- ecologically based harvest and silviculture planning implemented
- backlog NSR identified, program begun to eliminate
- program to eliminate backlog tending implemented
- intensive forest management proposal accepted
- IFM options scoped, several trials installed
- Historic forestry trials remeasured
- Greenhouse closed

2000- : Roger Hayward

Tree Improvement Foresters:

1976-81: Peter Sziklai

1996- Present: Diane Renaud

Notes: Strong leadership by Chief Foresters led to their direct involvement in a number of the projects, programs and issues of the day. Their omission, as well as many other silviculture team members, from this table should not be interpreted as lack of direction or involvement, because their names are inextricably tied to the proud history to the enterprise.

CHAPTER 4: LOGGING PLANNING AND FOREST HARVESTING

... Civilization requires slaves. Unless there are slaves to do the ugly, horrible, uninteresting work, culture and contemplation become almost impossible. Human slavery is wrong, insecure and demoralizing. On mechanical slavery, on the slavery of the machine, the future of the world depends.

Oscar Wilde, cited in Silversides, 1997¹⁶⁷

... While the tools of logging have generally evolved in steps with refinements in metallurgy, the actual systems employed remained remarkably constant until the middle of this century. This was particularly true for the process of felling, bucking to length and skidding to a landing for transportation. ... Since the late 1940s, however, the practices, tools and techniques of logging have been dramatically altered by rapid, unprecedented mechanization

P. Murphy and G. Wilson in Silversides 1997¹⁶⁸

4.1 INTRODUCTION AND ACKNOWLEDGEMENTS

Logging for the new company at Hinton began during the winter of 1955-56 to ensure that wood would be available in the wood yard when the mill started production, expected early 1957. The objective then was to have a full year of wood reserve as a buffer against possible delivery problems. The timing of this logging was at the beginning of the period of “rapid unprecedented mechanization” described by Ross Silversides, a leader in the study of mechanization with the Canadian Forest Service. It began with a mix of hand felling and bucking using arm-powered Swede saws and early power saws. Skidding was largely by horse, augmented by a few small tractors. The eight-foot wood was hand piled in the bush four feet high to be scaled before loading and hauling. Within forty years woodworkers had been reduced in numbers from 1,000 to 200 in the bush, while harvested volume rose from 700,000 m³ to over 2,000,000 m³ -- a reflection of advances in both mechanization and logging planning.

The practice of forest harvesting, or logging, is the essential operation in running a forest industry. Wood has to be delivered to the mills for processing, of course. As well, the right wood has to be sent to the right mill, it has to be the proper quality, delivered on time and at a cost-competitive price. At the same time, logging is part of the cycle of forest management, marking both the end of one forest and the start of a new one; and the impact on ecosystem processes and environmental quality must be minimized. Logging practices have therefore become sophisticated, based on extensive planning well managed operations. These refined practices developed under the direction of a succession of managers.

The first Woodlands Manager was **Gordon McNab** who was responsible for setting up the first camps, building the first roads and successfully getting the first wood into the mill yard. He started in 1955, coming from Ontario where he had been manager of a logging operation later taken over by St. Regis. His assistant was Stan Hart.

Adrien Provencher was brought in two years later in 1957, also from eastern Canada where he had been with a St. Regis operation. He was manager until September 1962 when he was promoted to take

charge of the St. Regis Woodlands North Division, at their office in Montreal. Adrien was well experienced in woodlands operations and smoothly oversaw wood flow in consultation with mill managers as the pulpmill started production, working out the technical problems related to species and quality. He oversaw the full implementation of logging and forest management programs and the expansion of the road system to much of the FMA area.

Stanton G.V. (Stan) Hart became Woodlands Manager in 1962, taking as his assistant Jim Clark. Stan had been raised in a 'forestry' family and obtained his forestry degree at the State University of New York at Syracuse. He worked as a forester with St. Regis and was a member of the original crews sent out to check the Edson-Hinton area in 1954 and 1955, moving to Hinton full-time as a '55er. Stan went on to become Woodlands Manager at Hinton before moving back east in 1968. He successfully led the transition from horse logging to introduction of the first major skidder operation in 1967.

James D. Clark was named Woodland Manager in 1968 to replace Stan Hart. Jim had come to Alberta in 1949, one of the UBC foresters recruited by Eric Huestis. After working in the Rocky-Clearwater Forest, Jim moved back to B.C. with their Forest Service in Kamloops. Jim was recruited back in 1955, also a '55er, by Des Crossley to help to get the immense forestry program underway. After contributing substantially to this end he transferred to Woodlands in 1960 as District Superintendent under Adrien Provencher, then replaced Stan Hart as Assistant Woodlands Superintendent when Hart took over. This was the pivotal time of changing to mechanization of logging, and together Hart and Clark got the process underway.

Clark left for two years in 1966 to be Woodlands Manager for the new Parsons & Whitmore (now Weyerhaeuser) operation in Saskatchewan, but was hired back in 1968. He oversaw the conversion to mechanization and commuting and led the way to sustained efficient operations. It was in 1982 that Jim offered his support to introduce a trial wildlife management program – an unprecedented idea in Canadian forestry that led in 1985 to the start of that program at Hinton. Jim also contributed professionally, among other undertakings, as President of the Canadian Institute of Forestry, President of the Alberta Forest Products Association and member of numerous advisory committees.

Upon his retirement in 1985 he was succeeded briefly by **Robert (Bob) MacKellar**, another '55er who had been active in Woodlands operations since 1961. Bob was raised in the woods in New Brunswick, was a graduate of the Maritime Forest Ranger School and started with the cruising crew at Hinton. He soon found his way into Woodlands operations, becoming a district superintendent then Woodlands Production Manager before he retired in 1987.

Donald Laishley was invited by Ken Hall to lead the newly-combined Forest Resources Division, incorporating both forestry and woodlands components, starting in January 1986. Don was a UBC 1960 forestry graduate, raised in Nelson in a family with a logging history. He worked in the woods and sawmills after high school before deciding on forestry as a career. He learned about logging and business in practice before joining Forestal International in 1969 – becoming vice-president the next year and president and CEO by 1975. He worked closely with Ken Hall to develop a new FMA agreement proposal and to successfully negotiate it with the Alberta government. In addition to leading changes at Hinton, he became active in the Canadian Pulp and Paper Association, providing leadership in sustainable forest management and certification. He played a major role in the 1990s update of the Timber Damage Assessment Tables for Alberta, including the buy-in by the oil and gas industry. In 1994 Don moved to Vancouver to lead a corporate policy and planning initiative, leaving a solid team in the Forest Resources department to carry on.

Dennis Hawksworth was appointed General Manager of Forest Resources and Hi-Atha in 1994 when Don Lashley left. Dennis was raised in the Okanogan area in B.C., making an early decision to work in forestry after experience in a local sawmill. He graduated from UBC in 1972 and moved to Prince George to work for Netherlands Overseas Sawmills in both woods operations and Sawmilling. In 1976 he was recruited by Weldwood to help construct a new sawmill at Burns Lake, also serving as a roving project manager. He moved to 100 Mill House in 1983 as general manager. When the expansion projects began at Hinton he was asked to visit in 1987 to advise on design of the new sawmill – then moved to Hinton in 1988 as project manager to build it. He was named head of Forest Resources and Hi-Atha, holding that responsibility until 1999 when he was appointed Vice-President, Hinton Forest and Solid Wood. Dennis served as president of the Alberta Forest Products Association and was also active on national scene through the Canadian Pulp & Paper Association and other committees.

Also in 1996, **Bryon Muhly** was named manager of the merged **Planning and Forest Operations**. Bryon started in the sawmill after his graduation in forestry from the University of Alberta in the spring of 1977, then moved through Woodlands from the field through trials of various logging systems and to supervisory positions. He found that his southern Alberta farm background also gave him a stewardship ethic, a sense of the production cycle from planting to harvest, familiarity with machinery and an understanding about cooperative working relationships. Working with Jim Clark, he developed an insightful plan by which to encourage more effective coordination of the forestry and harvesting aspects to enhance both forest conservation and cost savings, setting the stage for Don Lashley's reorganization.

Several changes took place in 1999. When the volume and complexity of wood exchanges among mills increased, Bryon was appointed to a new position of Manager, Resources Optimization.

In 1999 **Jim Lelacheur** was appointed head of Lumber and Forest Resources to replace Dennis Hawksworth. Jim is a 1978 UBC forestry graduate with a major in forest harvesting, earned his R.P.F. in 1980. His experience is largely in forest harvesting and sawmilling. He worked in the Williams Lake area and started a new sawmill at Chezacut, later in charge of a 275,000 m³ per year operation for Jacobson Brothers. Moving to Nakusp in 1987 he was woods manager for Westar, then woods manager for Weldwood at 100-Mile House during the CORE process, Forest Practices Code introduction and public involvement, later supervising the sawmill. In 1996 he moved to Hinton as Hi-Atha mill manager, mentoring under Dennis Hawksworth.

Rick E. Ksiezolposki was hired from Tolko Manitoba operations to replace Muhly as head of Forest Resources.

This Chapter was also developed by a number of individuals. Text was drawn from reports by, interviews with and contributions from most of the former managers, as listed in the Endnotes of references. In particular we acknowledge with appreciation the memoirs compiled by **Jim Clark** and the many references and editorial comments provided by **Stan Hart**. An early draft was prepared by Colin Bamsey, later reviewed and edited by Bob Udell, Bryon Muhly and Jack Wright.

Writer, editor and communications consultant, **Bob Bott** contributed of his considerable editing skills while also reducing the volume for a more concise publication. Forest historian **Bob Stevenson** contributed from his impressive collection of historical and contemporary photographs to better illustrate the story.

To this outstanding aggregation of contributors -- many thanks.

4.2 HISTORICAL – WHICH TREES TO CUT

The question of which trees to cut has no simple single answer. Before the Hinton FMA in Alberta, as early as 1950, the government recognized the need to “make possible a fair return to the operator but at the same time leave a residual stand of desirable trees for reasonably frequent re-cuts and ensure reproduction.” Higher diameter limits on timber sales indicate increased regard for after logging growth and a realization that partial cuts are in harmony with the objectives mentioned above. On the other hand, regulations based on diameter limit alone as the only restriction in determining the trees to be left standing causes great variation in degrees of cutting and disregards entirely the condition of the trees from the stand point of health and desirability. Therefore, a blanket policy of cutting to a diameter limit for every berth is not good forest management. When and wherever possible each should be dealt with specifically with cutting regulations recommended to suit its own characteristics and possibilities.¹⁶⁹

The whole idea of cutting to diameter limits was for a sawlog product, be it lumber, railway ties or mine props. The use of diameter limits was an administratively simple way of limiting the cut to larger trees, leaving the smaller ones to release growth and re-seed the open areas. By 1959 the emphasis switched to consider the age and condition of the trees, rather than just their size. Where partial cutting was to take place, cutting was restricted to no more than 40% of the total volume.¹⁷⁰ This prevented the common temptation of “high-grading”, or taking all the best trees and leaving behind crooked trees, and those infected with disease to produce inferior seedlings for the next crop. Some of these diameter-limit cuts did result in new growth of residual trees, but most did not. Approaches that were more stand- and species- specific were needed, along with regeneration practices to ensure forest renewal. The advent of Alberta’s first FMA and first pulp mill signalled a dramatic change from the old diameter limit system.

On Hinton’s new FMA, all major tree species were allowed to be harvested, but right from the outset it was agreed that harvest must be on a sustained yield basis, as reflected in the agreement signed 14 September, 1954:

1.(b) to authorize the Company to cut and remove from the pulpwood lease spruce, either black or white, jack or lodgepole pine, balsam fir and poplar timber on a sustained yield basis.

Once the St. Regis team had organized its Woodlands Division in May, 1955, and Gordon McNab, former logging superintendent at one of the Marathon Paper Company operations, was hired as Woodlands Manager, the need to immediately address the entire harvesting process was apparent. As Crossley recalled:¹⁷¹

Since the lease was so big, it became apparent that it must be sub-divided into more manageable units. The decision was made to create 4 units or working circles, each of approximately half a million acres, each to be managed separately with its own allowable annual cut, and each to come on stream progressively. Each working circle was subdivided into compartments, each designed to support a cut to be spread over a 20-year period. Those compartments containing the most over-mature and decadent timber were allocated to the first 20-year cutting cycle.^{xli}

^{xli} Subsequently, the Athabasca-Berland Working Circle was split into two Working Circles, bringing the total to five.

Blocks to be harvested were designed for a “two pass” alternate clearcut system. Half of the cut blocks, in alternating sequence, would be cut in the first “pass” and the remainder would be left standing. When the “first pass” blocks were reforested, the “second pass” blocks could then be harvested and reforested. Each compartment was designed to contain 500,000 cords of standing timber. At 25,000 cords per year, a 100-man camp would complete the first pass in 10 years, then stay on to harvest the remaining blocks in the second half of the period. There were nine, 100-man camps and several smaller ones (Camps 9, 13, 15, 16).¹⁷² The basic rule for the early plans was to harvest the oldest stands first, since they were growing slowest and were most vulnerable to fire, wind, pests or disease. In the terminology of the day, the most overmature stands were considered “decadent.”

Over the past 40 years, harvest planning has evolved from a system which was largely timber-driven to today’s system of plans that consider and incorporate a wider range of uses and values in harvest designs. Although timber production is still the prime use of most of the FMA area, planners also consider and balance other values such as watershed protection, aesthetics, recreation, wildlife and fish habitat, archaeology, and biodiversity.

The size of cutblocks has generally been dependent on the type of harvest system used. When horses were used, blocks tended to be small because horses could efficiently skid only about 50 metres. When large cable skidders were added, skid distances of 500 to 800 metres were within reason, and block sizes could be larger, but usually block were less than 40 ha. Later, block sizes began decreasing because grapple skidders have a maximum skid distance of 200 metres, and because of other considerations such as wildlife habitat. Then forwarders arrived on the scene and economic skid distances increased again.

Today, the logistics of skidding is only one factor influencing block size. Some parts of the current FMA area have been identified as having higher value for resources other than timber. In those areas, modifications to conventional harvesting systems are being evaluated and implemented. These include techniques like smaller patch cuts, cuts with structural retention such as individual trees or groups of trees, longer (or shorter) intervals between harvest passes, and shelterwood cuts (an even aged form of selective harvest). More recently, studies on the nature, pattern and size of natural disturbances are pointing to the need for a variety of block sizes and arrangements on the landscape over time. All these have a place in the planners’ tool basket. Weldwood is now at the point where a range of options is available that can be tailored to meet the needs of particular sites and conditions.

Deciding ‘Which trees to cut’ is now aided by the use of a Geographic Information System (GIS) , technology that allows data to be compiled for specific ‘polygons’, or geographically locatable units anywhere in the FMA. All maps, formerly hand drafted, are now produced using the GIS. More importantly, the system supports all the data which is tied to the map features. The GIS technology is designed in such a way that by merely changing the boundaries of features on the map, the planner is then able to receive information from the system about the impact of those changes on such values as timber volumes, log profiles, summer/winter wood splits, and wildlife habitat.¹⁷³ This is a technology whose applications are rapidly increasing.

More sophisticated planning tools continue to evolve. Because of the importance of accurate forecasting for both the pulpmill and the sawmill, company foresters are integrating forest inventories with field sampling, yard delivery measurements and mill recovery to produce ever better estimates at the block level. Using this system, a planner can produce accurate forecasts of log deliveries by diameter, species and product type from a long list of blocks proposed for harvest at any time. This system will become more important as both pulpmill and sawmill begin to implement “custom runs” for particular customer needs, e.g. pulp for lightweight coated paper production, Japanese lumber grades.

4.3 AN OVERVIEW OF LOGGING DEVELOPMENT

"No machine has yet been produced to equal the horse for its ability to snake logs out of the forest with a minimum of disturbance or damage."

-- C. Ross Silversides, 1964

Canadian forester C. Ross Silversides (1916-1993) spent most of his long career in government and industry assessing new technologies for removing wood from the forest. His monograph, *Broadaxe to Flying Shear*, published posthumously in 1997, details the transformation from horses and hand labour to mechanization that he witnessed firsthand. This section outlines the major changes that took place within each of the various phases of logging from falling to hauling.

While mechanization brought great improvements in efficiency and safety, Silversides became increasingly concerned about the impact on "the forest as a whole" and in his later years advocated a "softer technology" capable of balancing social, economic and ecological considerations. Such technologies began to emerge in the late 1980s, and they played a crucial role as the industry shifted its focus to sustainable forest management in the 1990s. Machines today can actually be "softer" than hands and horses without the high cost and the danger to life and limb.

Technological change affected every aspect of production -- felling, delimiting, skidding, loading, hauling, woodyard and mill -- but the most dramatic advances occurred in the woodlands, where daily output per worker soared from about seven cubic metres in the 1950s and 1960s to more than 130 cubic metres in the 1980s and 1990s. Meanwhile, the number of serious injuries plummeted almost to zero, as discussed later in this chapter (section 4.9).

As the new technologies were introduced, the number of workers "on the forest floor" dropped dramatically. A way of life in the logging camps disappeared. Workers needed higher levels of skill and training. Mechanics moved in as blacksmiths moved out.

The technologies had other social and environmental consequences that were initially unforeseen. Roads opened up public access to formerly inaccessible forest areas at the same time that the environmental movement was gaining momentum in Canada and internationally. The industrial "footprint" in the forest was heaviest and least pretty in the 1970s and 1980s, just as many urban Canadians were discovering both outdoor recreation and environmentalism. In the 1990s, a new wave of "softer" methods and technologies began to reduce environmental and aesthetic impacts, but a highly polarized debate continued about when, where and how to conduct harvests.

The following table (Table 1) shows some of the key technologies and the approximate era in which they were adopted by the Alberta forest products industry. Some of these will be discussed in the ensuing section of this chapter.

Company foresters had a second, equally important reason to modify harvest methods in the 1990s. Surveys of regeneration on recent harvest sites showed that heavy equipment and practices such as roadside delimiting were reducing the effectiveness of reforestation. If continued, this could have severe consequences -- more need for planting and other costly silvicultural treatments, less growth and yield, and an annual allowable cut lower than might be achieved otherwise.

Lighter and more versatile equipment helped to reduce these impacts, but perhaps the most important change was the integration of silviculture and harvest planning. Careful evaluation of ecological conditions enables planners to choose the best combination of harvest design, equipment, time of year, and silvicultural treatment for each specific site. Yet another technology, the computerized geographic

information system (GIS), plays a key role in the integration of silviculture needs, along with other values, in these sophisticated harvest designs.

Economic forces and government policies brought a third factor, wood utilization, to the fore in the 1980s and 1990s. As the Environment Council of Alberta noted in its 1979 report, nearly 50 per cent of the harvested wood was ending up in burners or landfills, and a lot of potentially merchantable timber was left on the forest floor. Companies and government recognized this waste was both economically and environmentally undesirable. By the 1990s, there was a much greater integration of lumber, pulp and panelboard operations, aiming toward maximum value added from the harvest. Full utilization of all cut timber became a key consideration, as did the quality of wood delivered to mills. New technologies also emerged during the 1980s to produce pulp and panelboard from aspen, formerly regarded as a weed species. Managing the wood inventory, at both roadside landings and the mill woodyards, became increasingly complex.

TABLE 4-1 KEY TECHNOLOGIES BY ERA IN FOREST OPERATIONS

Activity	Before 1950	1950s	1960s	1970s	1980s	1990s
Camps	logging camps, almost all in winter	'modern' camps with power and water, mostly seasonal work	daily commuting, moving toward year-round operations	year-round, commuting	year-round, commuting, reduced woods labour	year-round, commuting, further reduced woods labour per cubic metre harvested
Felling	crosscut or swede saw felling, undercuts with axe	Chainsaw felling replaces handsaws	lighter, safer chainsaws -- later anti-vibration designs	shear head feller-buncher (tracked) or chainsaw	saw head feller-buncher (tracked); high-intensity lighting, night shifts; reduced chainsaw use	feller-buncher or stumpside feller-processor (tracked or wheeled); minimal chainsaw use
Delimiting	axe or swede saw delimiting	chainsaw delimiting	chainsaw delimiting	chainsaw or roadside delimiting	roadside delimiting	in-block or roadside delimiting (or feller-processor)
Log lengths	50- or 100-inch pulp logs (1.25-2.5 metres); eight- or 16-foot sawlogs (2.5-5 metres)	50- or 100-inch pulp logs (1.25-2.5 metres); eight- or 16-foot sawlogs (2.5-5 metres)	transition to tree-length skidding, hauling and woodyards	whole-tree skidding and roadside delimiting; tree-length hauling and woodyards	tree-length continued	multiple systems including tree-length and cut-to-length (CTL)
Bucking (and chipping)	crosscut or swede saw	Chainsaw	chainsaw top, some chainsaw bucking	tree-length, shear topping	tree-length, shear topping; portable roadside chippers	tree length, shear or saw topping, or cut-to-length (CTL) sawing; roadside chipping
Skidding	horses, early bulldozers	horse, winch or rigid-frame tractor	horse or articulated wheeled skidder -- cable	cable or grapple skidder	cable or grapple skidder, wide tires, soft "terra" tires	various types of skidders or forwarders, low-impact tires and tracks

Roads	horse-drawn buckets and graders, tracked vehicles for road building, winter roads and ice-rutters	more powerful engines, earth movers, winter roads and some all-weather roads	winter and all-weather roads	winter and all-weather roads, pre-cast bridges	more all-weather roads; more bridges and culverts to reduce erosion and siltation	more all-weather roads; portable temporary bridges; low-impact installation methods
Loading	hand loading or A-frame and horse	A-frame and winch, grapple or front-end loader	mobile crane	self-loading truck or mobile crane	self-loading trucks, front-end loaders, chip blowers	multiple systems [photo montage or illustration?]
Bush to Mill	river drives, flumes and booms, rail, sleighs pulled by horses or tractors	variety of light to heavy trucks hauling wood to mill	off-highway heavy duty trucks; radio dispatch	self-loading trucks, year-round operations	portable chippers, chip vans, variety of truck configurations	central tire inflation, geographic positioning systems (GPS) and computer assisted dispatching

4.4 KEY WOODLANDS TECHNOLOGIES

At Hinton, foresters faced a series of challenges as they figured out how to get wood from the stand to the mill. Changing technologies radically altered the responses to those challenges. The chainsaw began the trend to mechanization that continued with feller-bunchers, delimiters and feller-processors. The rubber-tired articulated skidder was perfected a few years too late to be used in the initial harvests, but quickly replaced the horse between 1966 and 1969. Now skidders are giving way in some instances to "forwarders" that carry wood rather than dragging it on the ground. And the entire operation, relying on trucks to haul wood to the mill, would not have been possible without the bulldozer for road building.

Each combination of technologies produced a different result in the forest. Horses could only skid efficiently for short distances, 100 metres or less, and generally downhill, so cutblocks tended to be relatively small, but a great deal of road building was required. Rubber-tired cable skidders were efficient over distances up to about 800 metres, and the first generation of feller-bunchers, mounted on heavy crawler tractors, were most efficient for large clearcuts. As a result, in the 1970s and 1980s, mechanization led to larger cutblocks and bigger roadside landings, but reduced the need for roads. New machinery designs subsequently allowed a variety of options, including selective cutting, and harvest could occur up to a kilometre or more from the nearest road. This flexibility was crucial in meeting the multiple objectives of sustainable forest management.

FELLING AND DELIMBING

The chainsaw was just coming into its own as operations began at Hinton, although there had been designs and prototypes for such machines since the 19th century. Cost, weight and reliability were the big drawbacks of early models, and it was not until the 1940s that chainsaws began to appear in Alberta forest operations. Post-war improvements finally produced machines that were clearly superior to the woodsman's traditional axes, crosscut saws and "swede" bow saws.

Usage of chainsaws in the Canadian forest industry went from under 10 per cent in 1948 to over 90 per cent in 1958. Because fallers at Hinton had to provide their own tools, some newcomers in the early years tried to get by with handsaws and axes, but generally held out only a few days before they quit or obtained chainsaws. As the machines became more reliable and affordable, they also got lighter and safer. Important developments in the following decades included anti-kickback chains, chain brakes, more powerful engines and better vibration suppression.

Feller-buncher machines, with cutting shears on long hydraulic arms, began to replace chainsaws after 1973. Workers continued to use chainsaws for delimiting for a while longer, but mechanical delimiters took over this task as well. Saw heads began to replace shear heads on feller-bunchers in the late 1980s. Later machines, called feller-processors, could delimit and top trees at stumpside and if necessary cut logs to length. By the late 1990s, saw-head feller-bunchers and feller-processors accounted for more than 90 per cent of the harvest at Hinton.

SKIDDING OR FORWARDING

In the 1950s, the biggest technological puzzle for the forest industry was how to get wood from stump to truck. Horses or oxen were the traditional means of skidding logs from the bush to the nearest road, river or railway, but the industry urgently sought safer, more economical and less labour-intensive ways to accomplish this.

In British Columbia, cable systems had long been used to "yard" logs on the ground or in the air. This

was well suited to mountainous terrain and dense stands of large timber. Between 1957 and 1959, North Western Pulp & Power tested four yarding machines at several locations, but this method was not economical for foothills forests and pulpwood operations.

Elsewhere in North America, a variety of rigid-frame wheeled vehicles -- typically based on farm tractors or four-wheel-drive trucks -- had begun to replace horses for skidding on easier ground, but they could not cope with the heavy bush, steep slopes, sharp turns and sudden changes in grade often encountered in forests like those around Hinton. The forest industry also used crawler tractors occasionally for skidding, but they were expensive to buy and operate, and caused a lot of damage to soil and standing timber. As a result, the Hinton operation relied mainly on tried-and-true horse skidding for the first decade until better technology was developed.

Companies such as Garrett and Wagner in the Pacific Northwest developed the first really effective, economical and versatile skidders in the late 1950s. These four-wheel-drive, rubber-tired machines were hinged or "articulated" in the centre. Steered by hydraulic pistons, they could maneuver around obstacles and keep all four tires in constant contact with the ground. Such machines began to be introduced commercially around 1958, but it took several more years to find the right combinations of weight, power, tires and brakes for various forest types.



GARRETT TREE FARMER TRIAL AT CAMP 22, MCLEOD 6, 1964

WELDFWOOD PHOTO COLLECTION

The machines initially used a winch and cable to secure the logs, but later models were equipped with a hydraulic grapple for this purpose. Grapple skidders have a shorter effective range, generally 200 metres or less, compared to cable skidders. (The effective range of grapple skidders is shorter because they carry fewer logs at a time than a cable skidder. It is not economical for an expensive machine to make long round trips with a small amount of wood.)

An alternative method of moving wood from stump to roadside is the "forwarder" which carries wood on a deck or cradle and therefore avoids rutting soil. The Pettibone-Mulliken Carry-Lift, a wheeled machine with a hydraulic grapple, was sometimes used as a forwarder in the early years at Hinton although its main function was loading trucks at roadside. In the 1990s, forwarders began to be used at Hinton for sensitive and remote sites and specialized tasks such as commercial thinning. Forwarders can operate effectively for much longer distances than skidders, up to a kilometre or more if necessary, although longer distances are generally less economical.

ROAD BUILDING AND HAULING

American Benjamin Holt invented the tracked crawler tractor in 1904, and the same principle was used in military tanks during the First World War. Crawler tractors were called bulldozers when equipped with a front blade. After Holt's company merged with another to form Caterpillar Inc. in 1928, crawler tractors began to gain wide usage, and the "Cat" name became almost synonymous with crawlers. Even the underpowered early models had great advantages for road building, which had previously been a slow and tedious business involving horse-drawn equipment, hand labour, dynamite and sometimes power shovels.



**THE FIRST MAJOR TRUNK ROAD
CONSTRUCTION: ROBB ROAD 1958.
DEBRIS WAS BURIED UNDER THE
ROADBED**

WELDWOOD PHOTO COLLECTION

In the Alberta forest industry, beginning in the 1920s, crawler tractors were used for road building and for towing trains of log sleighs. The Millar family at Whitecourt acquired their first crawler tractors in 1927 and by 1936 were hauling trains of up to 16 log sleighs behind D-8 Caterpillars. Improvements in engines, hydraulics and drive systems during and after the Second World War led to more powerful and versatile machines. The thousands of kilometres of roads required for the Hinton operation could hardly have been built without the bulldozer. Crawler tractors also provide the motive power for scarification (although articulated wheeled skidders later took over this task on some terrain, and specialized silvicultural equipment has displaced scarification on many sites). Better bulldozers built better roads, which facilitated truck transport to the mill and eventually led to year-round operations.

At first the hauling to the mill woodyard was done with a motley assortment of farm trucks, most carrying 14 cubic metres or less in a load, and larger tandem trucks carrying up to about 28 cubic metres. After the switch to tree-length hauling in the late 1960s, big off-highway trucks carried more than 50 cubic metres in a load. After 1976, many of these trucks were equipped with self-loading

grapples. Otherwise, a crane or loader was required at roadside landings.

4.5 THE FIRST CUTTING

The Woodlands Division set out with the objective of supplying the Hinton pulpmill with 175,000 cords by the time it started up in spring 1957, and increasing the harvest to 300,000 cords of wood per year thereafter. A cord is a pile of 8 foot logs that is 4 foot high and 4 feet wide. To put it in today's metric units of measure, the annual requirement was 720,000 cubic metres (m³).

The first woodlands manager was Gordon McNab, former logging superintendent at one of St. Regis's operations in Ontario. While Des Crossley's forestry staff worked on the long-term harvest design, McNabb set about establishing the first logging camps on either side of Highway 16 west of Hinton. As Crossley noted in his 1983 Interview:

But where to start cutting the trees from this vast forest? In 1955 the cruising crews were still looking for the initial timber harvest areas. An aerial reconnaissance team flew out across the lease area in a Beaver airplane, utilizing both the Jasper and Edson airstrips. During this trip, maps that had been prepared from aerial photographs were checked against timber was seen on the ground to make sure no mistakes were made before the first camp was set up in the McLeod Working Circle. This was Camp 1, on the shores of Wildhorse Lake. The approximate harvest areas were selected on the basis of existing maps and aerial photos, and men were assigned to cruise the timber on the ground and mark out the first cutblocks by stapling surveyor's tape to trees along the boundaries.

The company built, and two experienced contractors operated Camp 1 (Nick Tomkiw) and Camp 2 (Webb Frizzell) during the fall and winter of 1955-56. These were large camps, designed to house up to 100 men and nearly as many horses. (Virtually all of the loggers were men, although a few women worked as teammates with their husbands; and the bush labour force also included some rare exceptions such as truck drivers Emma Nickerson and Lucy Berube.) Only one or two supervisors were present at each camp. There was little need for active supervision because workers were paid "piece-work" for each cord (2.4 cubic metres), plus "walking time" based on the distance to the harvest site. Company employees called "scalers" lived in the camps and measured the stacks at roadside landings to determine government stumpage fees and workers' pay. The chief scaler and some other supervisors toured operations in Volkswagen Beetles.



VOLKSWAGON "BEETLE" WITH TOTE
GOTE TRAIL BIKES

WELDWOOD PHOTO COLLECTION

McNab also hired contractors to begin the huge task of road building. At that time, there were hardly any good roads in the lease area aside from Highway 16 (which was paved as far as Hinton in 1956) and the oil company road to Muskeg in the north. The only access to southern areas was a circuitous route through Edson and back up the Coal Branch. One of the first priorities was a road south from Hinton to Robb.



CAMP 1 TOUR – PULPMILL GRAND OPENING, 1957
THE LOGS SUSPENDED IN A RACK REPRESENT ONE “CORD” OF WOOD – 4 X 4 X 8 FEET IN DIMENSION

WELDWOOD PHOTO COLLECTION

4.6 THE PULPWOOD CUTTERS

Cutting began in 1956, with about 600-700 men with horses in the bush. Soon there were 14 camps in operation. Camps 1-8, and 10 were designed for 100 men. Camp 7A had a small crew, Camps 9 and 13 were smaller camps, perhaps with 25 men. Camp 16 was also smaller and started in January 1957, along with Camp 15 (Johnson’s) set up to satisfy a request by Norman Willmore.¹⁷⁴

Recruiting loggers was a major undertaking as numbers rose to nearly roughly 1100 men in the woods, about half that many horses^{xlii}. It was clear that there were not enough candidates in Alberta so a special effort had to be made. Rosaire Lacroix was an experienced logger in Ontario, having started in the bush at the age of 14. He had been working for a woodworkers union in 1956 but at the invitation of an old colleague, Wayne Sawyer who was the new human resources manager at Hinton, on August 17, 1956 he drove into Hinton. Lacroix figured that the new forest development at Hinton would be just another stop in his wanderings, but he remained for 33 years.

In August of 1956, Lacroix noted that there were about 75 people working in the woodlands, mainly building camps in preparation for the first winter's harvest. In a few months, however, nearly 700 workers and an equal number of draft horses would be needed for the five-month logging season. Sawyer decided Lacroix was just the person to recruit pulp cutters. As Lacroix explained¹⁷⁵:

I was there [in Hinton] four days and the company sent me back on the road to hire woodworkers from Alberta, Saskatchewan, Manitoba and all the way down east to Quebec. I was gone four months. I went right through Saskatchewan and Manitoba and I stopped in Ontario. I spent a week in Ontario, about three weeks in Quebec, then back to Ontario for a few days and carried on to Manitoba, Saskatchewan and Alberta. I was back in Edmonton for about five days when Wayne phoned to tell me they had enough men and to come back.

When I came back we had 1,270 men. Many of them had no experience, but that was my instruction: "Bring anyone that you can and we will have some instructors in the bush and we will train them." Some didn't make it and some didn't like it. The work force was just a little over 600 men nine months after. The wood production was fairly good on the average, three cords per man-day, at that time that was a good production. We worked with horses until 1969.

The only thing the company did not pay was the fare. They had to pay their own fare to come to Hinton. But experience or no experience, the one who was willing to tackle the job or to come and see what was going on was welcome. That was the orders -- as a matter of fact it was put to me that way -- even if he was an elevator operator. If he wants to come, send him up or bring him up. So that is what happened, and that is why we had so many -- it was a heck of a job to train them. At one time we were four instructors in the bush to train those people.

Recruitment was an ongoing job. Robin Huth, one of the original cruisers hired in 1955, was later in charge of hiring loggers. He recalled taking ten men at a time into the part of the building in Hinton, which was later to become the clinic. He asked of them only two things: that they have prior experience falling trees, and that they provide their own saws, axes and equipment.¹⁷⁶ As he noted:

Hiring was a steady job. The rigours of the work, along with accidents, resulted in a high turnover. In a search for reasons why so many were quitting, Huth noted two common denominators:¹⁷⁷ First, those who tried to work using swede saws were quickly discouraged as their counterparts with powersaws were out-producing them.

^{xlii} Stanton G.V. Hart Pers. Communication 2000

and meeting their daily quota. Secondly, most of those quitting were Albertans, who were not accustomed to the discipline of this new type of high-production operation.



HAND FALLING, CAMP 1, LATE 1950S

WELDWOOD PHOTO COLLECTION

Sixty per cent of pulp cutters were immigrants from Poland, Hungary, Germany, Korea, Spain, Italy, Sweden, Finland, Belgium, and Yugoslavia. At one time, Stan Hart commented that they counted 13 countries of origin among their loggers.¹⁷⁸ They had to be trained for their various jobs and due to language differences, communications with hand signals were not unusual. Two to four company cutting instructors trained inexperienced people for two weeks then the trainee worked with an experienced person until it was felt he was safe to work alone. Safety training was a major part of this program. As Lacroix explained:¹⁷⁹

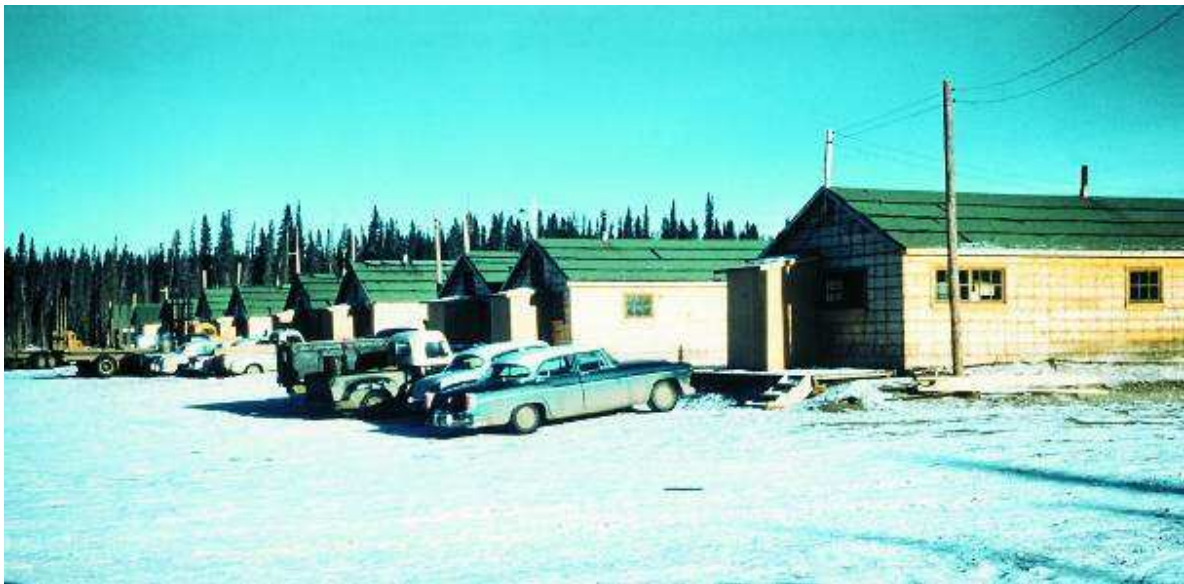
We showed them the proper way and we tried to be with them as much as possible and discourage bad habits. After 30 days if they didn't obey the rules and listen to the instructor and break their bad habits there was no use to keep them.

Pulpwood cutting also presented opportunities to immigrants for first jobs in Canada, enabling them both to earn a living and learn the English language. Bob MacKellar¹⁸⁰ explained:

Most of them at that time didn't speak that good of English, about the only thing they could get a job at was working in the bush. A lot of them were real educated people. Once they got their feet underneath them, mastered the language a bit, then slowly they went into the trades that they were trained for.

During the five-day work-week, the men were fed and housed in one of the 14 camps spread out through the FMA area. The camp personnel included foreman, clerk, blacksmith, and handyman, plus crews of cooks and 'barn bosses' to look after the horses. The cutters were paid by the hour for some 'walking time' as they trudged to the cutblocks with their horses each morning and back each evening – usually payment for one way. The rest of their pay was 'piecework' based on their output, which averaged about three cords (equivalent to seven cubic meters of solid wood) per person on a good day. Scalars, mostly living in the logging camps in the early years, measured the piles of wood to determine the loggers' pay and stumpage fees for the government. Each two-man crew worked on a small patch of timber within about 100 meters of the road, and well away from the next team's patch. The "cutter" used a power saw to 'fell' the trees and cut off the limbs and tops. The teamster would hook up one or more trees and drag them to the roadside landing, where he cut the wood into eight-foot lengths and placed them in stacks. To ease the strain on the horses, the skid trail was down hill wherever possible.

Chainsaws had only been introduced during the previous decade and often broke down under heavy use. Some of the earlier ones weighed as much as 75 pounds. Many crews carried hand saws in case their power saws quit, and a few Finns started out at Hinton using Swede saws although they soon switched to chainsaws.



CAMP 1, LATE 1950S

WELDWOOD PHOTO COLLECTION

4.7 EARLY CAMP LIFE

Hank van Zalingen worked on Weldwood's logging crew since harvesting began, retiring in July 2000 after 45 years' service. From 1956 to 1960 he lived in a logging camp. As he recounted during an interview for this project:¹⁸¹

We worked beyond the Wildhay River, towards Grande Cache, at Camp 8. We stayed at camp from Monday to Friday, and had to make our own way home on weekends. This was quite an expense, and many would share rides. We paid \$2.35 a day for room and board. The camp had propane heat, an electric generator, and running water. A 'bullcook' looked after the washrooms and swept and washed the floors in the dining room and bunkhouses. Four bunkhouses, each holding about 20 men in a large common room, formed the arms of an 'H' with the washhouse connecting them. Staff and the foreman had separate buildings from the workers. There were no showers, but our foreman, Helge Nelson, was a Swede and he had a sauna in a small building, which was fairly popular. Otherwise, we had to wait until we went to town to shower. In later years, camps were equipped with showers.

Our day began at 5:30 with a wake-up call. Breakfast in the cookhouse was hearty - bacon, eggs, sausages, pancakes, fried potatoes, etc. - and was eaten in silence, as was every meal. The cooks discouraged talking because they wanted the dining room cleared out as quickly as possible. Every man ate quickly, then made his own lunch from supplies placed on tables in a room off to the side.

The horses we used were kept in a barn at camp and we harnessed them up and took some hay and oats for the day. We then walked them out to our logging strip, sometimes up to an hour away. We also had to carry our own gas in two-gallon cans, and chainsaw oil. These were not supposed to be hung on the horse, because of the risk of spilling gas on the horse. Although we were not supposed to ride the horses out to the strips, many of us did. We worked hard all day with the horses, cutting trees down, bucking them to eight foot lengths and hand-piling them in 'ricks'. At the end of the day we left the singletrees and skid chains in the 'strip', returned to camp, unharnessed the horses, and turned them back to the barn boss.

Supper was served at six and again eaten in silence. Food was good and hearty, although there were not always fresh vegetables. The 'cookees' cleaned up the dishes while the cook began preparations for the next morning's breakfast. We were not allowed to linger in the dining hall, but could return for a cup of coffee at around 8 p.m.

In the evening, some men would read and others might play cards in the bunkhouse, usually poker. Some might go fishing. The company safety supervisor, Lloyd Stafford, would come to camp about once a month to check on and talk about safety. He would usually bring a 16 mm. projector with him to entertain us with some old Hollywood movie. Some time later I worked at Camp 27. Nick Tomkiw, the contractor, had some Belgians [horses] in which he took great pride. Although they were working horses, he was very selective about who could work with them.

Logging at Camp 1 was particularly hard on saw chains because of the sand that was embedded in the bark of the trees. We would often take our axes and "ring" the trees of bark before beginning to cut with the power saws. It was slow work and hard to get even two cords a day.

Helge Nelson, who was Hank's first foreman, stayed on as a Camp foreman for many years. He was a well liked foreman by all who worked with and for him, famous for his easy going ways and the two large dogs that accompanied him wherever he went. He passed away in the late 1960s, at which time he was foreman of Camp 33 on the Gregg River. The Company bridge over the Athabasca River behind town, completed in 1971, was named after him.¹⁸²

See Appendix 2 for a list and maps of camps and foremen by operating compartment.



CONTRACTOR NICK TOMKIW AND HIS PRIZED BELGIAN HORSES, AT CAMP 1, 1950S

WELDWOOD PHOTO COLLECTION

4.8 EVENING OUT THE HAUL DISTANCE

Crossley and Loomis had seen too many operations where cutting started at the back doors of the mills and spread out in concentric circles until often the enterprise became uneconomic. For the Hinton operation, this was to be avoided, and Crossley and Adrien Provencher, Woodlands Manager from Ontario who replaced McNab, agreed that it would be prudent to schedule harvest operations to maintain a more or less constant average hauling distance from the cutting operations to the mill to even out wood costs over time. This decision was made in 1957¹⁸³, and the further step to partition the FMA area into four sustained yield management units, or "working circles" that same year supported this objective. The further subdivision of working circles into operating compartments which would be

scheduled for harvest on the basis of their predominant age completed the picture in 1957. As Bob MacKellar¹⁸⁴ explained, they tried to get an average 40-mile (64 km) wood haul. For example, he noted that at the start they were hauling for 60 miles (96 km) or more, but in other areas only 7 or 8 miles (11-13 km). Once the initial road network was completed, this haul distance settled in at around 65 kilometres.

Obviously, these initial compartments were scattered throughout the working circles and this meant that haul roads would have to be built to each. This meant a major decision had to be made. Crossley recalled¹⁸⁵: “How was our New York office going to react to the capital costs of such a massive road building program during the early years of development? With some selling on our part, sympathetic ears were reached and the capital was made available. One of the telling arguments was that this approach to road planning would result in almost constant average hauling distances throughout the whole rotation. This subsequently proved to be attractive to the Company's shareholders.”

In 2000, even though the planning is based on just two Forests (Crossley and Loomis) within an expanded FMA area, the policy still stands and the average haul distance is now around 65 km.

4.9 WOODS WORKERS AND SAFETY IN THE WOODS

Safety was a major concern. The accident rates in the woods were high as a result of a combination of inexperienced crews, hand falling, chainsaws, and skidding with horses. As Lacroix explained¹⁸⁶:

We had two men working together, one skidding and one falling. In the beginning, before they got experience, it was two falling while the horse was parked a couple hundred feet away with some hay waiting its turn. The men could not judge the lean of the tree or its length, and trees were falling in all directions. If a tree is leaning, it can be felled in three directions using a powersaw or a Swede saw, but it can't easily be felled against the lean. When the tree was leaning the wrong way, or had too many limbs on that side, it couldn't be felled without help. They would make themselves a push pole as we used to call it, and go about eight to ten feet up the tree and push it down. That was all right, but some of them stood too close trying to push by hand right on the tree and the guy with the power saw would pull the saw back and hit the pusher on the leg with the saw. That is why we had about three or four power saw cuts a day on the legs, mostly between the knee and the ankle. That was the most common injury, and that is why it didn't take long for the safety department to purchase knee pads, made of nylon mesh. Mind you, wearing hardhats was mandatory from the beginning. The company stocked them in the safety store. Knee pads and steel-toed boots became compulsory at about the same time in 1957. Ear protection came along in the early 1960s.

In those early years accidents consisted mainly of powersaw cuts, fractures and sore backs from lifting logs into piles. A hundred or more lost time accidents per year was common. In 1958, for example, there were 174 lost time accidents, even though the camps were shut down from April to October that year¹⁸⁷. Personal protective equipment for powersaw operators included hard hats, gloves, safety foot wear and knee protection¹⁸⁸.

Ensuring a better safety record in the woods involved enforcing the rules about mandatory safety equipment. However, as Lacroix explained¹⁸⁹:

The main objective was working with the men and showing and explaining to them how to work safely. In late 1957 I became safety instructor and cutting instructor, and I worked at all the camps. Two of us worked in the safety department of the Woodlands Division after the main training program was over, Lloyd Stafford was the supervisor. We scheduled monthly safety meetings at all the camps, in the same evening we also showed safety movies.

Lacroix¹⁹⁰ noted that during his time they had seven fatal accidents.

We had three during horse logging system and four in conventional logging, none in mechanical logging. The causes of those accidents were similar; getting hit by fallen snags, getting hit by falling trees because the two men were working too close. As time went by the safety department developed and introduced an accident prevention program that helped reduce those kinds of accidents. No rules or regulations are fool proof. A real example of that was in July 1997. A fatal accident happened to one of the most experienced fallers working for the company. ... you had to be on the alert all the time. There are no buts about it. You cannot go and work in the bush on piece work with powersaws and think of what you're going to do in the evening. You have to keep your mind on your work.

During the summer of 1971 Rosaire Lacroix, then a bush foreman, later to become Woodlands Production manager, was attacked by a sow black bear with a cub. As he told the story:

In June of 1971, I was surveying the logging area for a location of a main road that we could skid and pile wood on and come out to a main access road about three miles from camp. I came to a side hill, and as I was looking for a natural bench close to the bottom of the hill wide enough for a road and log piles, I heard a 'woof'. I looked up and there she was coming straight for me. Her little cub was in front of her. It climbed a dry tree and she was on me. My reaction was to protect my head and face, so I raised my arm and she bit me under the arm. Skin and flesh were torn from my side. That is what Dr. Reid told me. She pushed me down on the ground. I tried to protect my face but I still had three big claw scratches on the left side of my face. I stopped breathing and I listened if I could hear her breathing -- I could not hear anything. Well, I had to do something. I got on my knees first, and looked in the direction where the cub could be. There she was sitting on the stump of the tree where the cub was. I made a move and she didn't. I got on all fours and that is when I saw blood coming out from under my arm. Again she didn't move so I stood up, still looking at her as I grabbed my hardhat -- she didn't move. I put my hand under my arm to try to stop the blood as much as I could. I turned my back and I walked down toward the main road. I didn't look back. I was about 800 feet from the main road where the road I was surveying was to join. They were loading wood at the main road, and two men were working with powersaws and skidders. With all that noise I never expected a bear in the area. I walked to the road and Bert Guimond was there. I said, "Would you take me to camp?"

Bert Guimond took him to camp, Don Sanderson, the mechanic, radioed the clinic to alert Dr. Ian Reid who was waiting there when they arrived. Before going to the hospital Rosaire insisted on stopping at home to tell his wife Ada first hand. He told her, "I just got into a little accident so I'm going to the

hospital.” She said, “What happened?” He said, “A bear took a little chunk off my side. She didn’t like Frenchman meat. She didn’t come back for a second helping! I’m going to the hospital now.”

This was the only known bear attack on an employee in 17 years of Woodlands activity to that point, and for over 40 years to the present. There was an ironic sequel to this story, as Lacroix explained¹⁹¹:

After that I was more careful. Someone had the bright idea to tell me that I should get a dog. I said, “Okay. I will get a dog.” I got a big lab. He was young though -- nine, ten months. One day (about a year later) I was walking from a two-man crew, a faller and a skidder, to another. The crews were about 2000 feet apart and the dog took off. I called him but he didn’t come back. There was a cow moose with a calf. The cow moose ran but it didn’t run very far because of the little calf. So she turned around and took off after the dog -- and the dog came to me -- lucky I was close to a skidder and I made it just in time. The cow moose was hot on my tracks. That was the last time I had a dog with me in the bush!

The Woodlands safety program was totally reorganized in 1975 to make each supervisor accountable for actions to effectively interface with all employees on a daily basis.¹⁹² The decrease in lost-time accidents is shown graphically in Figure 1, illustrating a major reduction from 1975, the first year for which reliable records are available. The contrast is even more remarkable in light of the 174 lost time accidents in 1958, and the comment that rates of 100 or more accidents per year were common during those early years.^{193 194}

Woodlands safety is now a key feature of company policy. Hinton Forest Resources in the past several years has won a number of prestigious safety awards, both from the Weldwood President’s Safety Award and internationally through the Pacific Northwest Forest Products safety Conference, as outlined in Table 2. In 1996 the Company passed the ForestCare standard for safety as a result of the trained staff, emergency response system and compliance with industry standards and regulations. Staff now look for hazards before accidents happen, and they know how to respond quickly and effectively to any manner of situation that might arise.

This concern for safety and the well-being of woods workers, along with the evolution of logging through the camps, led to close working relationships among woods workers and woodlands staff. Bob MacKellar¹⁹⁵ gave his impressions upon his retirement:

From the start the bosses were all good to work for -- Stan Hart was good to work for, and so were Adrien Provencher and Jim Clark, the last Woodlands Manager I served under. The company thought a lot of their employees, the employees thought a hell of a lot of the company. I know sometimes somebody would say something against the company, even a pulp cutter would be insulted and he'd tell you off right away. "Hey that's not right, this is a good company to work for."

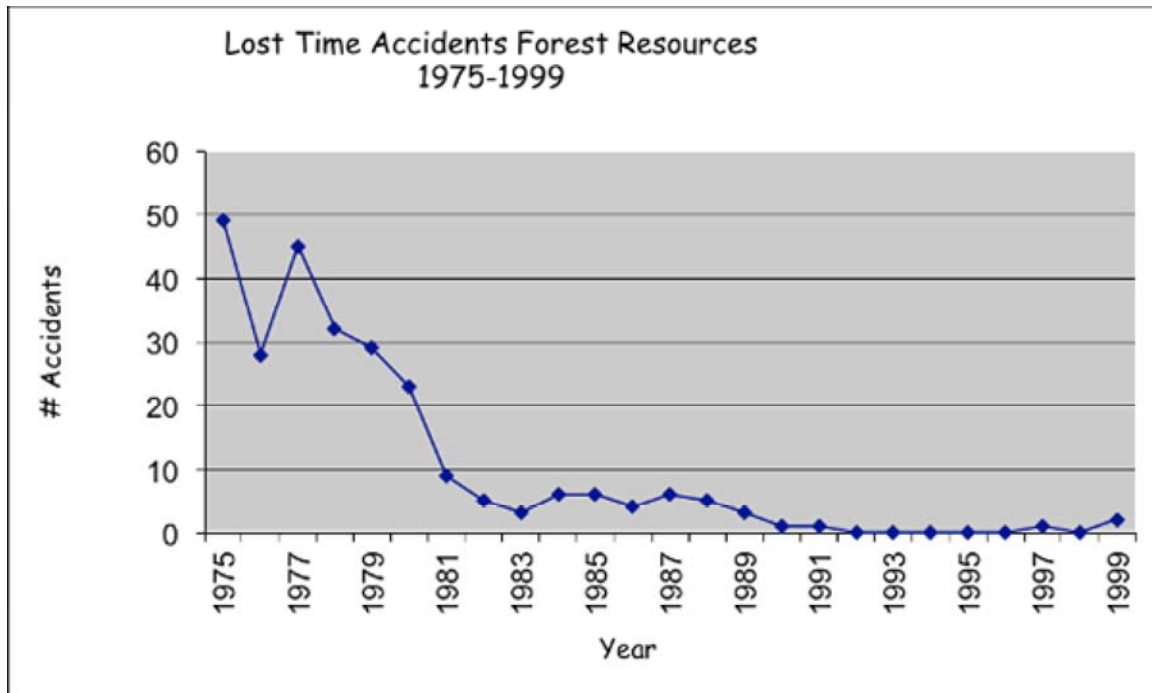


FIGURE 4-1 WOODLANDS ACCIDENT RATES FROM 1976 TO 1999

4.10 INTERNATIONAL WOODWORKERS OF AMERICA (IWA) – WOODS WORKER’S UNION.

Stan Hart, retired woodlands manager, recalled¹⁹⁶ that two unions, IWA and Lumber and Sawmilling Workers, expressed interest in unionizing woods workers in April 1956. For most of the horse-logging era, the woods workforce was generally between 400 and 600. Negotiations with IWA started 16 July, the first contract signed two months later on 24 August 1956. Hart believed one of the catalysts was the low piecework rate as compared to the east – the rate for cutting and piling 8-foot wood was then \$4.25 per cord.

Only two strikes have occurred. The first was in June 1968, ironically shortly after the first large order of skidders arrived; the second was in 1972. Both disputes focused on wages and benefits rather than mechanization. In fact, because of the high turnover among loggers, there were no layoffs due to mechanization. Former horse loggers adapted fairly easily to operating the machines, which were still doing essentially the same job as the horses. Productivity per worker rose from about seven cubic metres per day with horse logging to about 35 cubic metres per day with hand falling and mechanical skidding.

Bryon Muhly¹⁹⁷ noted that when he began in 1977 there were about 200 woods workers, all of whom were IWA members. Numbers of members has since declined to about 70 through a combination of mechanization and contract logging with specialized equipment. However, the IWA continues to play an important role in worker safety and forest stewardship. The union is now Alberta Local 1-207, Industrial, Wood and Allied Workers of Canada, but still referred to as the historical IWA.

TABLE 4-2 WELDWOOD FOREST RESOURCES SAFETY RECORD

Alberta Forest Products Association Partners in Injury Reduction Audits 1997 – 1999			
	1997	1998	1999
Element	%	%	%
Occupational Health & Safety Policy	92	76	78
Hazard Assessment	69	73	83
Hazard Control	59	92	88
Worker Training	83	83	99
Regular Inspections	75	68	60
Hazardous Materials	67	67	100
Emergency Response	88	96	89
Investigations	86	94	83
Records & Statistics	100	100	100
Program Review	96	95	85
Average Total	81	85	90
Awards			
President’s Safety Award	1988, 1990, 1993, 1995, 1998, 2000, 2001		
Forest Products Safety Conference - Pacific NW			
Best 5-year frequency rate	1990, 1993, 1994		
Zero frequency awards	1993, 1994, 1995, 1996, 1998		
Highlights			
Overall – the individual commitment to Safety			
Historical Safety Performance			
Committed people to specific safety items.			

4.11 FROM MUSCLE TO MACHINE

As noted earlier, the first company operation was entirely horse logging, with men and horses working out of nine large permanent camps, and a number of smaller ones, spread around the FMA area.

In 1955 John Pope of Hay River, North West Territories, approached NWPP with his design for a mechanical falling, limbing, bucking and piling attachment for mounting on a crawler tractor. This innovative unique concept was the fore-runner of our present day feller-bunchers, limbers and multi-purpose harvesting machines. St. Regis saw the potential, bought the patents, and financed the construction and trials of the machine. The delimeter portion of the machine was tested in Hinton on 7 and 8 January 1956. They also made numerous unsuccessful attempts to market the idea to potential manufacturers¹⁹⁸.

Dr. Ross Silversides, noted Canadian mechanical logging researcher, described this innovative Pope harvester as follows¹⁹⁹:

A suitable stump-area shortwood harvester was needed for Canadian conditions. A short-lived stump-area shortwood harvester was developed in Alberta and tried experimentally on the logging operations of North Western Pulp and Power Limited at Hinton, Alberta. It was conceived and fabricated in 1957 by John Pope of Hay River, NWT. The Pope harvester was designed as an attachment to the C-frame of a conventional crawler tractor. The attachment consisted of two hand-like jaws: a main jaw, capable of being rotated through approximately 100 degrees, and a delimiting jaw, mounted on a track along which it slid. A third component was a hydraulically operated chainsaw, which rotated with the main jaw. The largest tree cut was 22 inches dbh and 95 feet tall. The quality of delimiting was excellent. Its productivity averaged one cord per hour. However, this unit never passed beyond the prototype stage, mainly because of the need to position the crawler tractor (D-7 class) at each tree to be felled, regardless of the size or terrain conditions.



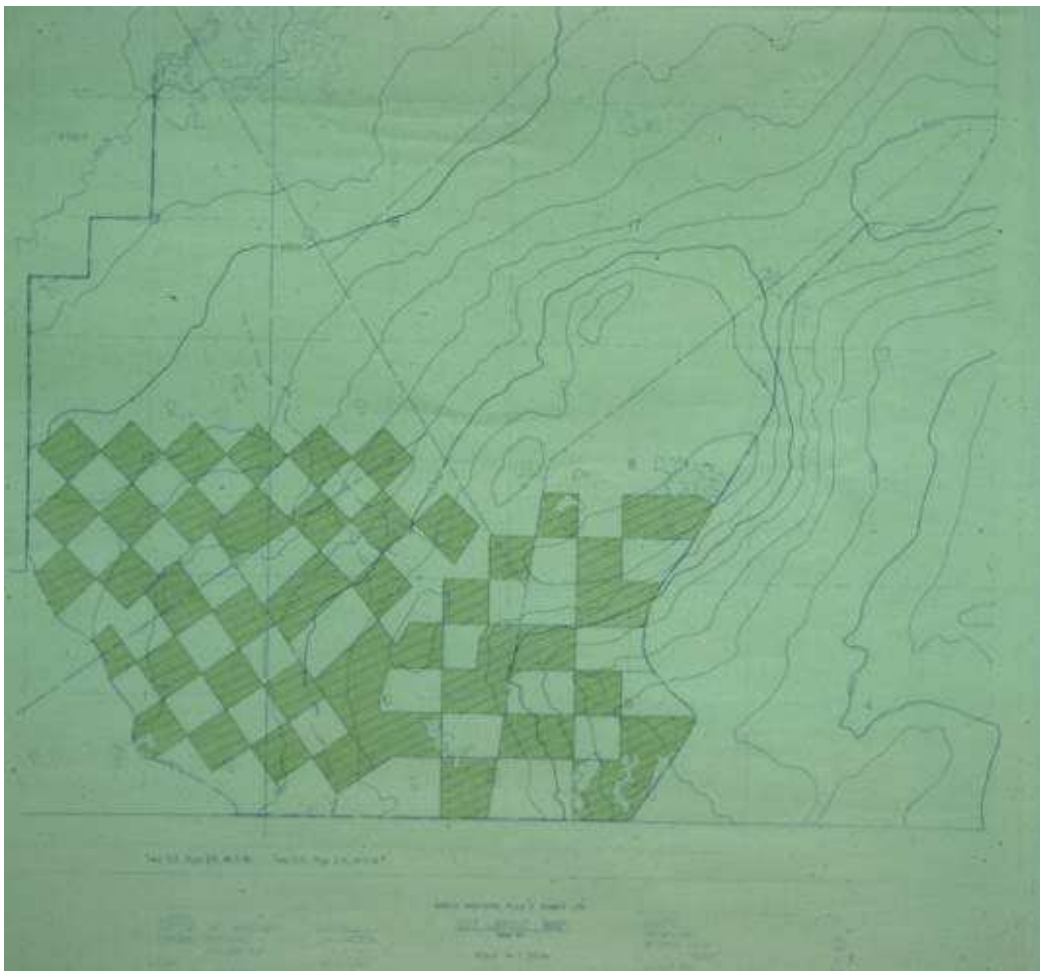
POPE HARVESTER TRIAL, CAMP 1 – 1956

WELDWOOD PHOTO COLLECTION

Jack Wright also noted that the hydraulics could not withstand continuous operation, getting so hot that the operator periodically had to get off the machine to cool himself off.

The first load of pulpwood was hauled to Hinton on 9 January 1956. St. Regis was not only getting their first large scale logging going at Hinton, but they were also trying new equipment at the same time. The first Pettibone-Mulliken "Cary-Lift" started forwarding and loading pulpwood at Camp 1 the same day that the first load arrived at Hinton. A year later Camp 1 was a show piece with over 100 loggers (still mostly skidding 8 foot logs with horses).

An experimental yarder logging trial with 2 Skagit and 2 Timberline yarders began in January 1957 with contractor Claude Eccles and foreman Stan Jobb at Camp 7 west of Obed Tower. Both were done on blocks 15 chains to the side, but were economic failures. These were later tried at Camp 2 under Ozzie Hansen, but they seemed doomed from the start and were sold in 1959²⁰⁰.



BLOCK DESIGN – EXPERIMENTAL YARDER LOGGING – CAMP 7 NEAR THE OBED TOWER

WELDWOOD PHOTO COLLECTION

While St. Regis logging was initially concentrated in the larger-diameter stands, cutting regulations with respect to diameter called for all loggers to utilize all merchantable parts of trees down to a 4 inch top. This was not the case on Licensed Timber Berths (LTBs) for saw timber where top diameters were

around 8 inches. Bill Nigro, an LTB operator, was the only one who was persuaded to cut pulpwood from smaller logs and tops – making a profit and setting a precedent cutting “peckerwood.” Nigro represented Hett & Sibbald of Edmonton in the Edson area.

Early travel, before the company road network was built, was sometimes an adventure. The Woodlands Division participated in a caravan trip to Grande Prairie, Alta., over a convoluted route northwest of Hinton, on December 6 and 7, 1959. Six company vehicles accompanied a caravan of privately owned cars and trucks. Three vehicles were radio equipped and proved invaluable in keeping the caravan together and in aiding those cars which encountered difficulties. The route used was the lower Road (Muskeg Road) north westerly from Hinton to the Muskeg River, thence the Simonette road north easterly to the Smoky River, and then by a series of oil Company and logging roads northerly to Goodwin, and provincial Highway No. 34.

District Superintendent Arnold Homan, assisted by Cut Inspector Lyle Lindsay, was responsible for Camps 1 and 2, as well as the independent operators in the McLeod working circle at Camps 3, 4, 5 and 16, generally between Highway 16 and the Gregg River, south of Hinton. At Camp 1, Contractor Nick Tomkiw used a highway type bus in 1959 to transport men to the cutting areas. This Contractor also participated in several Alberta rodeos and stampedes during the summer months, showing a matched set of 6 Belgian roans, and being awarded several ribbons and prizes for the quality of these horses. Pulpwood hauling was accomplished very successfully, using a 3/4 yard crane and 6 trucks²⁰¹.

By the early 1960s, the company began looking at a new machine which showed promise to replace horses. The Garret Tree Farmer, an articulated-frame, wheeled skidding tractor, manufactured in the State of Washington, was first demonstrated for the Company at Camp 33 in 1960. The inventor, Mr. George Garrett, was in attendance²⁰².

Charlie Miles bought a C4 Tree Farmer wheeled skidder in 1963. He was given a couple of blocks to log but they were not appropriate to prove the real value of the equipment. He cut and skidded to a landing and used a device mounted on a crawler tractor to pile it. This was also the year that tree-length extraction was introduced²⁰³.

The 1964 Annual Report of the Operating Department documented the continued effort the Company was pursuing in the area of mechanization of harvesting²⁰⁴:

An experimental mechanical logging operation was started in 1964 at Camp 22 to test and determine the feasibility and costs of producing tree-length wood into the Woodyard. Four (4) Garrett Tree Farmer skidders, C4 Models, were used for skidding, loading was done with a modified Unit crane, and the tree-length material was hauled with hired tractor-trailer units with trip-stake bunks. At the Woodyard the material was slashed into 8 foot lengths with a Nesco slasher. An evaluation report is now being prepared.

During 1964 a Time Study of job functions of pulpwood cutting was done as a continuation of the work initiated in 1963. This was supposed to be a joint study with the International Woodworkers of America, Local 1-207, as negotiated in the current Labour Agreement, Article 16:04. Discussions are continuing with the I.W.A, as to their future participation in this study.

Muscle was still needed, but in fact was getting harder to find, as noted in the 1964 Annual Report²⁰⁵:

The availability of woods labour is becoming a critical problem in this area. Recent hires, in general, have no experience nor adaptability to woods work. Compounding this problem are the many construction projects in process or planned, in Alberta and particularly in British Columbia, which are drawing, or could draw in the future, our present and potential workers. As a consequence we are making every effort to stabilize our work force by extending our operating period and by attempting to promote job security. It is anticipated that active recruiting will be necessary next Spring, perhaps extending as far as eastern Canada.

In 1964 the horse-logging operation revealed its antiquated base as a viable system. The planning process for wood production was based on a need for 450-500 bush employees for the year, and about half that number of draft horses. The woodlands manager was to assume recruitment of the labour component and Jim Clark, his assistant, would purchase the horses. As the year turned out, the manager recruited only 359 men. A wood shortage was imminent and was circumvented only by a quick policy change to increase the price paid for purchased wood. The year was saved, since the price increase was the catalyst that encouraged the production of added volume by the local suppliers²⁰⁶. As Stanton Hart explained²⁰⁷: "an increasing scarcity of experienced horse-loggers and horses as well as marked decreases in costs of mechanical logging due to increases in machine availability, reliability and efficiency led to further interest in mechanization"²⁰⁸.

Rosaire Lacroix added an additional perspective to mechanization and the concurrent closure of the camps, noting that²⁰⁹:

... The writing was on the wall. With expansion of the pulp mill and the sawmill in the future more wood supply was evident and increasing manpower was not the solution. Therefore a new method or system of logging had to be implemented and it was decided that a mechanical logging operation was the answer. In my opinion a major factor for the change was the cost of maintaining a horse logging camp, which was not acceptable any longer. For example room and board [charges to the loggers] at \$1.80 per day and high expectations of food quality, horse feed, a camp staff of 12 to 14 people and benefits of about 25 percent above their wages, an average production of five cords per man-day -- how many men would be needed to harvest approximately 400,000 cords? This is why manpower situations had to be resolved. To rectify the situation the company had to give the workers the tools to increase per man-day productivity and the best way to achieve that goal was to mechanize the operation. In regard to company benefits, the cost of statutory holidays, yearly vacations, unemployment premiums, walking time and travel time increased every year -- by how much it would depend on the Union contract settlement.

In four short years from 1965 to 1969 the company eliminated horse logging in favour of mechanized skidding. The camps were gradually shut down. They were no longer needed to house the horses, and improved roads and vehicles made it possible for workers to commute to work sites. It was also cheaper to operate commuter busses and to pay partial wages for travel time than to operate the camps.²¹⁰ The married men preferred this because they could spend their leisure time with their families. Some of the

bachelors found the adjustment difficult because they were leaving the social life of the camps for the single life in town accommodations²¹¹.

The last two independent logging contracts at Camp 22 (Nick Tomkiw) and 7 (Harry Anker) were terminated in 1968 after 11 years of continuous employment²¹². The Berland Camp 23 was closed in 1968 as mechanical skidders replaced horses. Camps 20 and 27 were company camps, the latter run by Nick Tomkiw after he left Camp 22. They were the last two, closed in 1974-75²¹³. The diverse locations of these historic camps are illustrated in Map 1.

The labour-shortage lesson of 1964 precipitated a study to determine the most effective mechanized system of logging for future operations, and the preparation of a capital budget to fit the changed needs. The time-frame of the study program was six months. Planning-engineering forester, Owen Bradwell, was assigned as leader on the project with others to help as needed²¹⁴. Bradwell was a UBC forest engineering graduate with experience on the Forestry Trunk Road Project through the Crowsnest, Bow River and Clearwater forests and was the company forester in charge of road development since September 1957. The 1964 trials led, in 1965, to the Company experimenting with tree length harvesting using wheeled skidders to move the wood to roadside where it was mechanically slashed before hauling.

Bradwell's proposal recommended a changeover to a mechanized tree-length product/delivery system with a slashing system. As MacKellar also noted, wood could be delivered to the mill cheaper than having to cut it into 8-foot lengths in the woods. However, delivery of tree-length wood also meant that the wood yard at the mill had to be reorganized. Bradwell's proposal was to add a slashing system near the intake to the woodroom so tree-lengths cut into the 8-foot size for which the drum barkers were designed. The tree lengths were dropped onto a deck that moved them sideways through a set of circular saws set at 8-foot spacing. The bolts were then carried to the wood room on a chain conveyor. These were the changeover elements adopted by Jim Clark and his pulpmill counterparts to modernize the logging and delivery system.²¹⁵

Former horse skidders adapted fairly easily to operating mechanical skidders. The early machines were basically just tractors with winches, doing the same job as the horses. After testing several types of machines and dealing with some safety problems, the big transition came in 1968 when 55 shiny new Timberjack skidders were delivered to Hinton. Stan Hart later commented: "It was an impressive picture to see a lineup of 55 red skidder machines sitting on the woodlands garage property one Monday morning! At the time that we bought them, the order was the largest single order for skidders that had ever been placed in Canada, according to Timberjack representatives."²¹⁶

The fallers' work was essentially unchanged for several more years. In the early 1970s, concerns about both worker safety and productivity led to a renewed search for a suitable felling machine. The first generation of these machines arriving in 1973 were called "feller-bunchers" because they cut the stems and piled them in a "bunch" for pickup by the skidder. These earliest feller-bunchers cut the trees with hydraulic shears, which were fast and efficient. However, they made a crude cut which frequently caused splitting in the lower stem. As Lacroix noted²¹⁷:

The feller-buncher was fine in the summer time, and we didn't damage the butt of the tree too much. In winter it was different. There was not much problem with pulpwood, but for saw logs at the stud mill the damage of the butt was significant. They had to butt off four to five feet from some trees because of the shatter, and that wood went to the chipper. That was too much waste. When the expansion of the

stud mill came about we had to increase the saw log production, and couldn't afford that kind of waste.

Lacroix added that they experimented with saw heads as early as the mid-1980s. Rob Stauffer^{xliii}, a district manager, noted that the full conversion to saw heads was made in 1991.



**INTERNATIONAL HARVESTER FELLER
BUNCHER, 1973**

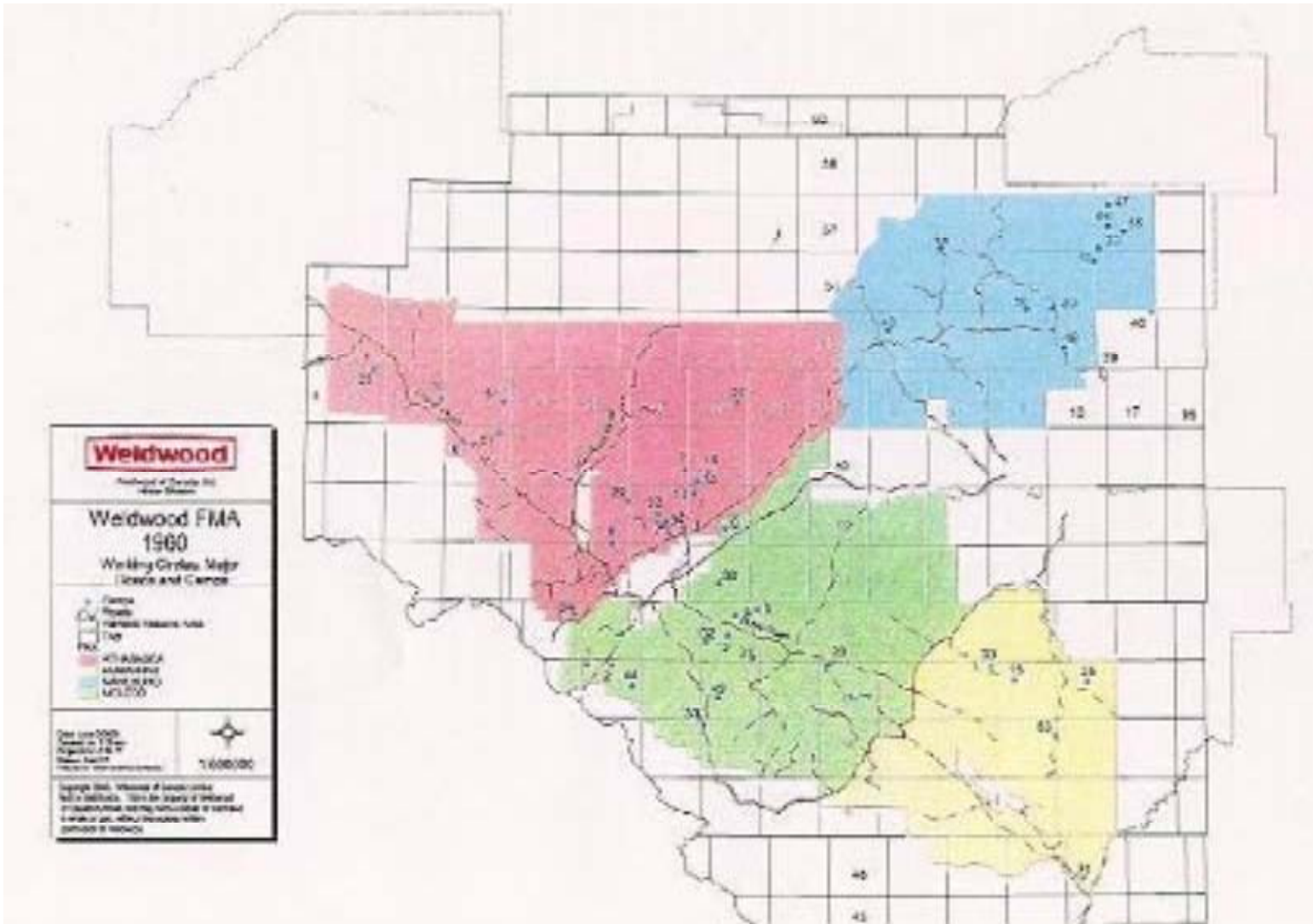
WELDWOOD PHOTO COLLECTION

LINE SKIDDING, 1973

WELDWOOD PHOTO COLLECTION



^{xliii} Rob Stauffer – personal communication.



Map 4-1. Company Camp Locations, 1960

Lacroix also noted that with the introduction of the feller-bunchers they had problems with powersaw delimiting, and began experimenting mechanical delimiting in the 1970s. The first crude but somewhat effective device was a “flail delimitter”, consisting of a large drum with numerous chains welded to it. Mounted on the front of a small tractor, the drum spun rapidly and the chains literally beat the branches off the trees along with a lot of bark and some merchantable wood. Lacroix noted they first experimented with the flail delimitter at the stump, but it didn’t work, defeating the purpose of the feller-bunchers by slowing down the production significantly. He added that the experiment continued at roadside but it didn’t work much better. There were too many branches in the pile and trimming with power saws still had to be done with the result that the slow down in production was shifted to the loading site, which also affected the hauling.



FLAIL DELIMITTING
JIM CLARK COLLECTION

In 1982 or 1983 they got their first stroke delimitter²¹⁸. These hydraulic delimitters picked up the felled trees and stripped the branches off them by pulling the stem through a cluster of shears which adjusted to the diameter of the stem. The delimitter also had a shear to cut the top off at whatever diameter was prescribed, usually 3.5 to 4 inches. The result was a much cleaner stem, which is critical if the tree is to be sent to the sawmill for conversion to lumber.

During this time the line skidder evolved in size, power and speed. These were used with the first feller-bunchers in a very efficient system, as Muhly²¹⁹ explained:

... even behind the feller-bunchers the method of skidding was line skidders – significantly larger skidders than hand falling. And that was a very cost effective system. They were able to skid long distances with very large loads. The payment system was an incentive based on the number of pieces skidded to the landing. I can recall it wasn’t uncommon to have a hundred to a hundred and fifty logs behind some of the larger skidders.

However, Muhly²²⁰ further explained:

... there was a general move to reduce cutblock size, largely through the government and the Alberta Forest Service -- for wildlife habitat reasons. So with the reduction in cutblock size you no longer had the opportunity to skid long distances, the density of roads increased and it became more important to have skidders that could produce higher volume at shorter distances. And the line skidders that used to carry the very large loads for long distances were no longer practical. So, for cost and safety reasons, we converted to grapple skidders.

The grapple skidders use hydraulic clamps, like small cranes, to pick up stems for skidding. The key advantage is that the operator can stay in the safety and comfort of the cab while picking up a load. Grapple skidders became more common as more feller-bunchers came into service. For many years, combinations of feller-bunchers, line or grapple skidders, delimiting at roadside with single stem delimiters, and wood hauling with self-loading trucks were the major systems.



GRAPPLE SKIDDING

WELDWOOD PHOTO COLLECTION

The self-loading truck program was introduced in 1976 and proved to be an efficient system to assure wood delivery during inclement weather conditions. A hydraulic “cherry-picker” clamp on an articulated boom was permanently mounted on the truck behind the cab. It was capable of loading logs and, if necessary, unloading. This was a modification of a system in vogue in Washington and Oregon area forests²²¹. Events leading to its introduction were described by MacKellar²²² as part of a reassessment after the Hearsey big-truck hauling contract ended in 1972:

My thinking was that the trucks were too big to start with. They were trying to haul 100 tons out of a summer strip road. When you have to put a D9 cat in the front pulling them, you are not going to make any money. After that we started in with self-loader trucks with cherry pickers. The first one we hired with the company was Dick Smith -- he bought it from Inland Kenworth in Langley BC with a cherry picker on it. We called him a Junk Truck -- anybody who would upset a load of wood somewhere, he'd stop and pick it up and haul it to town -- or seismic wood, or some place there wouldn't be a full truck load left, or the last truck load in that area, so he would go and get that. That worked so good that we wound up with all private trucks and no cranes loading at all.

Muhly²²³ also noted that this was:

... an interesting innovation for the industry that added a lot of flexibility to the operations, particularly with respect to roading in that we didn't have to invest quite as much in the construction of roads in the blocks because what it allowed you to do was put half a load on in a block and then move out to a main road or substantial road and top it up. It was an early innovation that allowed us to log larger volumes on a more year round basis. At that time the incentive was to reduce inventory levels as a cost reduction method.

Radio dispatch assistance to log hauling trucks was also introduced about this time. Roads and dangerous passing areas were numbered. Truckers would let other haulers know by radio as they approached these areas so empty trucks could plan to give way to loaded trucks at these points.²²⁴

SELF-LOADING "PICKER" TRUCK, 1970S

WELDWOOD PHOTO COLLECTION



4.12 SUPPLYING WOOD TO MEET THE NEW MILL REQUIREMENTS

MILL EXPANSION

The major mill expansion began in the late 1980s, and woodlands operations had to gear up to meet the demands of a larger pulpmill and new state-of-the-art sawmill. Don Laishley, appointed manager of Forest Resources in 1986 when interviewed in 1998 discussed the key elements of the change in the woods²²⁵.

The question that we had to deal with was to move our annual roundwood production from about half a million cubic meters per year up to about two million cubic meters per year. It was really clear that as we moved into the new production system that we were going to have to be sorting logs in the woods and we were going to have to differentiate between a pulp log and a saw log.

We had to get hundreds of cutblocks ahead and we had to get the roads into those cutblocks. Clearly we needed flexibility. As we were ramping up to the two million cubic metre mark and as we were gearing up to supply the new sawmill with larger wood or specialty wood, we knew we were going to have problems. You just can't

quadruple your cut without having a problem. But my view was that if we had enough roads ahead we would have the flexibility to move around our problems and achieve the production necessary to supply the two mills. It was clear that we were going to have to bring in a lot more contractors, people and equipment in to quadruple^{xliv} our production.

Muhly²²⁶ later noted that with the additional contractors they obtained a great deal more flexibility in the types of logging systems they could introduce. Laishley went on to discuss the changeover from an exclusively company woods operation to one that included a preponderance of contractors with a mix of company crews to harvest and deliver wood to the mills²²⁷:

We had always run the trucking on a campaign basis. One group would go out and do all the skidding to roadside, then you would move the trucks in and they would haul it all away. As we started to expand we moved to some 'stump to dump' contractors. This would be a contractor that brought in perhaps one feller-buncher, a couple of skidders and two or three trucks. And his contract was so much a delivered metric tonne to the mill as opposed to the phases.

We put in two weigh scales and fully automated the process. A trucker would drive up, get out of his truck, go over and punch in his truck number and the date, the load number, etc., and hit a button and he got his weigh slip. This was all done electronically and was transmitted to the office. He would then go in and empty his truck, come back and weigh in empty, and theoretically he would have then driven over to the office and got his pay for that load.

One of the other changes in 1986 was introduction of night shifts. The current models of feller-bunchers were well designed for operator safety and came equipped with lights that clearly illuminated the work area. Since these machines were also more expensive, it was important to the contractors to utilize them for as many hours in the day as reasonably possible. They are typically operated for two shifts and serviced during the third.

A RETURN TO STUMPSIDE PROCESSING

Starting around 1973 the combination of feller-bunchers with line skidders created great efficiencies in moving wood from stump to roadside. For example, as Muhly noted²²⁸, line skidding was very cost effective. Skidder loads were 'bunched' in piles from 3-4 to 8-10 trees depending on diameters, so picking up loads was much easier. Further, loads of 100-150 logs behind the larger skidders were not uncommon, and skidding distances could be 0.5 to 1.0 km. The major drawback was limbing. Trees had to be limbed close to the stem, especially those portions destined for the sawmill. Chainsaw limbing at the stump was out of the question. The least destructive place for the mechanical limbing systems that were developed was at the landing. However, this left great piles of slash that had to be burned, an expensive, risky and soil-degrading treatment, although the most cost effective. Silviculturally, the

^{xliv} Editor's note: Although the total pulpmill requirements were doubled, the logging effort on the expanded FMA was trebled from about 500,000 m³ to over 1.7 million m³ due to the additional needs of the new 220 million fbm sawmill. Wood obtained from outside would meet the balance of wood needs. PJM

cone-bearing pine slash was removed so planting became more of a necessity. Removal of the needles and fine limbs removed nutrients from the site, along with other coarse woody debris important as microsites for seedlings and micro-habitat for animals. When grapple skidders were introduced from 1989, additional firm roading had to be constructed for them to work more effectively. Even so, with the mat of limbs removed, some sites became rutted by the skidders.

Then, in the overall review of logging systems in the early 1990s as a result of the mill expansions under way, as described next, staff recognized that the efficiencies in logging were being more than offset by increased silvicultural costs along with environmental problems. A decision was made to introduce new or revised logging systems that would enable a return to stumpside processing. Wright noted that:²²⁹ “Roadside delimiting was argued against by forestry department personnel from the very beginning but got little attention from woodlands operations.” The hope of Woodlands staff was that most cones would have been knocked off during falling and skidding, but the silvicultural results were not satisfactory. Even though lodgepole pine lent themselves well to natural regeneration, the results were somewhat spotty in practice for blocks where the full-tree system with roadside delimiting was used, as David Presslee wrote in the Canadian Forest Industries magazine²³⁰:

It got to the point where if we didn't do something, we were going to have to plant everything, so the choice was, do we plant everything, or do we do something different. Stumpside processing which leaves the cones scattered through the cutblock would obviously give us the seed source for natural regeneration, along with other silviculture benefits.



STUMPSIDE DELIMITING, 1993

WELDWOOD PHOTO COLLECTION

Brian Balkwill, then area operations superintendent added further comment²³¹:

There are many other benefits like the elimination of slash burning, better nutrient recycling, a more favourable environment for seedling establishment through less disturbance, areas for small animals to hide in, which the trappers like, slash to hold more snow for a burst of moisture in the spring etc... but the big one is the seed source for natural regeneration. If you take all the factors together, it has proven to make more sense than roadside processing and full planting.

Bryon Muhly, forest operations manager, explained that this ballooning harvest program, along with the brand new contractors that would have to be hired to cut it, presented an opportunity for the Hinton Division to take a fresh look at its whole harvesting operation, and at how it would best serve the two mills:

The pulpmill and sawmill expansions, and the introduction of contractors in 1989, gave us some opportunities that a lot of operations don't get. We've gone from 500,000 m³ to about 1.7 million m³, and that scale of expansion is almost like starting a harvesting operation from scratch, in terms of system selection. And we also saw some of the current issues coming down the road, like the need to reduce site disturbance and to move to a more natural silviculture. It seemed like a good time to begin addressing a variety of issues²³².

Several important points emerged from the in-depth review of logging operations and exploration of options in order to treble the harvest. One was the realization that silvicultural considerations must be made an integral part of logging planning -- that logging must be viewed as both the end of the stand of trees and the beginning of the new forest, as discussed previously. This principle was clearly articulated in the Crossroads Report²³³ of 1993 and the Linked Planning Process²³⁴ of 1994, which became basic tenets of the forest resources department.

Another related point concerned incidents of site deterioration through such skidder-related factors of rutting and soil compaction. This concern was highlighted by the fact that operations had to be conducted year-round and that the utmost of flexibility in operations was needed. These problems could be alleviated through a combination of low-impact, higher floatation machines (wider tracks, lower-pressure tires), judicious use of slash as mats to protect the soil, and developing operator awareness and skills. An outstanding example of this last point is the 1999 Handbook of Forest Stewardship for 21st Century Workers²³⁵ and related training programs, introduced in 1998.

A third point centred on the more specific needs of the Hi-Atha sawmill that came online in August 1993. This 215 million FBM mill was designed to maximize value added. In order to respond to high-end market demands and opportunities, it required precision cut quality logs. By this time saw heads had replaced shear heads so butt-shatter was no longer a problem. Rough sorting of logs could be done in the woods, but handling and sorting were costly and needed space, so grading and bucking of saw logs was to be done centrally at Hinton. Cut-to-length (CTL) systems had been evolving, but were discarded as out of step with an overall tree length hauling system as well as lacking the necessary precision in bucking.



STUMPSIDE PROCESSING WITH SCANDINAVIAN-TYPE CUT-TO-LENGTH PROCESSOR

WELDWOOD PHOTO COLLECTION

Size, straightness and soundness of logs are obvious qualities. What had also been recently recognized was that freshness of the wood was also an essential quality. Fresh wood added value to both saw logs and pulp chips. Fresh logs sawed more easily, yielded higher grades of lumber and facilitated kiln drying schedules. See Figure 3. Fresh pulp chips yielded higher pulp strength and enhanced oxygen delignification, which reduced chemical needs. To achieve freshness meant that log inventories had to be kept as low as possible. As a consequence a necessity for year-round access was further emphasized, along with a high degree of flexibility among logging systems to enhance delivery of the required quality at the right times -- including during the traditional break up and wetter periods. Flexibility was enhanced by both increasing contractor operations and the variety of logging systems.

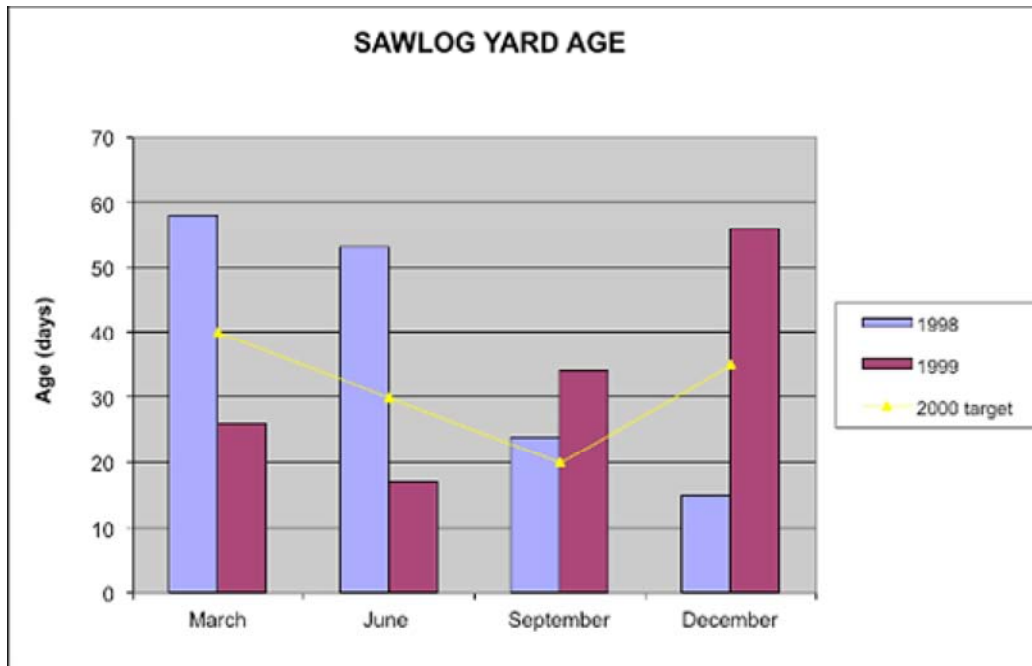


FIGURE 4-3 TRENDS IN WOODYARD LOG FRESHNESS 1998-99 AND TARGET FOR 2000

As Bryon Muhly noted²³⁶:

... There were a number of benefits of moving and changing harvest systems that really allowed us to operate on a more continuous basis. We reduced the ground compaction and site impact and improved our silviculture cost, improved log quality and fibre quality for both the sawmill and the pulp mill, reduced logging costs in that contractors were able to operate, put more volume through their equipment, and reduce to some extent our roading costs through being able to transport on limbs and tops out of the block and to roadside.

The change also had favourable cost implications, as Muhly described:

... our traditional break-up period, typically at that time, could be three to four months long. We wanted to reduce that period. It was primarily cost driven in that with contractors we could allow them to operate over a longer period, essentially put more volume through their equipment, reducing their capitalization cost. The side benefit that came out of that of course was fresh wood for the mill and smaller inventories carried at the mill yard. So there were some cost savings there.

The importance of operator skill was recognized from the start both in respect to productivity and equipment maintenance. Training and skill development became increasingly critical as the kinds and complexity of machines evolved. However, operator skills really came to the fore when consideration of site productivity and silviculture became fully integrated with woods operations. This was reflected in a comment by Muhly, for example:

... those operators got adept at limbing and topping in front of the machine so they had a mat to walk on. We had an increase in cost but really not anywhere as significant as what we had anticipated. And that really completed our move back from roadside to 'in the block'.

This aspect was intensified with introduction of the Forest Stewardship program in 1997 and publication of the *Handbook of Forest Stewardship* in 1999, as noted earlier.

4.13 HARVESTING AT CENTURY'S END (1999)

CURRENT HARVEST

In 1999 a total of 2,209,000 m³ was harvested from the FMA. Of this amount, 1,065,000 m³ were sawlogs and 654,000 m³ pulp logs that were hauled to the mill site at Hinton – a total of 1,719,000 m³. The other 490,000 m³ were transferred to other mills a part of the strategic plan to optimize value of the wood. Some of the wood was first sorted in the woods, the rest at the mill. Sorting was done by species, size and product type such as for peelers, sawlogs and pulpwood. The peelers and sawlogs were particularly valuable so quality checks were conducted routinely.²³⁷

Log deliveries from the wood to the mill site were timed so the wood was as fresh as possible. Fresh wood results in higher quality of pulp, lumber and veneer. It was necessary to have some stockpiling of wood at the mills in case of disruption of hauling such as storm-caused damage to roads or bridges. The objective was to have three weeks' consumption on hand during the summer and, during the fall and winter to build to two months consumption at the end of March in anticipation of the spring break-up period. Actual inventory volumes by period for 1998 and 1999, and targets for 2000 are illustrated in Figure 3.²³⁸

The complexity of factors to consider in the forest harvesting process requires a diversity of systems and processes. Harvesting locations and volumes are planned for up to 20 years ahead, through the rigorous and integrated forest management planning process (Figure 4). Forest management planning is described in Chapter 10.

MULTIPLE SYSTEMS FOR MULTIPLE SITES

The resulting changes were as wide-ranging as the changeover from horse logging in the 1960s, but in some ways more subtle. Instead of two systems, there were now at least seven different combinations of machines and methods, and in the future there will likely be even more. These also reflected the linked concerns about environmental stewardship as well as meeting wood supply and optimization of wood product values.

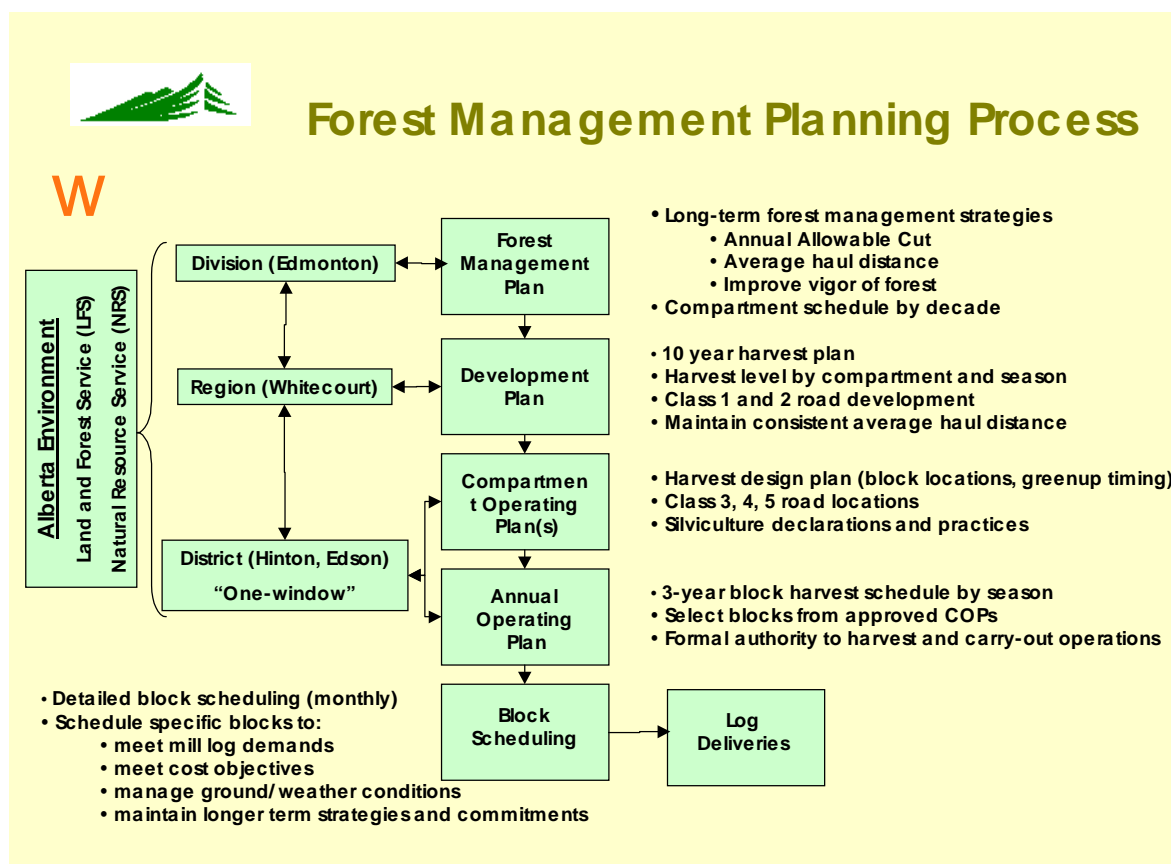


FIGURE 4-4 FOREST HARVESTING LOCATIONS AND VOLUMES ARE PLANNED FOR UP TO 20 YEARS IN ADVANCE THROUGH THE RIGOROUS FOREST MANAGEMENT PLANNING PROCESS.

By 2000, about 90% of wood production was from fully mechanized logging systems. Hand falling, with an average man-day productivity of 35 m³ was restricted to areas where terrain or tree size prohibited the use of mechanized systems. As new technologies emerge, the role of hand falling continues to decline. It simply cannot match the productivity (and safety) of fully mechanized systems where production approaches 120 m³ per man-day²³⁹.

But productivity was not the only driving force for choice of equipment. Concern about worker safety and environmental damage were dictating the type of machines and logging systems in use. Each harvest area was assessed and a harvest plan that matched the site and silvicultural objectives was made. Weldwood in 1999 deployed 7 major systems as outlined in Table 3.

80% of all skidders and forwarders were equipped with flotation tires to minimize soil disturbance. The use of forwarders, typically multi-wheeled and multi-axled with tracks, minimized site disturbance and soil compaction. Because they also carry bigger loads over longer distances, the need for roads was also reduced.²⁴⁰ However, a network of permanent roads is essential for a variety of reasons beyond logging access and wood hauling alone. The diversity of wood needs along with harvest patterns designed for watershed, wildlife and wood quality require multiple entries into the forest to effect smaller-scale impacts. Other reasons include access for silvicultural stand treatments, forest protection, salvage of timber from other forest-based industries and public recreational use. The Company road system is

designed to avoid public highways except for a few crossing points. See Figure 5. In 2000, road maintenance on the over 2000 km of Company roads employed both Company and contractor operations for new construction, gravel and grading. Three contractors spent 8-10 months a year to build and upgrade roads and bridges on about 200 km.²⁴¹

TABLE 4-3 THE SEVEN MAJOR LOGGING SYSTEMS IN USE IN 2000

SYSTEM	TYPE	% of Volume (approx.)
Feller Buncher, Grapple Skidder, Roadside Delimiting	Tree Length	10
Feller Buncher, Grapple Skidder, In-Block Delimiting	Tree Length	45
Hand Falling, Topping, Line Skidding, Roadside Delimiting	Tree Length	4
Feller Processor, Grapple Skidder	Tree Length	22
Feller Processor, Clambunk Forwarder	Tree Length	6
Feller Processor, Shortwood Forwarder	Shortwood	4
Feller Buncher, In-Block Topping, Grapple Skidder, Bush Chipping	Chips	9

Transportation also became much more specialized. For off-highway hauling (Company roads) there were 22 self-loading trucks and 30 conventional trucks that required a loader. These hauled an average of 50 tonnes in summer and 55 tonnes in winter. For hauling on public highways, both load- and axle-weights needed to be lower. Tree-length hauling used 20 tandem-axle trucks with seven axles. Shortwood for logs or bolts used a variety of specialized trucks and trailers that carried loads of 37-39 tonnes. There were also five chip trailers with 30-tonne capacity.²⁴²

Central tire inflation (CTI) was becoming a standard fixture on logging and chip vans operating on woods roads. CTI allows a vehicle operator to remotely raise or lower tire pressure according to road conditions, reducing environmental impacts and permitting more year-round operations. Muhly noted that he expected to see more such systems, on logging equipment as well as on trucks.

Other systems aimed to protect fish habitat and streamside environments. River corridors had been mapped and assessed for ecological, recreational, watershed and wildlife values. Timber was still extracted, but the other values lead to a range of special management practices including small openings, selective harvest and sometimes no harvest at all. Visual quality was also assessed for harvesting areas in site-sensitive viewscapes, with blocks landscaped in design for both visual and biodiversity aspects.

Will horse logging ever return to Hinton? In 1990, an interesting experiment was conducted on an environmentally sensitive riverside area south of Hinton. Weldwood wanted to selectively remove some older timber while maintaining wildlife habitat, so it was decided to do part of the job with

modern machinery and part with hand falling and horse skidding. “The mechanical system was much more effective,” Muhly says. “The environmental impacts were the same, but the machinery was far safer and cheaper.” In fact, the hand faller could not meet one of the environmental objectives — to leave standing, dead trees (snags) for wildlife habitat — because this is unsafe and contravenes Alberta Occupational Health and Safety regulations.



HORSE LOGGING, GREGG RIVER RIPARIAN ZONE, 1990

WELDWOOD PHOTO COLLECTION

New harvesting machines improve tree utilization. Trading equivalent fibre with other industry partners adds value for everyone’s operations. For example, poplar may now go to oriented strand board mills in exchange for wood chips; sixteen-foot sawlogs of uniform diameter can be sent to other sawmills in exchange for wood chips and pulpwood logs; sawmill waste can be shipped to a medium-density fibreboard plant in return for wood chips. A portable debarking and chipping unit improves fibre recovery and reduces waste by producing chips from the small trees in mature, small-diameter stands.

In addition to secure tenure, both Muhly and Terry Nilson, fibre allocation manager, said they were encouraged by management to experiment as much as possible with new, and potentially rewarding, technology and systems. A lean and simple project approval process also helped.

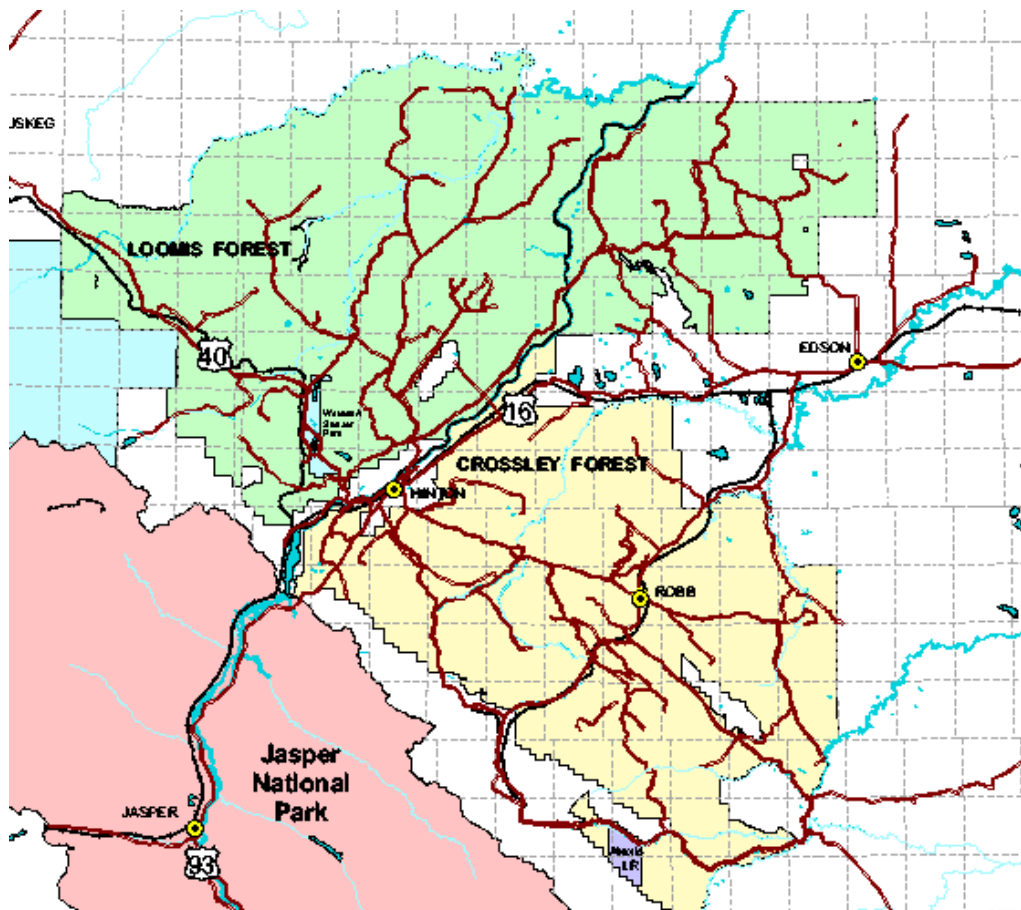
“We’re not forced to put together complex proposals for every innovation,” Nilson said. “If there’s something we want to try to improve our business, to run a little longer, to protect the environment, we just do it. We have that luxury - management wants us to have that freedom, so they encourage it.”

A two-man crew on foot with a horse pulling a single tree could work almost anywhere in the forest. It was a simple system, but efficiencies were limited. Machines on the other hand, have enormous productivity potential if utilized properly in an effective system. From the mid-1970s to the late 1980s, there were two primary harvest systems at Hinton. One was based on hand falling and cable skidders and was used on steeper terrain. Feller bunchers, working with cable or grapple skidders and in combination with manual or mechanical delimiting, handled the rest. By the early 90s saw heads had

replaced shear heads on the new feller bunchers, reducing damage to the butts. As well, with the new, more sophisticated machines with good electrical lighting systems, night shifts were introduced. This advance in technology contrasts with Silversides' comment about early logging: "During the animal power era, operations were primarily conducted in daylight and were highly seasonal in nature."²⁴³

The average production per worker in the late 1950s was about three cords (7 m³) per day. With fresh wood weighing about 800 kg per m³, each man was handling an average of more than five tonnes of material daily.

By the century's end, labour productivity soared to more than 80 cubic metres per person per day compared to about seven or eight cubic metres per person per day in horse logging days. The safety record improved, although the accident rate was still higher than many other occupations. A summary of the productivity gains through mechanization and planning in response to the major changes in logging systems is illustrated in Table 4. The accident rate was still higher than many other occupations.



Map 4-2 Company Permanent Road Network 2000

TABLE 4-4 HARVEST, MECHANIZATION AND MANPOWER: 1955-2000

YEA R	WOODS Staff	Major Logging Systems and Events	Area Logged (ha)	Volume X1000 m³	Man-day Prod'n m³
1955			356		
1956	600	Hand falling, horse skidding, hand limbing and piling, 100 inch wood. Stockpiling in woodyard at mill	3268	548	
1957		Pulpmill begins production	1548	366	5
1958			1882	401	6
1959			2066	401	7
1960			2866	540	
1961			2729	470	
1962			2624	474	
1963			3603	627	
1964			4050	700	
1965			4618	789	
1966			4527	829	
1967			3467	386	
1968		Nine month "year" due to changeover from government fiscal year to calendar year for records	1520	566	
1969	375-400	Hand falling and limbing, line skidding, tree length.	4532	856	35
1970			3769	904	
1971			3444	639	
1972			4497	912	
1973	160	Feller-buncher shear head, line skidding, flail delimeter roadside, and Hand falling etc. on steep/rough sites	5245	904	
1974			3974	904	
1975			3624	799	
1976			4068	815	
1977	.c 200	(50% feller buncher and hand falling BM)	2753	695	
1978			4024	851	

1979			3544	833	
1980			4000	762	
1981		Beginning 9-year period of reduced harvest due to major purchased-wood program	2380	881	
1982		Feller buncher shear head, line skidding, stroke delimeter roadside replaces flail, and Hand falling etc. on steep/rough sites	2699	677	
1983			2899	652	
1984			2303	783	
1985			2541	620	
1986		Introduction of night shift work with new feller bunchers (Timberjack Timco) with saw heads	2253	789	
1987			2457	490	
1988		New Agreement soon leads to increased demands for wood.	2506	335	
1989		Introduction of expanded contractor operations, first cut-to-length	2050	563	
1990		Expanded pulpmill opens - Feller buncher with delimeter stumpside, grapple skidders (55%) and feller processor with delimeter stumpside, grapple skidder (22%), plus hand falling etc.	4158	978	
1991		Last shear head replaced with saw head	4306	1655	
1992		First bush chipper operation	5155	1310	
1993		Hi-Atha sawmill opens in August	5676	1130	
1994			7825	2263	
1995			5045	1696	
1996			6311	1695	
1997			5182	1539	
1998			6243	1583	
1999			7596	2110	83
2000		(86% in-block processing)	6681		

Although the woodlands labour force was reduced as a result of mechanization there had been ongoing difficulties in including loggers to work in those rugged conditions, especially in competition for employment with the many other resource industries in Alberta. As Lacroix explained²⁴⁴:

Actually we didn't have too much problem with reducing the work force. The members understood that the production had to come up with less people and mechanical logging was one way to improve it. First of all when the experiment with line skidders began in 1966, it was done on a voluntary basis and there was no shortage of volunteers. When conventional logging was introduced, the system of falling was about the same except tree length with skidders -- and no piling was a welcome change. There were no problems adapting to the new system. As for reducing manpower, there were no lay-offs. If someone quit we didn't replace. Four years later the feller-buncher system was introduced. It was a major transaction and an intensive program was developed. It took a couple of years for the feller-buncher operators to produce to their potential. Shortly after the conventional logging manpower was reduced gradually.

Machine logging is here to stay, but it is always improving in capability, productivity, suitability, safety and sensitivity to the environment.

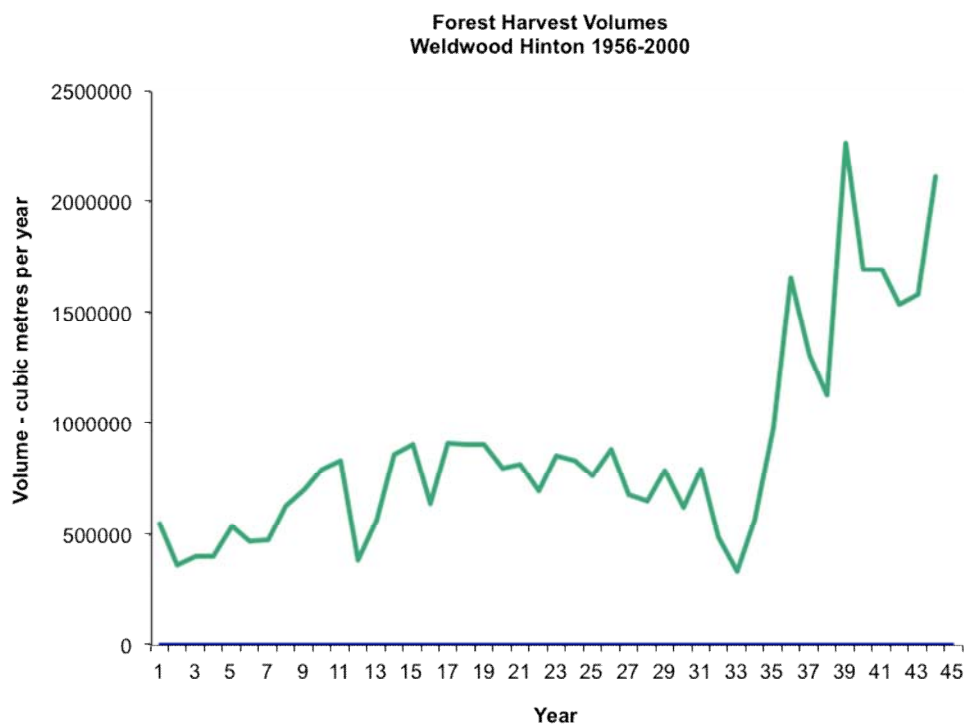


FIGURE 4-5 VOLUME OF WOOD HARVESTED ANNUALLY FROM THE FMA – 1000 M³

FOREST STEWARDSHIP PROGRAM

One of the most innovative moves was introduction of the *Forest Stewardship* program. Weldwood also recognized that many impacts depended on the minute-by-minute decisions of operators who usually worked without direct supervision. As a result, a high priority was put on developing operator awareness and skills. This was accomplished through group presentations and one-on-one contacts, backed up by post-harvest audits. A computerized CD-ROM stewardship-training program was developed in 1998. It encompassed all aspects of stewardship – including legislation, planning, ecosystems, water quality and best management practices. A total of 54 contractors and employees completed the course in the first year, and the goal after 2000 was to have all contractors and staff complete the course once every three years.

The educational program was enhanced in 1999 with publication of the company's *Handbook of Forest Stewardship for 21st Century Workers*. In plain English, the 85-page handbook explains both the principles of sustainable forestry and practical ways to put it into effect. Training in safety and stewardship was provided for employees and contractors each year during spring breakup. For this handbook, the Company was awarded a Wildlife Habitat Canada Stewardship Award in 2000.

In 1999, Weldwood logger Glenn Davies also received the WHC Stewardship Award for his individual contribution to stewardship. Davies was operating a feller-buncher when he spotted a goshawk flying into a nearby clump of trees. It turned out the goshawk had its young in a nest there. The harvest crew left the area until the birds fledged and left the nest.

4.14 WOOD PURCHASE, EXCHANGES AND STRATEGIC ALLIANCES

The Company has purchased pulpwood on the open market from the time the woodyard was opened in 1956. John L. Janssen, former resident of Edson and just-retired head of the AFS forest protection branch, was recruited that year as the first pulpwood buyer. The 1954 and subsequent Agreements were explicit that the Company would “as far as feasible” purchase all surplus top logs and other material from timber operators throughout the province and “will purchase pulpwood from *bona fide* settlers” provided that it was offered at a cost competitive with Company wood.

Purchased wood remained a minor component of the wood supply since Company operations were able to ensure that the volume needed was available in the woodyard. However, in the spirit of encouraging fuller utilization and extending economic opportunities to local settlers and timber operators, some wood was purchased every year.

The situation changed in 1988 when the new Agreement was signed. Since the AAC of the new FMA was estimated to be capable of meeting only 70 per cent of the wood needs of the expanded pulpmill and new sawmill, it was essential that new sources of wood be found. Part of the increase could be provided through an Enhanced Forest Management (EFM) program that included increased utilization of wood in the forest, and measures to increase site productivity. However, the remaining volume had to be actively sought from outside the FMA.

The first phase in addressing the immediate supply aspect was to negotiate “chip direction” clauses in the Agreement. However, these became politically unacceptable because of fair trade and economics implications. Most of these purchase arrangements are still in place on a voluntary basis, but with no requirement to continue them.

A second opportunity was provided in 1995. Under a re-negotiation the Company gained full rights to the hardwoods on the FMA. This enabled the Company to make log-exchange agreements with other forest products industries.

The third phase was development of strategic alliances among forest industries to try to maximize the end product value of their wood, while meeting their own volume requirements. Dennis Hawksworth, then General Manager of Hi-Atha and Forest Resources, outlined their strategic approach in 1997:²⁴⁵

Our company recognizes Alberta as a very good place to do business and we want to grow in Alberta. We really see that the growth in Alberta from a strategic perspective is not in isolated operations away from Hinton. We still see Hinton as being the lever to future growth through an ability here to be almost like fibre brokers. Hinton in terms of this magnificent land base, our fibre mix, our location, and the businesses that we run here, will provide us opportunities down the road outside of the Hinton operations.

Bob Udell described the situation in place in 1998:²⁴⁶

We have wood coming and going every which way here. We are selling aspen to Weyerhaeuser's OSB plant in Edson and in return we are getting chips from their sawmills in Drayton Valley. We are selling peeler logs to Sunpine and getting back chips from their operations in Sundre. We are selling cut to length wood to Sundance in Edson and in return we are getting back roundwood logs of the diameter that is suitable for our sawmill. They like a particular diameter profile of logs to their sawmill which we supplement from our FMA. And they provide us with logs. Some of them are run through the sawmill. Others we run through the wood room at the pulpmill, plus we get all their chips. Blue Ridge Lumber needs some of our sawdust and fines for their MDF plant, in return for which they sell us chips from their sawmill. We sold roundwood to the sawmill at Grande Cache and get chips back from them. We have been successful in negotiating agreements with many companies. These are good symbiotic relationships.

But the main value to us is building long-term strategic alliances with these companies. We know that we need their fibre, in many cases they need ours, and they need a market for their by-product chips. We strive to build a business relationship with them that helps them be more successful and helps us be more successful at the same time. I think Bryon Muhly and Terry Nielson and others in their departments have gone to great lengths to build some of these relationships. And Don Laishley of course really started the whole initiative off.

The flow of fibre among mills is illustrated in Figure 6.²⁴⁷ These exchange developments led to a new focus on highway transportation of logs and chips, increased emphasis on log and fibre quality, and concern about the timing of delivery. These factors became major influences on the design of logging operations to ensure delivery of the right wood to the right mill at the right time.

As Bryon Muhly, then Manager of Resources Optimization, put it:²⁴⁸

... how do we extract the maximum value out of that forest resource. as opposed to primarily producing a commodity product we now develop a very close relationship and a good understanding of the end user customer -- working with them to develop new products that really add value to their business and therefore add value to yours, assuming that you'll be paid more for specialized products that fit their needs. So it's really moving to a customer value based philosophy and culture, which is pretty significant for the industry.

... you have to be able to compete on a cost basis, there's no question there, there's a lot of profitability there as well. But now you also have to take a look at what you can achieve on the top line of the business, in other words, on your revenue coming in. So a lot of effort must go into a better understanding of the resource -- quality issues -- and what we're seeing now is a need to understand fibre characteristics and quality characteristics more so than what we have in the past. That will influence our planning of delivery schedules from the woods to the mills and developing the planning processes.

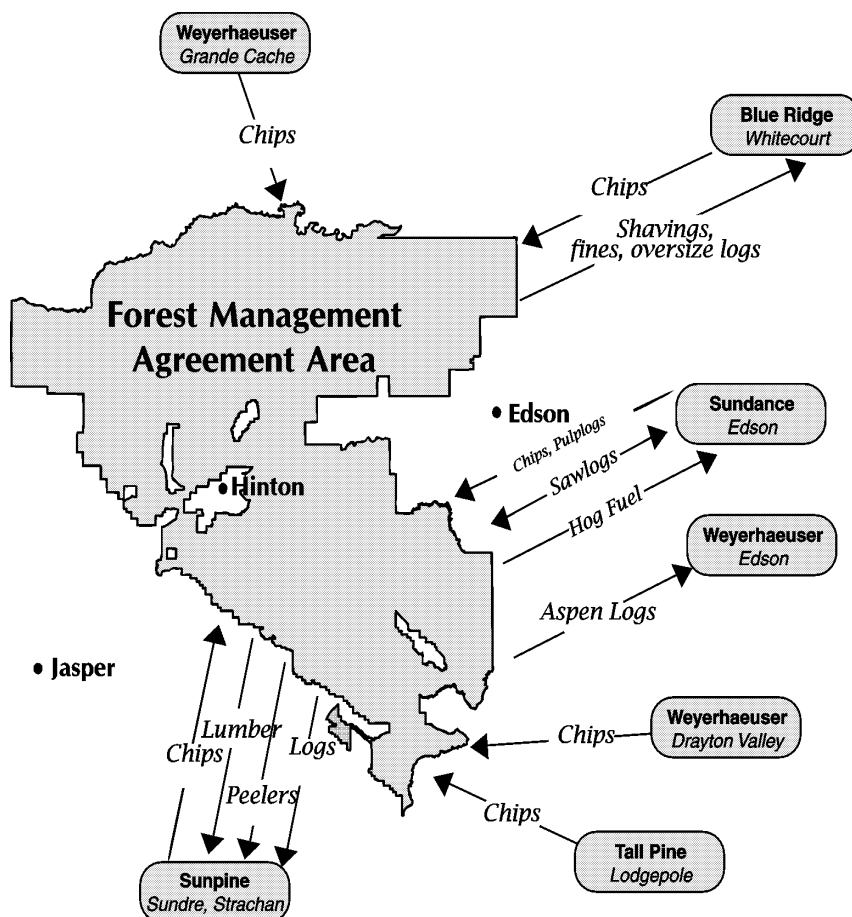


FIGURE 4-6 FLOW OF WOOD AND FIBRE AMONG MILLS TO MEET WOOD NEEDS AND OPTIMIZE WOOD VALUE, 2000

An indicator of the effect of wood exchanges is shown in Figure 7.²⁴⁹ In 1991, before significant wood exchanges began, and before the HI-ATHA sawmill began operations, almost 70 per cent of the conifer harvest from the FMA was used in the pulpmill at Hinton. This proportion declined to 20 per cent in 1999 and remained at the 20-30 per cent range. Smaller- sized wood and chips from other operations were brought in to make up the difference for pulping at Hinton.

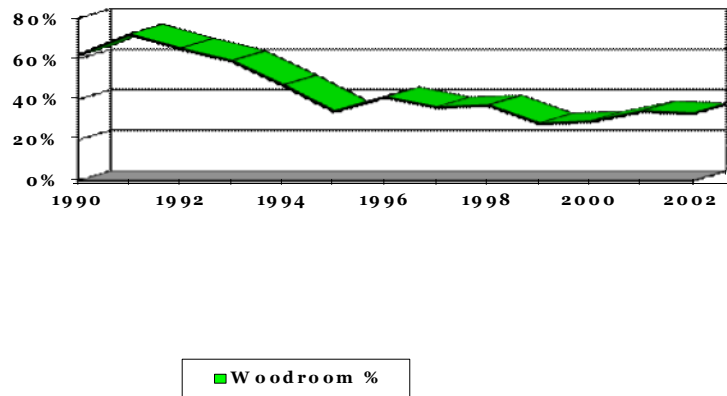


FIGURE 4-7 ANNUAL % OF FMA HARVEST CHIPPED IN THE HINTON WOODROOM

TABLE 4-5 WOODLANDS MANAGERS AND EVENTS/ACCOMPLISHMENTS BY PERIOD

Manager	Period	Accomplishments
Gordon McNabb	1955-56	Set up Woodlands/forestry operations First camps, initiated horse logging First road development Operational cruising
Adrien Provencher	1957-62	Oversaw the full implementation of logging and forest management programs and the expansion of the road system to much of the FMA area.
Stanton G. V. Hart	1962 - 1968	Led change from horse logging to skidders Change from winter operations to year round commuter operations
James D. Clark	1968-85	Offered FMA area for wildlife program Contributed to policy through involvement in AFPA (president 1983/84), CIF at senior levels Introduced mechanized harvesting, self-contained haul trucks to operations
Donald W. Laishley	1986-1994	Negotiated new FMA for expansion Led expansion start-up team New department organization Contract logging/ silviculture crews Approved enhanced silviculture program Implemented wildlife/ forest management program Strategic fibre alliances developed
Dennis Hawksworth	1994-1999	Design, construction of highly successful HI-ATHA sawmill Integration of woods ops with sawmill needs Implementation of strategic supply agreements and log allocation Chair/member of Alberta Softwood Lumber Advisory Committee 1 st Chair, Alberta Chip Users Committee Acquisition of Sunpine operations ForestCare certification all facilities AFPA President – 1998
Jim Lelacheur	1999 - present	ForestCare re-certification ISO 14001 certification CSA Z809 Certification of FMA area Building strategic alliances with secondary manufacturers Approval “Natural Forest Management” program (2002)

CHAPTER 5 FOREST PROTECTION

5.1 INTRODUCTION AND ACKNOWLEDGEMENTS

The fundamental purpose of forest management is to provide a reasonable assurance of wood supply, in volume, quality and continuity. Forest management is based on maintaining a living dynamic forest. However, the forests, like all living creatures, are affected by “disturbances” which may cause illnesses that reduce growth, degrade wood quality or even cause death of trees – singly, in clumps or even in extensive areas of forest. There are many disturbances that affect forests, including insects, diseases, windstorms, ice storms and winter drying by Chinook winds. However, the disturbance of single most significance is fire -- fire has by far been the most pervasive and dramatic disturbance. Despite advances in forest fire management fire’s potential for destruction of timber values remains high. However, at least in part, because of the introduction of fire control efforts around 1910, the rate of burn seems to have decreased. This has resulted in generally older forests with greater continuity of fuels so the potential for more intense fires has increased. At the same time, habitats had been reduced for certain species that prefer earlier-succession forest communities. Fire is a dynamic part of forest ecosystem processes.

KEY PLAYERS IN FOREST PROTECTION AT HINTON

Dexter Champion 1955-1967

Dexter worked 21 years for the Alberta Forest Service from 1935 rising from seasonal lookoutman to district ranger in the southern Forests to Timber Inspector at Athabasca. He left in 1956 to join NWPP as Fire Prevention Superintendent in the Woodlands Division. He transferred to Safety Supervisor in 1967. He brought with him a rich experience in forestry and fire control. He served as Hinton Fire Chief for many years and the fire hall was named after him.

Russell Powell 1967-1968

Russ Powell graduated from the University of Toronto in 1965 and was the Gold Medal graduate that year. He joined the company directly, working in silviculture and inventory. Upon the transfer of forest engineering to Woodlands in 1976, forest protection was moved into the Forestry Department and Powell placed in charge. He worked with his counterpart in the Edson AFS protection organization – Chuck Geale – to harmonize training programs and fire fighting equipment for the two organizations. He left the Company in 1968 and joined the Ontario Department of Lands and Forests in Kenora, where he became and management forester responsible for the two Ontario-Minnesota Pulp and Paper management units in the area.

Robert W. Udell 1968-1970

Bob Udell is manager of Forest Policy and Government Affairs. He is a University of Toronto forestry graduate, becoming interested in forestry in his central Ontario home area. He was hired by Des Crossley in 1966, starting as a field forester in production layout, then working with Wright on the permanent sample plots. He was promoted to head production layout and forest protection in 1968 upon Powell’s resignation. He continued the efforts of Powell in training and harmonization, working with Chuck Geale’s replacement – Ben Shantz – of the Edson AFS. In 1970 he resigned and moved to Kenora, taking over Russ Powell’s position there. He returned to Hinton in 1975 to replace Jack Wright who in turn replaced Des Crossley as Chief Forester.

Brenton Simmonds 1970-1981

Brent Simmonds was a member of the original NAIT graduating class in 1966, having previously worked in the Company's technical department before returning to school. Brent headed the protection program for 11 years and made significant improvements to training and equipment during his tenure. The old fire warehouse was replaced in the early 70s by a much larger and more modern facility with a more modern and comprehensive inventory of equipment.

Wayne Mayan 1981-1986

Wayne Mayan, currently an Area Coordinator in the Forest Resource Department, joined the company in 1965 and worked in every section of the Forestry Department before his promotion to head up the forest protection program. During Mayan's tenure the company struck an initial attack crew, initially using students and a few years later using full time IWA workers.

Warren Kehr 1986-1998

Warren Kehr is currently the Purchase Fibre Manager for the Company. He is a NAIT graduate and was hired upon his 1975 graduation by Jack Wright and Des Crossley as a technician. He worked in most of the company program areas including silviculture, inventory and management, land use, forest protection and purchase fibre. During most of his career at Hinton he has been, and continues to be, directly or indirectly involved with forest protection policy and operational activities, including co-chairing the provincial forest protection advisory committee, and participating on a provincial task force on holding and protection charges in fire control agreements (March 2000 report). While in charge of fire, he developed new and innovative equipment for effective attack and control.

Jim Bushner 1993-2000

Jim Bushner is currently the Road Maintenance and Forest Protection Supervisor at Hinton. He planted trees in 1962, then started working full time for the Company in 1964, as a bush cutter, moving progressively through positions in scaling to logging crew supervisor to his present role. He began managing the Initial Attack crew in 1993, about the time the crew changed from part time to full time work. During his tenure, he has continued the tradition of fostering very good working relationships with the Forest Service and implemented improved fire protection training for employees.

5.2 FOREST FIRES – A HISTORICAL PERSPECTIVE

Forest fires have been a natural part of the ecosystem process. Trees and plants in the forests have grown, year by year, storing carbon in the woody and plant parts, creating the forest complex of living and dead material. These same materials are also fuels for fires. As fuels accumulate, recurrent fires will burn them. .

Fire is a natural part of ecosystem processes. The combination of an often-dry climate, lightning strikes and abundant fuel brought frequent fires throughout the 100 centuries of the modern forest. Depending on moisture, fuel and wind conditions, a fire might be contained to a small patch or could envelop millions of hectares. Also, the forest does not burn uniformly; recent research indicates that a single 1,000-hectare fire event creates an average of about 60 distinct burnt patches.²⁵⁰ The 1880s, when smoke from widespread fires in Western Canada darkened skies over London, England, typified the devastating fire cycles that probably occurred at least once a century during the preceding millennia. The first inventory of the Hinton forest in the 1950s indicated about one-third of the timber dated from regeneration after the fires of the 1880s and 1890s, one-third from regeneration after more recent fires, and only one-third originated prior to the 1880s. Such a mixture of old, middle-aged and young forest stands was probably common for most of the post-glacial period. Repeated visitations by fire, on

varying scales of time and area, shaped the structure of the forest, and each species evolved with its own survival or renewal strategies.

LIGHTNING

Lightning has probably been the most frequent cause of fires over the last 10,000 years. Lightning is generated when warm air is lifted up through cooler air when the atmosphere is 'unstable' or susceptible to churning. Lifting can be caused by surface heating under the sun – usually generating isolated storm cells. More frequent is the widespread lifting that takes place as cold fronts lift the warm air ahead of it, sometimes quite violently, resulting in a line of storms. In this region, the most common influence may be the Rocky Mountains that cause the 'prevailing westerlies' to rise up over the peaks – a process called orographic lifting. The map of average lightning occurrence for Alberta (Map 5-1) shows areas of high frequency east of the Rockies. Typically, if the atmosphere is unstable, storm cells are created over the mountains, but they develop and mature as they drift eastwards, becoming most active away from the mountains. However, given the diversity of 'triggers', lightning can and does occur throughout the region with enough frequency to start fires most anywhere.

FIRST PEOPLE AND FIRE

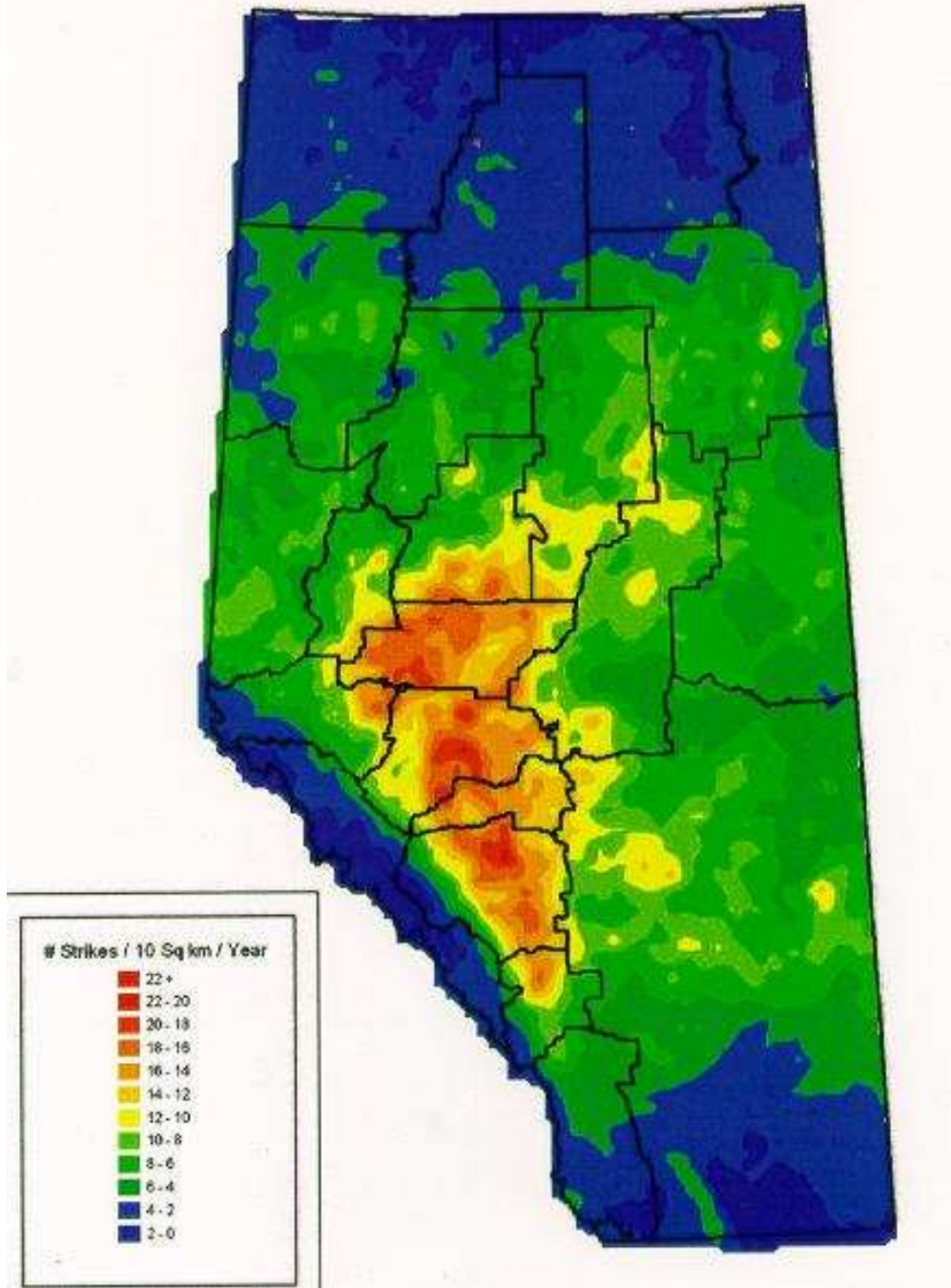
Another common fire cause now is human activity. This has probably been the case ever since humans first arrived, again possibly about 10,000 years ago.

Fire not only shaped the landscape but also destroyed most signs of human use. Buried archaeological artifacts may eventually tell us more about early peoples. Evidence from a few campsite remains in the Athabasca Valley indicates an Aboriginal presence near the Snake Indian River west of Hinton as early as 10,000 to 11,000 years BP, although there is little to suggest there were ever any permanent settlements. Rather, the area seems to have served as a corridor for people hunting or just passing through.

The first people were hunters and gatherers, moving to take advantage of seasonal opportunities. They depended in large measure on bison in the prairie, parkland and montane areas, and moose in the forested areas. The moose was an important staple in this region, providing meat, clothing, footwear, coverings for lodges and boats and sinew for sewing. Hides were smoke-tanned, and surplus meat was dried to preserve it. The same traditions of hunting and gathering remain today. Finds of bison skulls and evidence of buffalo wallows in meadows in this region indicate they were present or migratory along most of the river valleys.

Fire made life possible in these northern forests, for cooking and providing heat for year-round living. The ability to carry fire or fire-making materials was essential for survival. Recurrent forest fires, natural and man-caused, also created the earlier plant succession stages and the mosaic of habitats that were necessary to sustain the plants and animals on which they depended, such as berry-bearing plants, birch used for bark and syrup, willows and aspen providing browse for the large herbivores, and the beaver that also used them for food and dam building

Lightning Occurrence 1992 - 1996



Map 5-1 Lightning Occurrence in Alberta 1992-96

The frequent fire cycles must have played a major role in Aboriginal life in this area. Although burned-over areas soon support a wealth of plants and animals, the immediate aftermath can be bleak and barren. This was another reason for people to keep moving, perhaps to return later when wildlife feasted on new growth. Both bison and moose were early occupants of recently-burned areas.

Life in the northern forests was not always idyllic, and starvation was a constant threat. This was illustrated in this excerpt from the Hudson's Bay Company (HBC) post record at Fort Edmonton²⁵¹ in 1812 about the nature of the hardships, frequently related to fire. In these regions, with such a great continuity of fuels, fires could become very large, with effects extending over vast areas.

The Plains are, and have been these several Days past, burning in a most dreadful manner. Fires are raging in all Directions, and the sun obscured with Smoke that covers the whole Country, and should the remarkable dry weather which has now continued so long, not change very soon, the plains must be burnt to such an Extent as to preclude all Hopes of our getting a large supply of dry provisions, for which appearances on our Arrival here were very flattering.

A subsequent entry in the HBC Post record stated the Sarcees reported that from Fort Edmonton to the banks of the South Saskatchewan there was not a buffalo bull to be seen nor a bit of dry ground unburned (about 450 km, possibly 6.5 million ha). The HBC was forced to send men 80 km away to find and kill game for food that fall and winter. As well, very few came to trade that year since the Aboriginal population had to move to unburned areas that still supported bison.

Judging by the later practices of Aboriginals in nearby areas, the early peoples seem to have used this knowledge and deliberately set fires to create habitat for favoured species such as bison and moose, to encourage growth of berries and other food plants, or to clear travel routes along streams and rivers. Fire was essential to these people for cooking and warmth, and their survival depended on the ability to light or carry it. There were undoubtedly instances when they accidentally ignited wildfires too. In prairie or parkland areas Aboriginal people also learned to set back fires to help to protect themselves.

Colonel Sam Steele, who led the Northwest Mounted Police into western Canada, noted in 1874: ²⁵² "Indians ... wilfully set the prairies on fire [in the autumn] so that the bison would come to their part of the country to get the rich green grass which would follow in the spring. "

Louis Martel, a Beaver Indian in north-western Alberta, conveyed a clear understanding about fire during an interview by Dr. Henry T. Lewis²⁵³ in 1975.

Fires had to be controlled. You couldn't just start a fire anywhere, anytime. Fire can do a lot of harm or a lot of good. You have to know how to control it.... It has been a long time since my father and my uncles used to burn each spring. But we were told to stop. The Mounties arrested some people ... The country has changed from what it used to be -- brush and trees where there used to be lots of meadows, and not so many animals as before.

There is growing evidence that Aboriginals significantly affected landscapes through their use of fire, but their use appeared to be tempered by an understanding of the ecosystem, their place in it, and the need to constrain fires to the areas that they wanted to burn. For example, they would burn stream and river margins for ease of travel, to provide grass for horses, encourage willows for moose and aspen for beaver, open areas on which to camp and to stimulate berry production. They would also burn

meadows to encourage grass and sedges, and would burn some stands of living trees to create sources of dry wood for fires.²⁵⁴ Edward Moberly described burning on the Henry House Prairie area in Jasper in the early 1900s²⁵⁵:

... in the spring that's the first thing everybody does is burn the meadows -- well everyone goes and helps him -- but burn when he wants to burn. This way the meadow doesn't grow in -- willows and things doesn't come in -- it's always the same size and it's always clean.

... they watch the wind very close -- that's the main thing. Some of it, they have to do it when it is absolutely still -- no wind to tackle that. -- they start the fire in the east and it can't cross that burn. When the west wind blows -- you start this way and it's all done.

Their burns were also family and cultural events, as Moberly went on to explain:

When we burn the meadows, every child that is big enough to help control be on the job. What did we have to control the fire with -- a bunch of spruce boughs dipped in water. There was no other equipment to be had -- but it worked -- and if somebody has a big meadow that fire might get away -- everybody goes and helps there -- even the kids. The kids them days were put to work early in life, so they be able to learn what they have to learn. Because they're going to use that way of life themselves. There's not too much shovels -- I think each family might have one or two spades, that's all there was -- maybe two picks in the outfit, for the whole outfit. So you have to figure out how you control, and the best I've seen beside the pump is spruce boughs -- you know, maybe four, about so long (about 3 feet long) -- for smaller kids shorter. They tied up where you hold them -- dip them in water -- and as the fire goes along, as long as the fire doesn't go too fast -- there's no wind -- you can control like that -- very neatly.

Stephen Pyne²⁵⁶, noted historian and fire ecologist, referring to Upper Palaeolithic Europeans, put it this way:

Wherever climate allowed a sliver of dryness and wherever pyrophytes^{xiv} salted biomes^{xvi}, humans could drive a wedge of fire to crack open the ecosystem and cook it into more palatable forms. Why would they not exploit fully the most indispensable element of their toolkit?

Maskuta Creek means "meadow creek", similar in nature to the name of the Wild Hay River. It is likely that spring burning was done by Aboriginal people at times along most of the rivers and streams in this region. This included the Beaver and members of the eastern tribes of Iroquois, Nipissing and others who came with the traders. Those practices were stopped around 1910 when the federal government took over management of the land. As Edward Moberly²⁵⁷ related:

^{xiv} Pyrophytes: plant species adapted to survive or benefit from some type of fire regime;

^{xvi} Biome: a regional ecosystem with a distinct assemblage of vegetation, animals, microbes and physical environment often reflecting a certain climate and soil.

... when they land in the Park -- that they going to take this area for Jasper National Park -- they put the notices all over -- everybody to watch [out for] fire -- no fire -- watch your campfire -- always put it out -- watch your smoke -- all this -- they put the notices out. How do we know? -- because Adam Joachim can read. He read them out for us -- for the people -- what it says. So, in a way still they are -- they follow the instructions right from the beginning -- otherwise you did wrong. Old Swift^{xlvii} -- he shot a squirrel on his own property, he got fined 50 bucks!

M.P. Bridgland was a Dominion Land Surveyor who pioneered the use of panoramic photography as an adjunct to triangulation to prepare topographic maps. He worked along the Athabasca Valley from the eastern Jasper Park boundary to Jasper townsite in 1915, leaving a legacy of photographs. These were re-photographed in 1999 by Jeanine Rhemtulla²⁵⁸, a graduate student at the University of Alberta, and Eric Higgs, professor in charge of a major project to study human impacts in the montane region. The following pair of photographs show the appearance of the Athabasca Valley looking downriver towards the Jasper Airport. The early photo was taken just five years after the Moberly families were evicted from the park. The open nature of the forest clearly reflects the influence of fires. The 1999 photo illustrates how much the forest canopy has closed in response to effective fire control.



MP Bridgland 1915



J. Rhemtulla 1999

ATHABASCA VALLEY – BRIDGLAND REPEAT PHOTOGRAPHY PROJECT
COURTESY UNIVERSITY OF ALBERTA AND PARKS CANADA

We will probably never know the actual extent of Aboriginal burning. Accounts suggest that their burning was mostly location-specific, such as along watercourses and meadows, travel routes and camping areas -- as effectively described by Lewis and Ferguson²⁵⁹ in their paper “*Yards, Corridors and Mosaics*.” These burns seemed usually planned for and conducted in spring when adjacent forests were still moist. However, some burns undoubtedly spread further than intended, but probably not seriously impacting their ways of life given the apparent scarcity of population and vastness of the area. As Pyne²⁶⁰ explained about human influence: “ ... small numbers of fire-wielding people can exercise wide influence, that people move, that fire propagates. Humanity's fiery reach far exceeds its grasp.”

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EXTENT OF BURNING

The extent of fire is clearly evident in photographs taken during the early 1900s and in descriptions by forest surveyors. For example, J. A. Doucet commented about fires north of Edson during his survey in 1913:²⁶¹

Here the Athabasca valley was, at one time, very well timbered with the best of lodgepole pine, spruce, birch and poplar. Repeated fires have swept over it in such a way that there are, at the present time, only a few remaining patches of the old stand. These are found scattered along its flats, and mostly at the entrance of streams.

The young growth, however, is generally abundant over the old brule (fire-killed timber), to which large and healthy patches of forest, 35 to 50 years old, give a certain value. But no one will ever know how many millions of dollars worth of national wealth, represented by the virgin forest, were turned into ashes by recurring forest fires and washed away with the best of the soil by the rapid current of the Athabasca River.

It has also been estimated that only about 1,760 square miles, or 23 per cent of the 7,330 square miles examined, have been free from fires during the last 100 years, and of these 1,760 square miles, only 250 could be considered as bearing a mature cover.

T.W. Dwight, another Dominion forest surveyor, discussed the forest conditions of the Rocky Mountains Forest Reserve in 1913, part of which is now included in the westerly portions of the Weldwood forest management area (FMA). His remarks illustrate both the influence of fire and the resilience of the forest²⁶²

Second-Growth Stands (Resulting from Fires) -- These occupy three quarters of the forest area, and the timber is over ninety percent pine, the remainder being mainly spruce or, in the foothills, poplar. The reasons for the dominance of pine over spruce are explained in the influence of fires. There does not seem to be any limit to the period during which fires have occurred. An extensive fire occurred in the Ghost River valley one hundred and eighty-three years ago (c. 1730), and the resulting stand is now being lumbered. Evidences of fires are found in still older stands and the general even-aged character of the forest indicates the extensive influence of past fires on the present conditions of the forest.

Within the past sixty years, fires have increased greatly in number, judging from the ages of most of the second-growth stands, which lie below that age. An extensive fire occurred in the vicinity of the Sheep River forty-five years ago (c. 1868), and widespread fires have been periodical there during more recent times. The splendid reproduction of pine, even after severe fires, has been a boon to the forest, since practically all of the burned-over areas have seeded up to merchantable species instead of, as in many regions of Canada, coming to be occupied by comparatively worthless species. Under conditions unfavourable to reproduction, occupation of the burned areas by grass takes place; and that is the worst result than can come of a fire, or of repeated fires.

Only more recently have fire-related studies begun to show how pervasive fire has been, how frequently it recurs and the complexity it introduces into forest ecosystems and developing approaches to sustainable forest management.

The first detailed study in this region was the three-year age-classing project completed in 1961. It was done to try to determine dates of stand origin for forest management planning and to identify areas that would be suitable for the first logging operations. What it also revealed, since most of the forests are of fire origin, was the recurrence of fires (Map 20). Jack Wright found during his analysis that 33 per cent of the FMA had burned during one major period during the late 1880s and early 1920s. Wright also identified four other years of major burns in the 100 years before 1960: 1870, 1876, 1896 and 1921.

Fire scientist Charles VanWagner²⁶³ used the data in his classic 1978 paper "*Age-class and the fire cycle*." He showed the average annual rate of burn (average % of total area burned annually) as of 1915 was 2% but that by 1960 it had declined to 1.5%, a result, at least in part, of active fire control. More recent studies by David Andison²⁶⁴ indicate that in recent centuries an average of 1.0 per cent of the upper foothills forest burned annually, 1.2 per cent of the lower foothills forest. Some sites would be affected more frequently, others less often. The average annual rate of burn is now considerably less. On the Weldwood 1,000,000-hectare forest, about 100,000 ha have burned since 1955 or 0.2% annually.

There are two aspects about fire occurrence that are important with respect to both fire control and understanding the role of fire in the ecosystem. These are the potential for extensive burns and the repeated recurrence of fires on any one site.

The potential for extensive burns can be illustrated in age-class maps. The 1961 age-class map (Map 5-2) showed the disperse nature of burns as approximated by tree ages; and the rates of burn as expressed by VanWagner and Andison as yearly averages. However, the actual occurrence of fire seems to have been one of major surges of fire activity followed by periods of fires of smaller sizes. For example, the area of the legendary burns of the 1880s and 1990s on the Weldwood forest management area represents over 38% of the forest (Map 5-3). Since some of the evidence of these burns has been obliterated by more recent fires, it has been estimated that as much as 45% of the area may have been burned during those two decades²⁶⁵. It is difficult to imagine burned areas of this extent today. Of course, these burns have since regrown, and many have since been logged.

The recurrence of fire on a single site was illustrated on a cutblock south of Robb²⁶⁶. The stand being logged had originated after a fire in 1896 (see photo ensuing). Snags from the previous stand and an even earlier one enabled estimates of the years of those prehistoric fires, one as early as 1387, and fire scars on them allowed dating of other fires of lower intensity as shown in Table 1.

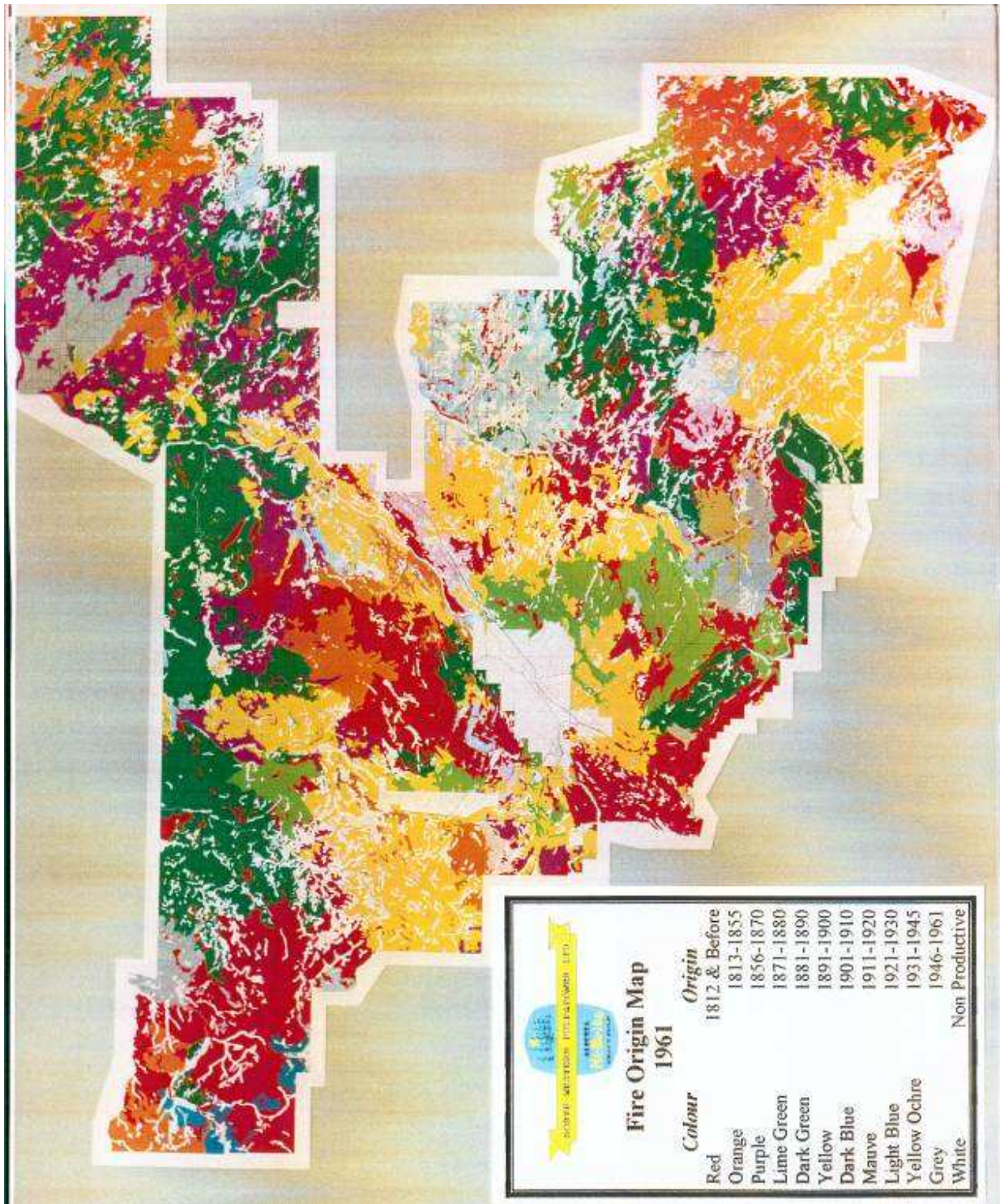
TABLE 5-1 ESTIMATION OF FIRE EVENTS DERIVED FROM LIVING TREES AND SNAGS, ROBB AREA, WELDWOOD FOREST MANAGEMENT AREA.

Event	Year
Logging	2000
High-intensity fire -- starts new stand	1896
Low-intensity fire -- scars snag	1734
High-intensity fire -- starts new stand	1686
Low-intensity fire -- scars snag	1595
High-intensity fire -- starts new stand	1387

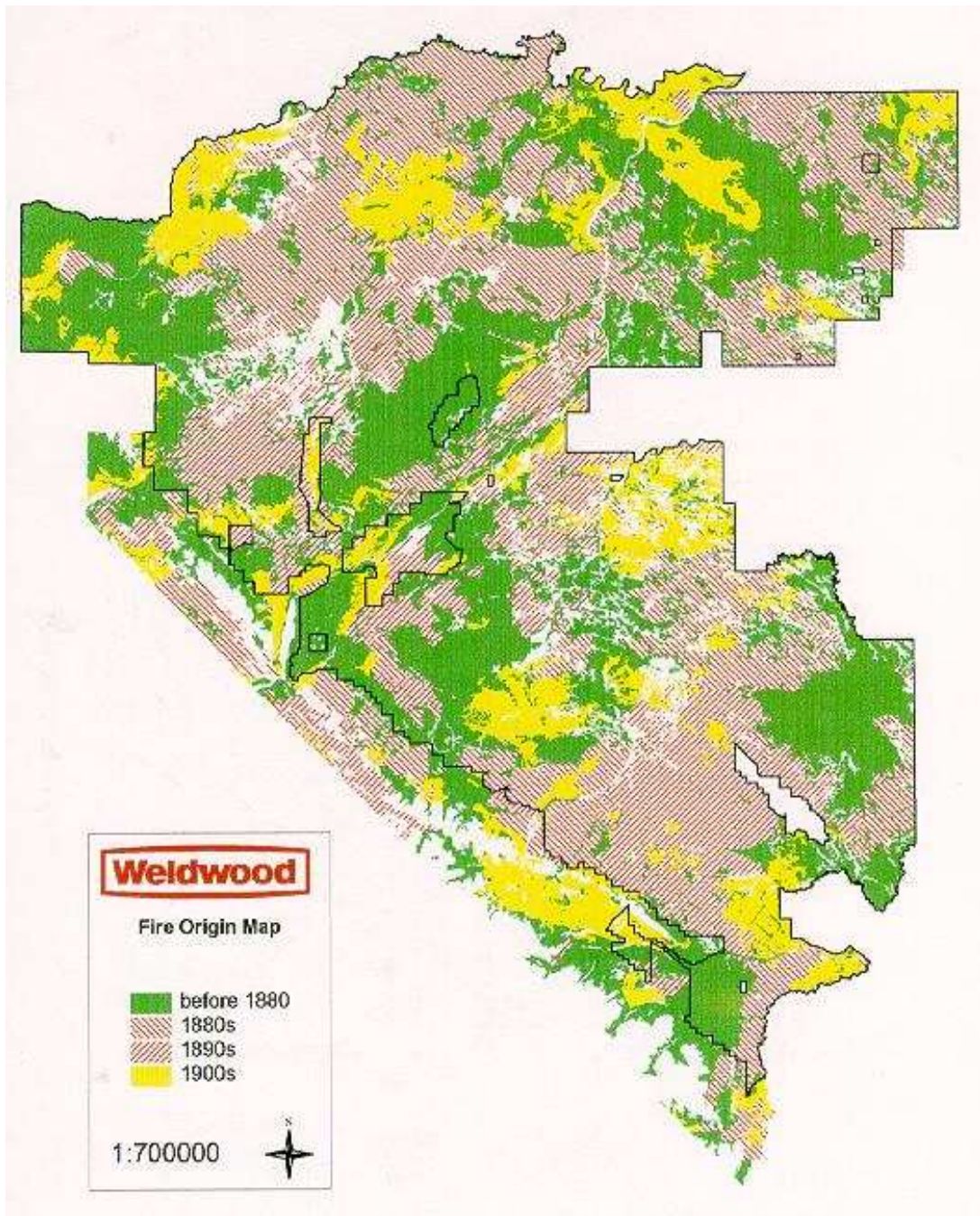


FIRE-KILLED TREE SECTION FROM 1686 FIRE. THIS TREE IS ESTIMATED TO HAVE ORIGINATED AFTER A FIRE IN 1387, WAS SCARRED IN A 1595 SURFACE FIRE, AND KILLED IN A HIGH-INTENSITY FIRE IN 1686. IT WAS PARTLY BURNED BY FIRES IN 1734 AND 1896, BUT REMAINED STANDING IN 2000.

PHOTO: PETER MURPHY



Map 5-2 NWP&P Fire Origin Map, 1961



Map 5-3 Areas burned during the decades of 1880 and 1890 on the Weldwood FMA.

The challenge to forest managers now is to study the patterns, sizes, shapes and effects of fire for lessons by which to better plan for sustainable forest management. At the same time, it is important to maintain a fire control capability to reduce the chances of catastrophic disturbances. The philosophy now is that orderly forest harvesting may substitute for wildfire as the major disturbance. Fire and logging are not precisely the same in influence, but studies, research, trials and monitoring are helping to ensure that the results of human disturbance in the forest ecosystem produce conditions similar to those of fire and that they will continue to conserve biological diversity.

The Black Cat as an Icon

The legendary Black Cat near Brule is a striking illustration of two of Nature's dynamic forces that have shaped the forests of this region: Disturbance (forest fire) and succession (regrowth). Fittingly, the name "Brule" itself is the French word for "burned".

The Black Cat is clearly outlined in the 1927 photograph. The old forests in the body of the Cat originated after a forest fire around 1808, and the shape of the Cat was carved out by an extensive fire in 1896. Some other remnants of the 1808 forest also remain as patches of timber in the valley to the left, and in ragged stands on the hill.

How extensive was the forest that grew in 1808, and how many other fires have burned in the area in the meantime? This is difficult to determine, but evidence suggests the influence of at least 13 fires within the scene in the photographs. Evidence of many previous fires had been destroyed by the more recent ones. The story told by these fires is that the forests in this area have been shaped by many, recurrent fires -- ranging in size from small to large -- disturbance has been very much an inherent part of the ecosystem processes. Also inherent is the ability of the forest to renew itself and to grow.

Fire history studies show that before the 1808 fire, at least four fires left older stands in this landscape dated at 1705, 1735, 1760 and 1795. Between 1808 when the Cat was born and 1896 when the Cat was formed -- at least six other fires burned in the area within the photographs -- in 1830, 1840, 1860, 1869, 1880 and 1885.

Then, an extensive fire in 1936 burned through some of those regenerating forests and burned off the Cat's tail and part of its head. And another fire occurred in 1946. These burns are renewing themselves yet again, as the forests have done to sustain themselves over the last 10,000 years. As a result, the Black Cat today is difficult to distinguish.

Like its more famous cousin the Cheshire Cat of Alice in Wonderland, the Black Cat is slowly disappearing as a result of these natural forces -- fires and regrowth -- and will itself eventually vanish except, perhaps, for the smile of those of us who remember it as it was.

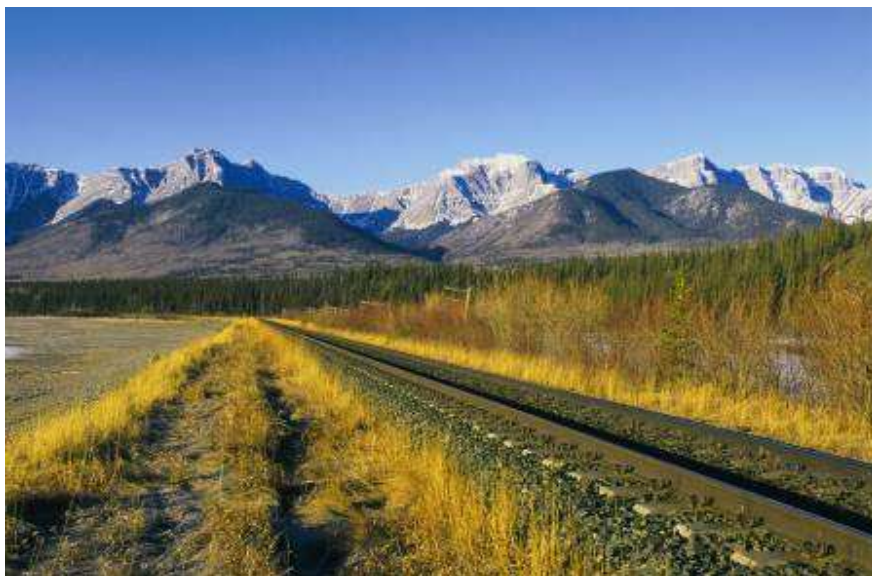


THE "BLACK CAT" IN 1927

MR. MCKILLOP IN "VISION OF AN ORDERED LAND" BY J.G. MACGREGOR 1981 WESTERN PRODUCER PRAIRIE BOOKS

The "Black Cat" was starkly displayed on this hillside near Brule following an extensive fire of 1896 that left this part of a 90-year old spruce forest untouched while burning surrounding and embedded stands.

Subsequent fires and growth have softened the profile of the "Black Cat" and today it is slowly blending into the maturing forest stands that surround it – as evidenced in the photograph below.



THE "BLACK CAT" IN 2000

BRIAN CARNELL

5.3 FIRES AND FIRE CONTROL ON THE FMA

In order to manage the FMA on a sustained yield basis, two actions are necessary. First is to protect the forest from the large catastrophic fires. The second action is therefore to substitute orderly harvesting as the major stand-creating disturbance. The forests on this area have largely originated as a result of disturbance by fire. Logging is not the same as fire, but we can learn from observing how the forests respond to fire disturbances to adapt logging practices to better encourage the renewal of both forests and sustainability of the ecosystem.

In the spring of 1956 the first season of logging had just been completed. Forestry staff were in full swing extending the forest inventories and surveying for roads as part of their initial planning process. That spring was hot and dry, leaving the forest very flammable. Then in May, fires broke out in several areas across Alberta. Six of them in Alberta that year reached sizes of over 7000 ha. The Gregg River fire on the Hinton FMA was one of them, burning 9,325 ha. Two other fires also affected the FMA. The Berland fire, 3,424 ha, started on the FMA, the Marlboro/Windfall Creek fire started to the north-east in the Whitecourt forest and soon spread southerly into the lease burning 6,060 ha.. In total 18,809 ha were burned.

The Gregg River fire burned 9325 ha in a U shape with two arms each about 18 km long. Fire investigators believe it was started from a debris fire at an oil seismic crew camp on Antler creek, about 8 km away. The seismic crew fought it for the first day with support by a sawmill crew. But, a strong wind on the second day blew it out of control and crews had to jump into the burned area to escape as the flames roared past them, racing through the tree crowns towards the Gregg Cabin.

Vernon Truxler had grown up in Jasper. His father, Mark, was a Jasper Park warden, his mother, Agnes, was one of the Harrigan sisters, the first women guides in Jasper. Vern was among the first employees hired in 1955 by North Western Pulp & Power (NWPP). During his 18 years with the company, he worked on timber inventories and later in maintenance for the first mechanical skidders. He was subsequently employed by Switzer Provincial Park and the Forest Technology School.

In May 1956, Truxler was cruising timber when fire broke out near the Gregg River south of Hinton. There was no road into the Gregg valley at the time, so he and his crew drove up the Robb Road as far as they could and then hauled a gasoline-powered pump on a Bombardier tracked vehicle to the old Dominion Forestry Branch ranger cabin. He and his crew arrived at the Gregg Cabin to find that the sawmill crew had just safely arrived there after the blow-up. As Vern explained:

We could see that the fire was a hot one. As we drove up to the cabin from the Robb road we could see the thick smoke and flame from a long way off. It was burning in the crowns moving along and down the hill like a wall of flame. It was heading for the Gregg River and was threatening the cabin and us on the way. We quickly decided that we had to keep it from crossing the river, which could have let it head towards Hinton. And we wanted to try to protect the cabin as well. We had two power pumps and hose so we split the crews. The mill crew headed up river to try to stop the fire at the river. I stayed with my crew at the cabin to protect it and to keep the fire on this side of the river, too. It was too far from the river for our hose, so we dug out the spring and pumped out of it. We knocked the fire out of the crowns with the hose, and the crew shovelled like hornets, throwing dirt on the fire to put it out. It was plenty hot in there. The fire was roaring like a freight train and the smoke was heavy and thick, but we held the line.

We had a small Bombardier tracked vehicle with us to haul supplies. Leaving a couple of men at the cabin for mop up, the rest of us took the Bombardier and the pump to the river. There was no road along the Gregg here, so we set up the pump right on the Bombardier and drove into the Gregg. We pumped right from the vehicle, knocking the fire out of the trees with the water and letting it burn to the edge of the bank. We moved right up the river to the other crew and held the fire along the bank all the way. We were on that fire for 28 days, digging out the hot-spots and holding the lines. But the burn was just a forest of dead black snags on a black landscape.

Meanwhile, the other arm of the fire was moving east towards the coal mining town of Mercoal. There were no roads in that area, so supplies were brought in to the fireline by pack horse. While fire crews were trying to control that end just 4 miles from town, the Canadian National Railway had a special twin engine diesel train on standby to evacuate residents if that effort failed. Fortunately the winds dropped, the fireline held, and the town was saved. The three fires on the Hinton FMA burned a total area within the lease of 18,809 ha, representing about 2.4 per cent of the total lease area, even before it had been inventoried. This was cause for great concern for the Company as well as for the Alberta Forest Service.

The Alberta Forest Service had been established in 1930 with two major responsibilities: timber management and forest protection. Since most logging was conducted in winter, timber and fire tended to be treated as separate responsibilities. Except for concerns about treating logging slash to reduce fire hazards, or lending Company equipment for fire fighting, timber operators were not involved in fire control.

The 1951 agreement reflected this situation. The only reference to fire was to payment of a fire guarding charge of \$15,000, which equated to approximately \$7.50 per square mile.

A major departure appeared in the 1952 agreement in which the Company was to agree “to accept responsibility for any fires originating in the area reserved in which the Company has an organization for the safe guarding of timber from fire and it shall compensate the Minister for any expenditures that may have been made by the Department in suppression of such fires.” This may have been intended as a strong incentive for fire prevention. However, this would have entailed a major investment by the Company in developing a fire control capability. It would also have incurred a substantial financial liability, as later events would show.

The AFS had been struggling since 1930 to try to develop a stronger fire control capability. Unfortunately, as former Director Blefgen²⁶⁷ later commented, as noted earlier: “...during the depression years we were definitely informed that no money could be made available and during the war years the necessary labour could not be secured.” By the early 1950’s appropriations were starting to increase, but the needs were so great that little change was in evident in the field. However, forest protection staff had a vision to develop a province-wide organization for detection and effective suppression of fires. They were concerned that if industries, such as NWPP, developed their own independent fire control organizations, opportunities for building a strong provincial organization with an effective central dispatching and management base would be diminished. It may have been this philosophy that led to abandoning the 1952 clause and substitution of the clauses in the 1954 agreement.



FIRE WAS NO STRANGER TO THE EASTERN SLOPES, AS CAN BE SEEN IN THIS PICTURE OF THE MOBERLY CABIN CONSTRUCTION, 1939. IN THE BACKGROUND ARE FIRE KILLED SNAGS FROM THE FIRES OF THE 1880S

ALBERTA FOREST PROTECTION COLLECTION

In the 1954 Agreement fire was addressed further, but still in general terms. A nominal fire guarding charge of \$0.02 per acre (equivalent to \$4.92 per km²) was stipulated. The Minister agreed in Clause 16:

...to provide and maintain an organization of men and equipment necessary for the detection and suppression of forest fires over the area reserved and to pay for the cost of fighting any fire which originates within the area reserved, (except if such fire originates on a cutting operation which is being conducted by the Company, it's employees, agents, or contractors.)

The Company responsibility was “ ... to provide whatever additional fire protection it may deem necessary to safeguard from fire the areas in the immediate vicinity of cutting operations.”

The Company concern about these fires is reflected in Chief Forester Des Crossley's recollections: ²⁶⁸

Everybody including our New York office, was upset over this unexpected situation and the Alberta Minister was made aware of this concern, which he apparently shared. It was his suggestion that our concern be documented and sent to his office in order that the situation could be assessed. I was assigned to the task of reviewing the situation in the field and preparing a brief. Two months spent in the field eventually resulted in the requested report and eventually the Minister arranged a meeting with us and his senior staff to discuss it. Unfortunately, he never did advise his staff that the brief had been prepared at his request! It was a devastating report and subsequent relations with the Forest Service were clouded for some time. Our resident manager, following the mutual discussions, made the point very strongly that our management program

could not proceed unless our Company could be assured that the situation would be rectified.

This led to a meeting with the Forest Service in January 1957 that reportedly was beginning to become quite acrimonious until the participants realized that most of the problems related to money or budget allocations to the Forest Service. At that point, as Jim Clark explained, Eric Huestis, Director of Forestry, returned to the meeting and changed the tenor of the meeting by stating, as Jim Clark reported: ²⁶⁹

Gentlemen, there is a need to finish this meeting, and in a positive manner. I need a way to assure more money is made available to my Forest Service to give good forest protection. You need some positive commitment from us to assure the timber losses to forest fire is minimized on an averaging basis. I am thinking of writing ... a commitment whereby we attempt to keep the average annual loss by fire to ... something less than one tenth of one per cent ... averaged over a twenty year period. I think this commitment should help your need from us and it, in turn, if you accept this proposal, should pressure us to improve our forest protection.

In the meantime, and two years before this fire event, the Rocky Mountain Section of the Canadian Institute of Forestry had prepared a "Fire Brief" which was submitted to the government in 1954 in which it had also outlined concerns about fire control²⁷⁰. That plus the 1956 experience resulted in two major changes. The first was the start of building a fire control capability within the AFS. The other was to enlist more assistance from the industry. As Crossley explained:

...after the 1956 experience it was agreed that the Company would accept more responsibility and would be quite prepared to assist. Working closely with the Forest Service protection staff in its Edson office, we agreed to the procuring and maintenance of such equipment as pumps, hose, pulaskis, etc. Information would be provided to the Forest Service on the location of our own mechanical equipment in the field at all times so that it could be acquired rapidly in the event of a fire. The training and certification of our field staff would be the responsibility of the Forest Service. We pressed for the obtaining of a fire simulator and once it was acquired our protection staff underwent training.

Fred McDougall²⁷¹, retired Director of Forestry and Deputy Minister, recalled the government response to the fires of 1956:

... the fire led to a very significant policy review at the end of the fire season in terms of the adequacy of the Forest Service effort and it was generally deemed that the Forest Service simply were not, either organizationally or by way of equipment, prepared for fires like that and not able to do the kind of effort that was going to be required if forest management at Hinton was going to be a reality. The Company wrote a review of that fire and I think it was instrumental in getting the Forest Service, not motivated, because I think the Forest Service were motivated to improve all along, but it gave them the reasons they needed and the arguments they needed to go to the political level and get significant additional resources.

If you look at the record after that 1956 season there was a significant boosting up of resources and personnel and growth in the Forest Service. I am sure in my own mind:

that it resulted in large part because of the problems on that fire. So I think the fire is a positive event in the sense that it motivated the government to expand and improve their ability in the Forest Service to fight fire.

But despite prevention and patrols, fires could still start from a variety of causes. Jim Clark described an unusual but serious event:²⁷²

In May, 1959 we experienced a most unique forest fire occurrence in the headwaters location of Maskuta Creek below Folding Mountain south of Highway 16 in our Camp 2 operating area. Two loggers were working on timber blowdown cleanup near one of our temporary logging roads. They were living in a trailer parked on the road. While relaxing in their trailer on a Saturday afternoon their propane stove suddenly exploded and started a fire in one of the bed mattresses. They tossed the burning mattress out the door and busied themselves with the fire extinguisher to douse the trailer fire. Then they went outside to stop the mattress fire. It was too late as the fire had spread into the roadside grass and forest debris and was now running quickly up the sidehill and into the green forest. The men jumped into their half-ton truck and headed for Hinton to report the fire and to get help.

In the meantime, the Athabasca fire detection lookout, directly north of Maskuta Creek, had already spotted the starting fire and reported the fire by radio to the Edson headquarters of the Alberta Forest Service. They in turn reported the fire occurrence to our Company, which was agreed procedure.

Both agencies soon had men and equipment on the fire, which had travelled east up the steep hillside of the valley and was burning in old growth forest on the east rim. A bulldozer was brought in to the fire campaign and was dispatched to fireguard the area burning on the east rim. The fire was corralled from spreading eastward but at nine that Saturday evening the wind changed direction. It blew sparks, from the valley rim fire, west into timber growing on a large island of steep, rocky cliffs between the two branches of Maskuta Creek. The fire was now confined to the island. The east flare-up on the valley rim was now fireguarded by the bulldozer-built, flammable-material free barrier.

A large group of firefighters spent the night on a logging road high on the east side of the valley watching the island-confined fire. We watched to see if the fire would jump westward again to the valley's slopes stretching to Folding Mountain and then into Drystone Creek, the last valley barrier before Jasper National Park's boundary. The wind died during the night and the fire intensity diminished. By morning we moved into the isolated island location of the fire with men, tools, fire pumps and hose to begin extinguishing the fire with water.

By 1959, fire fighting capability had advanced considerably, both within the AFS and Company. Company staff became more fire-conscious -- as Jim Clark noted: "When the fire hazard got high, people were out on the road, even on the weekends, used the company car to put your radio on, go fishing and it worked. It worked because we spotted a lot of lightning strikes that way."²⁷³

Then, in 1960, a slab fire escaped from a Company operation in the Camp 2 area, burning along the flats along Maskuta Creek, skipping across cutover strips and burning residuals. By this time the AFS had

begun to build up its fire fighting resources. These included aircraft that could deliver and drop water-based fire retardants on fires. When this 1960 fire blew up, the Forest Service was quick to respond with all the tools available to it, including aircraft.

Since this fire started as a result of a Company operation, the AFS sent the sizeable bill for fire suppression costs to the Company for payment. That prompted another round of vigorous discussions that eventually resulted in a formal fire control agreement. This was reflected in the 1968 agreement which stated (Clause 31) that stated although the Company shall pay the cost of suppressing any fire that is caused by their operations, that "... in no event shall the liability of the Company exceed the liability provided for by the "Schedule 'B' Formula -- Appendix 1" of the Fire Control Agreement dated the 15th day of May 1967."

The fire control agreement reflected the same spirit of the cooperative nature as the Forest Management Agreement in that in return for a stipulated Company commitment to fire control preparedness, the government would set a maximum level of liability for the Company. The 1968 formula indicated that the Company would be liable for a share of the total fire costs on a sliding scale ranging from 50% of small fires to about 30 % of fires costing over \$65,000, to a maximum of \$19,200 liability.

The result was a major and continuing improvement in fire prevention and suppression. Although there were a number of subsequent years when the rest of the province's forests experienced much more extensive fires – notably 1968, 1980-1982 and 1998 – the Gregg burn remained the largest on the lease area, and 1956 stood as the worst single year for fire losses on the forest management area since the first lease was signed.^{xlviii}

The fires of 1956 actually came at a pivotal time for Alberta. For the first time, the means were at hand for a major advance in fire protection. Oil and timber revenues meant the province could afford to train and recruit rangers and firefighters. The just-completed 1,000-kilometre Forestry Trunk Road along the foothills, combined with a growing network of roads built for logging and oil and gas industry operations, made it possible to get heavy equipment to fire sites much more quickly. Powerful bulldozers could clear fire lines. Helicopters and fixed-wing aircraft assisted lookouts in spotting fires, ferried personnel, helped to co-ordinate the attack, and doused the flames. Better radios and an expanding telephone network aided detection and control efforts.

In addition to better roads and equipment, the other key elements in protection were personnel and training. The AFS began to hire more foresters and rangers after the war. The first formal fire training in Alberta was a four-month course for returning veterans given at Calgary and Kananaskis in 1946, and the next was a five-week course for rangers and national park wardens at the Banff School of Fine Arts in 1950. A year later, the AFS began conducting a 10-week "forestry training school" annually at the Kananaskis Forest Experiment Station, a former prisoner-of-war camp west of Calgary. The program was offered only to AFS staff, and the primary emphasis was on fire prevention and control.



EARLY DFB FIRE TRAINING EXERCISE WITH BACKPACK PUMPS, 1925

ALBERTA FOREST PROTECTION COLLECTION

Peter Murphy was given responsibility for the training program in 1956, and in 1960 it was moved to a permanent facility in Hinton. Fire control training was extended to people outside the forest service in 1962, and a certification program for firefighters was established the following year. Many Aboriginals were among the more than 1,300 firefighters certified during the 1960s. In co-operation with the Northern Alberta Institute of Technology, the Hinton school also began to offer a two-year diploma program, for rangers and forest technicians, beginning in 1965. In 1967, the school acquired its first simulator to train supervisors in how to manage fire control operations.

Although aircraft had been used for fire spotting since the 1920s, their use in support of firefighting was hindered until the late 1950s by lack of landing strips in forested areas. The AFS acquired its first airplane in 1957 and thereafter both fixed-wing aircraft and helicopters played an increasingly important role. Most importantly, it became possible to get “initial attack” crews to fires while they were still small enough to contain. Forest fires would still rage on the FMA, but so far not as often or over such large areas.

There are many elements to consider for an effective fire control program. Prevention is the first step -- trying to keep fires from starting in the first place. This involves establishing a fire-consciousness among all field workers, other industrial users and the travelling public. However, accidents will happen, and lightning will always be present, so fires will invariably start.

The second step is to detect and report new fires as quickly as possible. A network of lookouts provides a basic framework. In addition, the LFS, more recently installed a province-wide lightning detection system that plots the locations of all strikes. Based on these reports, lookouts are alerted, aircraft patrols may be sent to observe, and air tankers and helicopter-based fire fighting crews may be dispatched.

Third is an initial attack capability. Hard-hitting initial attack is most important so fires may be fought while they are still small and approachable. The Company and LFS share this responsibility, the Company taking the lead on the FMA.

If any of these small fires “get away”, then it is essential to have an ability to immediately move in with organized fire fighting crews supported by air tankers and heavy equipment. This fourth element is built into integrated planning between the Company and LFS. Joint measures are described in the Fire Control Agreements.

The Company approached fire control in a cooperative spirit, as reflected in then District Superintendent Bob MacKellar’s recollection: ²⁷⁴

... when you had a forest fire in the summer time -- Ben Shantz [AFS Fire Control Officer] would phone me from Edson that they had a fire at a certain place and would ask: "What can you do for us?" Normally, if it's on a weekend you'd wonder now, if it's Saturday morning or Friday night after work, "Who in the heck am I going to get?" So you'd phone somebody and usually you'd get the guy right away, there'd be no argument. The guys would come and go. Here there was no problem, we'd phone guys and ask them, and they were very obliging. We used to treat them good afterwards too, if they had holidays, we'd say O.K. take a couple of extra days off.

In 1975 the company established its own “initial attack crew” to fight fires on the lease area. The crew was initially university students working under a company employee, but later became a full-time, year-round team of four company IWA employees. They worked closely with counterparts in the Land and Forest Service and have evolved to become part of the provincial man-up system to respond to high fire hazards. Since they were employed year-round they have been immediately available to take action on normally off-season fires such as those of December 1997. They also provide primary response for fuel or chemical spills in the FMA. The crew has pioneered new techniques such as the use of foam on forest fires and adapting skidders and all-terrain vehicles to carry water tanks. As Warren Kehr²⁷⁵, purchase fibre manager explained, the crew is versatile and represents “basically cheap insurance” for the Company. In 1989 when the Company installed a new communication system they included the LFS, Town of Hinton fire department and ambulance service and the County of Yellowhead so all emergency services could be linked.

The most recent fire control agreement was signed in 1989. It is based on an understanding of the importance of fire control and the advantages of sharing resources. The AFS maintains final responsibility and authority for fire control, including the overall provincial fire detection system. The Company agrees to assume many additional, but complementary, responsibilities. First among these is preparation of an annual fire control plan. The list of requirements in its Schedule “A” is impressive for its length and detail. Included in the Appendix (4) it illustrates the diversity of aspects that have to be considered in such a plan. Among the aspects are levels and kinds of training of Company staff in fire control, evaluation of fire hazards in the Annual Operating Plans, levels of preparedness as hazards increase, and conditions for road closures during periods of high fire hazard and their affect on Company operations. Initial attack is a shared responsibility. For “escaped” fires the province draws on its greater resources and organization, with the Company responding with all the resources at its command.

Despite these preparations, weather and fuels still conspire to create conditions in which fires may figuratively “blow up” becoming virtually uncontrollable almost from their ignition. For example, in the early morning hours of December 14, 1997 the ongoing challenge of forest protection was demonstrated yet again. A dry autumn, and lack of snowfall, combined with unremitting Chinook winds to create tinder-like conditions in the forest. Then the wind snapped a spruce tree near Mountainview Estates just

outside Hinton, casting it against a power line. Sparks ignited a firestorm that cascaded across the land and consumed everything in its path, including a large ranch house whose occupants narrowly escaped.

South of Hinton along the highway to Luscar, Alberta Transportation had a contractor burning brush on a road improvement project. Extremely strong winds spread sparks from the brush piles igniting two fires that quickly joined and consumed about 3,000 hectares of the Gregg River drainage, including various ages of reforestation, old forest stands and younger lodgepole pine in the “Gregg Burn” area of regrowth from one of the 1956 fires.



AFTERMATH OF 1997 FIRE IN THE GREGG RIVER VALLEY – 2005

BOB UDELL PHOTO

Company crews, contractors, and Alberta Forest Service firefighters — almost 200 people with an array of heavy equipment — battled both blazes for almost a week. High winds and frozen waterways prevented any effective use of water bombers. Even helicopter use was severely limited by the gale force winds.

“The sky north and south of Highway 16 was lit up by the fires, and at first I thought the town itself might be hit.” said Dennis Quintilio, former fire researcher and now director of the province’s forest management division, who was summoned to Hinton in the early morning darkness. “Thankfully, this was not the case although had the ignition point been elsewhere it could have been a more serious situation.”

These fires brought home to many the need for awareness and readiness to protect forest-based communities. It reinforced for many residents the timeliness of a new Alberta government initiative. In 1997, the province began a new study of ways to anticipate and reduce the potential risks of forest fires

to communities, and Hinton was chosen for one of the pilot studies, the Hinton Wildland Urban Fire Interface Initiative. The program includes risk definition, fuel modification and educational components. In the process, the Company, LFS and Town of Hinton have made their equipment compatible either by standardizing or by use of adapter kits. In this way differences among agencies are minimized and both forestry and municipal firefighting equipment can be used on all kinds of fires. The Company also helped to develop a hazard reduction plan for the new Town of Hinton administrative site as a demonstration area for Wildland-Urban interface fuel treatment. The Company has also been working with other communities such as Robb and Brule to integrate fire training and fuel management.



AFTERMATH OF THE 1997 FIRES, GREGG VALLEY 1998

BOB UDELL PHOTO

In 1998, a dry spring and high winds combined to spread devastating fires across many Alberta forests. The government's fire protection spending soared to \$149 million, compared to a 10-year average of about \$30 million. This led to a re-examination of protection options. One of these possibilities is to reduce the continuity of fuels. One such approach might be through the design of harvesting area patterns, and reducing the fuels within cutovers through post-harvesting treatments. For example, scarification as a post-harvest site treatment for regeneration in the 1950s was also welcomed by AFS fire control staff since it broke up so much of the slash and mixed it with soil. There may be ways to improve the effectiveness of these and other treatments.

Another approach is through prevention of fires from identified risks. For example, Bryon Muhly, manager of resource optimization, noted his concern about increased uncontrolled camping, explaining that "its hard to predict exactly where people are going to be or know where they have been, and follow

up with any kind of checking to make sure that campfires have been properly put out.” Among the options to be considered are to generate increased awareness among campers, more patrols during time of high hazard, or directing all camping to established campgrounds. The company took a major step forward in this initiative when, in 2000 it assumed responsibility for the maintenance of 13 provincial recreation areas and campsites within and adjacent to the FMA. Two conservation officers were hired to patrol the campsites, as well as random camping areas to ensure people were controlling their fires, as well as respecting the environment and the rights of their fellow campers to enjoy the surroundings also.

Kehr was appointed a member of a government - FMA-holder task force to review holding and forest protection charges. Their March 2000 report²⁷⁶ identified a number of ways through which fire control could be made more effective by investment by industry in such programs as fire prevention, detection, deployment of resources and mutual aid arrangements. One recommendation was that all or part of the industry costs for approved projects may be offset by a credit to their forest protection charges. This may provide opportunities for further integration of fire control with forest management. Table 5-2 is a summary of wildfires on the FMA from beginning of operations to 2000.

5.4 OTHER DISTURBANCES

The result of frequent fires in the past left much of the forest area in relatively younger age classes. As a result they have been better able to withstand attacks from destroying insects and diseases. Potentially harmful insects and diseases live throughout the forest as part of its biological diversity. However, they could become a threat as fire prevention becomes more effective and greater areas of susceptible older trees develop.

INSECTS

The major potential threat from insects is from the mountain pine beetle. It has killed extensive areas of lodgepole pine in the southern interior of British Columbia and, for a while during the late 1980s, in the Crowsnest Pass forest of Alberta. This small beetle bores a hole through the bark to lay its eggs in the cambium region. This small beetle bores a hole through the bark to lay its eggs in the cambium region. As the larvae feed on this growing layer, they effectively stop growth and impair the tree's ability to move nutrients through the bark to the roots. The beetle can also transmit bluestain fungi, which further weakens the tree by clogging the water-carrying cells in the sapwood. The natural defence of the trees is to flood the insects' feeding galleries with pitch. However, during an epidemic, the numbers of beetles are so great that these defences are overwhelmed.

The mountain pine beetle recently spread to the upper Fraser River area in British Columbia, and an increased infestation was noted in Banff and Jasper national parks during 2000. Alberta's cold winters normally kill off the beetles, but forests are monitored for any signs of outbreak. The only effective control is to cut the affected trees, peel the bark and burn the slash. In the 1930s and 1940s, about 25,000 trees were cut and burned in a 4,000-hectare area of Banff National Park to control mountain pine beetle.

TABLE 5-2: WILDFIRE STATISTICS ON THE FOREST MANAGEMENT AREA FROM 1955 -2000

Year	Date of Origin	Fire Location (Fires over 100 ha)	Area Burned (ha)
1956	May	Gregg River	9325
1956	May	Berland River	3424
1956	May	Pine Creek	6060
1959		Shacker's fire – Camp 2 (McLeod 1)	347
1960		Slab fire – Camp 2 (McLeod 1) ^{xlix}	N/A
1961		Nosehill fire	5536
1963		White Creek	113
1967		Berland Compt 31	2521
1970		Embarras 15	1131
1970		Athabasca 33	160
1980		Embarras 3	170
1980		McLeod 1 (Terris)	427
1985		Marlboro 9	175
1988	December	Brush Burning – Gregg R. Resources - 681 ha total) McLeod 4	470
1997	14 Dec	Powerline fire – Athabasca Ranch Outside FMA ^l	N/A
1997	14 Dec	Alberta Transportation brush burning – Gregg River – McLeod 2, 3,4	2800
Total			32659

^{xlix} The 1960 fire is included because it was quite significant in the history of the evolving relationship

^l This fire was contained within MU E9 and did not spread to the FMA

Bob Bott²⁷⁷, writer and editor, summarized explanations by Alan Westhaver, ecologist with Jasper National Park, about the background and current status of the mountain pine beetle in this region:

In more than 60 years of conducting annual forest health surveys in Jasper National Park, the Canadian Forest Service did not find evidence of mountain pine beetle infestation until two years ago (1999). However, subsequent examination of trees found evidence of earlier attacks, so it is now assumed that mountain pine beetle is part of the natural ecosystem, but at very low levels, controlled historically by the combination of forest vigour and climatic conditions. Aging forest stands, recent warm winters and the potential effects of climate change raise the possibility of more severe infestations in future. Previously it had been assumed that mountain pine beetle was only endemic in Alberta forests south of Castle Junction.

To date (2000), about 70 affected trees have been identified, all in the upper Smoky River drainage, one of the most remote parts of the park, near the Continental Divide and at least 50 kilometres from the nearest road (Highway 16 in Robson Provincial Park). None of the trees showed evidence of bluestain fungi, often carried by mountain pine beetle in more southerly infestations. The infested trees were generally among the weakest in the stands, already stressed by age, bark rubbing, windthrow, etc. It is assumed that the beetles blow over the divide from the Holmes River drainage in British Columbia.

As in other parks, the preferred strategy in Jasper is the use of prescribed burning to restore the historic distribution of age classes as well as to control pests. Parks Canada is working with the Canadian Forest Service and Alberta authorities to develop a stand susceptibility model. This will assist in assessing the risk and examining the alternatives.

Because of the close proximity to Willmore Wilderness, any burning or other control strategy would have to be co-coordinated with Alberta authorities. The multiplicity of provincial agencies with interests in Willmore complicates the task. Any strategy would be subject to a very detailed environmental assessment prior to implementation.

The forest tent caterpillar causes defoliation of aspen that reduces the rates of growth. Outbreaks in the late 1950s caused extensive mortality in aspen on the FMA.²⁷⁸ These infestations do not usually cause extensive mortality unless the caterpillar populations remain high for over two or three years. Their outbreaks had generally been accepted as part of the ecosystem process. However, their potential threat is greater now that aspen has become an economically important species.

Mean annual temperatures continue to rise, a trend which, in conjunction with a reduction in precipitation, has led to higher drought indices, and appears to be increasing the susceptibility of young lodgepole pine to not only direct climate injury, but also to mortality from root disease, root collar weevils and other pathogens.

Other naturally occurring insect threats include spruce beetle and the spruce and pine terminal weevil. The long-horned wood borer is an interesting beetle that affects dead and dying trees, usually those injured by fire. The insect has a very sensitive heat-sensing organ on its thorax that enables it to locate heat from forest fires that may produce dead or weakened trees. The beetle chews a hole through the bark and lays its eggs beneath it. The larvae feed on the inner bark and wood, leaving a widening oval channel as they grow. The larvae then burrow into the wood to the heart and loop back to pupate over winter in the outer layer of wood. They emerge as adults in the spring, chewing their way out of the tree ready to search for other suitable habitat trees. They leave behind clearly visible holes in the wood, reducing its value for lumber. They do not kill the trees but degrade the quality. As a consequence, a high priority is given to quick salvage of fire-killed timber, especially of trees of sawlog size.

DISEASES

Tree diseases occurring in the forest management area include *Armillaria* root rot, Atropellis canker, dwarf mistletoe, western gall rust and a number of other rusts. Healthy trees can usually withstand the effects of such diseases, but may succumb when weakened by old age or stresses such as drought. The most serious of these is the *Armillaria* root rot that may cause mortality in seedlings and that can affect residual trees in stands that have been thinned.



REGENERATED STAND SUFFERING FROM ROOT DISEASE, ROOT COLLAR WEEVILS AND RUSTS. THESE PATHOGENS APPEAR TO BE INCREASING, POSSIBLY AS A RESULT OF CLIMATE CHANGE

PHOTO COURTESY FGVA

BLOWDOWN

Strong winds in the foothills can often blow down residual trees and threaten the survival of new growth after harvest. Orienting the residual stands at right angles to the wind can reduce this effect. In laying out harvests, foresters consider the location of wind-firm edges, such as those along natural openings and muskegs, that can be used to provide shelter for the regenerated harvest sites.

Some of the early cutting at Camp 2, west of Hinton and south of Highway 16, was so severely exposed to wind that many of the residual stands blew down. The company was able to salvage the timber as these events occurred, but the result was a large clearcut on a highly visible hillside. The site has since regenerated but it provided some lessons in design.

One of the advantages of the extensive road system in the forest management area is that it provides an opportunity to salvage trees affected by blowdown, fire and other disturbances. Salvaging not only makes it possible to utilize the wood, it also helps to reduce habitat for the potential threats such as bark beetles.

HAIL

Hail is a frequent event in the foothills of Alberta, and the damage it causes to young trees can be severe. Even if they survive, they may carry the scars through the rest of their life, causing deformities and rot in the stems of the trees.



(above) Hail damage on a 15-year old regenerated pine stand

(left) Scarred stems and deformities are the legacy of hail damage 25 years previous to the photo

Photos by Bob Udell

5.5 FIRE CONTROL AGREEMENT -- SCHEDULE "A"

This section provides a summary of the contents of the fire control plan required from the Company (2000 basis).

Schedule "A" -- The Fire Control Plan

The fire control plan will contain:

1. The name of the person who will act as the Forest Protection Supervisor and/or Forest Protection Coordinator.
2. The names of all fire guardians.
3. A list per personnel who can perform overhead functions on a fire and their current ratings in compliance with Alberta Forest Service fire certification.
4. A list of key personnel, duty roster and contact method by District and camps.
5. A complete list of all personnel available and able to fight fires, together with a map showing District and camp.
6. A complete list of firefighting equipment by location.
7. A complete list of heavy equipment owned by the Company and adaptable for use in suppressing fires, together with an adequate description of their location and method of contact.
8. A list of equipment owned by persons or companies under contract to the Company and adaptable to fire suppression duties. a description of their location and method of contact.
9. A plan showing the location and availability of all communication equipment.
10. A description, during the Fire Season, of hours not worked listing key personnel who are on call and a description of arrangements for contacting them during hours not worked.
11. A list of any available weather reporting stations and equipment.
12. A description of contingencies for fire patrols, shift periods, and shut down as may be required in view of a Ministerial closure of the Forest Management Area.
13. A complete description of all rules and regulations and policy governing the behaviour of the Company's employees, agents and contractors in regard to fire prevention, suppression and state of readiness, i.e. smoking rules, extinguishers, etc.
14. A map and description indicating proposed areas of logging and construction crews and their camps.
15. A description of all survey, planting and other miscellaneous forestry crews as well as movements of logging and construction crews shall be provided to the Alberta forest Service on a weekly basis or as moves occur, as a means of keeping the fire control plan current.
16. A complete road plan showing the class and condition of all Company roads and portions of them.
17. For pre-attack planning purposes, a map showing the location of known reliable sources of water usable by water trucks and pumps within each district.

18. A statement of any intent to use prescribed fire for either hazard reduction or silviculture. A map showing potentially high hazard areas in which burning may be used.
19. A description of the training program to include:
 - (a) The type and level of courses.
 - (b) A course subject outline.
 - (c) What employees will be involved.
 - (d) Timing and location of courses.
 - (e) Instructor assistance requested from the Alberta Forest Service.
20. A map showing high risk areas due to forest damage from insects, disease, blowdown, snow damage or other natural causes as well as areas heavily used by the general public.
21. The location of any off season burning shall be shown on a suitable map attached to the fire control plan.

CHAPTER 6 MULTIPLE VALUES -- MULTIPLE USES

Other blessings of the forest ... feed springs, prevent floods, hinder erosion, shelter from storms, give health and recreation, protect game and fish, and give the country aesthetic features.”

Abraham Knechtel, Dominion Forestry Branch - 1909

A comprehensive land-use program must ... make allowances for the interrelationship of all resources, and provide a co-ordinated plan of utilization that will avoid making changes detrimental to any one of them, and if possible, be beneficial to one or more.

Desmond I. Crossley, Canadian Forest Service - 1951

PREFACE

In 1949, just two years after its fabled Leduc No. 1 blew in at Leduc, Imperial Oil drilled an exploratory well in the Muskeg-Grande Cache area. Unlike Leduc it was a dry hole. However, to reach the site meant constructing a road from Entrance about 70 km north, following along the historic forestry pack trail and changing forever the traditional horse-based way of life for AFS rangers along the way. The new road also ‘opened up’ the country to recreation, hunting, fishing and logging.

Also in 1949 the Alberta government passed a revised *Forests Act* that contained a clause enabling what would become Forest Management Agreements.

Although these events took place quietly and without fanfare, they both portended major changes in and by themselves, and also resulted in major impacts on each other.

6.1 INTRODUCTION AND ACKNOWLEDGEMENTS

Achievement of sustained yield forest management was the visionary goal in 1954 when North Western Pulp & Power Ltd. And St. Regis paper Co. signed their joint Agreement with the government of Alberta to build Alberta’s first pulpmill. Multiple use on the FMA was implied, and that philosophy was embraced by the Company from the outset. However, few foresaw the extent to which development of mineral resources, notably oil & gas and coal, would impact the FMA, nor could the rapid transition to sustainable forest management for a wide range of values have been anticipated. Attention to multiple use has evolved from something incidental to forestry practices to an essential, inherent and pervasive consideration at all stages of forest management. The Company has both responded to and led the changes that have, and still are, occurring.

Many individuals contributed significantly to defining and practicing multiple use on the FMA. Their contributions have enriched the practice of forestry and are much appreciated. Among the leading contributors are the following, distinguished by leadership and authorship roles.

LAND USE MANAGERS

Desmond I. Crossley was Chief Forester from 1955 to 1975 and nominally responsible for multiple use as part of his overall responsibilities. He was an advocate for multiple use, as frequently espoused in talks even before he moved to Hinton. His experience at Hinton led him to foresee sustainable forest management as early as 1972 when he spoke to the Canadian Society of Wildlife Biologists at the Prairie Habitat Conference in which he described relationships between forest management for fibre productivity and the preservation of a healthy forest environment, coining the term: **environmental forest management**.

As the pace of land use activities increased, he initially assigned responsibilities to **Bob Udell** who was appointed as Forester i/c Protection and Production from 1968 to 1970. Bob is a University of Toronto forestry graduate, initially joining NWPP in 1966. He left in 1970 to return to Ontario for five years.

In 1970 land use activities had increased to the point where a full-time position was warranted. **Ray Ranger** held this position from 1970-1989. As Warren Kehr commented, "Ray is the father of land use". Ray was raised in a farming family in the Lloydminster area of Saskatchewan. His farming and outdoor interests led him to consider forestry as a career. He came to Hinton in 1955, taking whatever work was available to him, eventually becoming a compassman with NWPP. His capabilities brought him to the attention of Des Crossley who encouraged him to attend the Ontario Forest Ranger School to learn the basic forestry skills, and arranged that he be given a year leave of absence, without pay but with assurance of employment on his return. He graduated in the class of 1958, returning to Hinton in January 1959. Ray grew with the responsibilities of his land use position. When negotiations for the new Agreement were started in 1986, Ray was asked to join the three-member team that included Bob Udell and Don Laishley. He retired early for health reasons in 1989, the year after successful conclusion of the negotiations.

Paul Folkman held the Land Use position from 1989 to 1991. Paul is a University of Alberta forestry graduate, started with the Company in 1979 in the Woodland Division where he became experienced in forest harvesting throughout the FMA. He resigned in 1991 to become a consulting forester and also taught forest harvesting courses at the University as a sessional lecturer.

Warren Kehr started with the Company in 1979, working in most aspects of the Forestry Department. He was appointed to head the land use responsibility in 1991, later moving into the management of the purchased chips program as well as forest protection, where he continues to the present.

Rob Stauffer, born and raised in the Hinton area of a Coal Branch family, graduated from the University of Calgary with a degree in zoology, then the University of Alberta with a degree in forestry. He started with the company in forest operations in 1986 and took over the land use responsibilities in a major organizational review in 1986. During his tenure he saw a substantial increase in the scope and magnitude of land use activities on the FMA.

RECREATION MANAGERS

Jack Wright was at the leading edge of forest management and silviculture throughout his 30-year career with the Company. He was the first to recognize the significance of the historic trails that traversed the FMA, making a special effort to identify and locate them. In logging planning he either utilized them as block boundaries or surveyed them so they could be later relocated within the regenerating stands. Jack also initiated the first Company recreation planning for the hoodoos and

Sundance Lake with his Wild Sculptures Trail. As Chief Forester from 1975 to 1987 he was a strong advocate for multiple use management.

Bob Udell returned to the Company in 1975, where he took over responsibility for the forest recreation program. Continuing the hiking trail development started by Jack Wright, Udell expanded it to include ski trails. Under his watch, the Pine Management and Spruce Management ski trails were developed, as well as the Canyon Creek hiking trail and the short-lived but memorable St. Regis Marathon Trail.

David Presslee also had a keen interest in forest recreation as an important element of sustainable forest management, and was responsible for the development of the new picnic shelter at the Gregg Cabin in conjunction with the 100 millionth tree planting. He and Udell collaborated in the initiation of the Special Places in the Forest program for the Hinton operation.

Aaron Jones joined the company in 1999 and was assigned responsibility for the forest recreation program shortly thereafter. He completed a strategic plan for forest recreation, entered into a service contract with **Fox Creek Development** for maintenance work on the recreational network. In 2000 he negotiated the transfer of eight more provincial recreation areas to the network maintained by Weldwood, bringing the total to 10, and implemented a communications program on SFM linked to the sites.

WILDLIFE MANAGER

Richard Bonar was hired by Don Laishley and Bob Udell to lead the new wildlife initiative, previously offered by Jim Clark in 1982. As Rick commented about his interview, Don said that he wasn't sure what a biologist would do with the Company, because this hire was unprecedented. However, he added that it was time to get a wildlife/forestry program going, and they would rely on Rick to develop it for them. Rick developed an interest in wildlife and forestry early on in the Prince George BC area in which he was raised. Following graduation in wildlife from the University of Victoria he worked in forest industry and BC Hydro before coming to Hinton. Since his arrival he has developed an integrated forest management program, a habitat model to plan for wildlife and biodiversity needs and launched cooperative studies with other industries in the region and Foothills Model Forest. Rick contributed substantially to developing the first SFM standard for the Canadian Standards Association. Rick also enrolled in a Ph.D. program under the supervision of Dr. James A. Beck, Jr., at the University of Alberta, using his database and experience to develop more refined models to quantify relationships between habitats and the pileated woodpecker in the Hinton area. He was awarded his degree at Fall Convocation 2000.

AUTHORS – RECREATION

Bob Udell and David Presslee collaborated on a review of the significant developments in the evolution of forest recreation on the FMA, completed in October 1999. Jack Wright reviewed a draft with his customary scrutiny and his comments were incorporated into the final copy. The Timeline of highlights in forest recreation is based on their work and is included as Appendix 3. **David Presslee** had a tragically shorter career with the Company at just nine years, passing away prematurely in 2000. Although he was hired to lead the silviculture program, his interests and enthusiasms were wide ranging. He was a firm believer in sustainable forest management and lent his energies to all facets of it, including forest recreation and historical trails.

Bob Bott drew heavily on the Udell-Presslee paper when he wrote the Recreation section of the 'Learning' project. His synthesis was so readable that we have incorporated Bott's version in this chapter, with appreciation.

AUTHORS - WILDLIFE

Rick Bonar prepared the initial summary of highlights of the wildlife program. **Bob Bott**, writer, editor and communications consultant, edited the section in this chapter and also added a section on trapping.

Bob Bott did much of the original research for these aspects, also drawing on his wealth of experience in working with leaders in these sectors and writing about them.

Forest historian **Bob Stevenson** contributed from his impressive collection of historical and contemporary photographs to better illustrate the story.

6.2 BACKGROUND

Des Crossley, the Company's first chief forester, was still a researcher for the Dominion Forestry Branch (DFB) when he addressed the annual meeting of the Canadian Institute of Forestry at Banff in 1951. He warned Canada's foresters that they must prepare to meet the ever-increasing needs and demands of a growing population. "For a great many people," he said, "the comparative solitude to be found in our forests, and on our lakes and streams, holds great recuperative powers. This relief from tension, whether during a hunting or fishing expedition, or simply in a quiet sojourn in the wilds, is a tremendous safety-valve, whose therapeutic effects we should not readily relinquish."

Crossley was not the first to make this observation. Multiple use has been a long-standing concept in forestry. It recognizes that forested lands support a wide range of values and human activities, and that people have a right to a share of them, even on public lands dedicated to forest harvesting.

As early as 1910, Abraham Knechtel, a forester and Inspector of Forest Reserves with the Dominion Forestry Branch recognized what he called the "other blessings of the forest" noted above. He concluded: "The Dominion Forest Reserve policy has for its motto 'seek ye first the production of wood and its right use and all these other things will be added unto it'." This statement reflected Knechtel's European upbringing and training. It was a basic tenet of forestry practice, consistent with earlier definitions of multiple use or integrated management. The Company's vision as articulated by Crossley was also consistent with Knechtel's -- that a well managed industrial forest can continue to supply high value for other uses including recreation. However, as Crossley noted, there is more to multiple use than this seemingly passive expectation, but Knechtel's was certainly a visionary statement at the time.

Crossley's was a more pro-active approach, and he tried to incorporate multiple uses into their forest management program from the start. As he explained:

Around mid-century professional foresters were slowly becoming aware of the multiple use philosophy, and I was asked to prepare a paper on the subject for presentation at the Rocky Mountain Section of the Canadian Institute of Forestry meeting to be held in 1952 at Kananaskis. Reading everything I could unearth on the subject I became convinced that we, as professionals, in all conscience, could no longer disregard it. We must become aware of the fact that we were not just guardians of wood productivity of forest lands under our care and would have to recognize that the land itself was public property and therefore they had the right to expect that they would not be excluded from it and it would be managed on renewable basis, the same as the timber. I attended the World Forestry Congress in Seattle in 1962 where the multiple use of wild lands was the theme. People from all

over the world participated and were in full agreement that wood, water, forage, wildlife, and recreation must be taken into account in the management of wild lands.

6.3 HISTORICAL REVIEW

The scenic, wildlife and forest values of this area were officially recognized as early as 1907 when “Jasper Forest Park” was established and in 1911 when the Brazeau and Athabasca Forests were added to the Rocky Mountains Forest Reserve. The Weldwood FMA includes parts of all three of these former Dominion lands to which the concept of ‘multiple use’ applied.

Then, as the Grand Trunk Pacific (GTP) Railway extended west, coal mines sprang up to serve the needs of steam locomotives. In 1911-12 the GTP built a spur line, called the Brazeau line, to access major coal deposits lying south of the mainline and east of Edson²⁷⁹. The line opened a large area, soon known as the “Coal Branch”, which became a major source of supply for the railroad. Small communities sprang up around mines along this line, which remained the only access to the area for many years.

Thousands of residents of the Coal Branch, cut off from the outside world (the first road in was built in the 1940s), had to create their own recreational opportunities²⁸⁰. Much of this recreation was in the surrounding forests, foothills and mountains. Because there were no roads, horses were the main mode of transportation with almost every family owning at least one. Fishing, hunting and horseback riding were favourite activities. Skiing was also popular for some²⁸¹ where the mines were adjacent to alpine meadows, for example, Mountain Park. Professional outfitters set up business in many of these Coal Branch towns, providing service to hunters and travellers from across North America.²⁸²

Early Dominion Forestry Branch rangers began their patrols of the Brazeau and Athabasca Forest Reserves in the mid – 1910’s. Using a system of old native trails, along with new trails and cabins they built themselves, Dominion rangers travelled the east slopes inspecting timber berths and conducting fire prevention and control. The headquarters of the Brazeau Forest was built at Coalspur, around 1915. Fire lookouts began to be established, such as the Athabasca Tower, built in 1926, which remains a popular visitor destination to this day.

Many rangers were employed only during the fire season and during the winter they were left to their own devices²⁸³. Some of them stayed in the area either in the settlements or in the DFB cabins scattered along the foothills. For them, trapping, hunting and fishing were not only favourite pastimes but also a major factor in their survival and sustenance. This transient lifestyle continued when the Dominion Government transferred control of resources to the Province of Alberta in 1930 and the Alberta Forest Service was established. Indeed, many Dominion Forestry Branch foresters and rangers merely switched badges and continued their duties under the new Provincial agency.

The Company’s first public consultation occurred when a team of St. Regis foresters visited Alberta from March 8 to April 6, 1955, to assess the new location. They held a public information meeting in Edson on March 18. Those present included area lumbermen as well as Norman Willmore, the new minister of Lands and Forests and Member of the Legislative Assembly (MLA) for Jasper-Edson. The St. Regis team reviewed project developments for the group and hosted a “social hour.”

It is not surprising that local lumber people were the first external stakeholders to be consulted. Their interests were directly and immediately affected. Other stakeholders in the area’s renewable resources, such as recreational users and livestock grazers, became increasingly prominent (and vocal) over the ensuing decades.

The concept of multiple use was not explicit in the 1954 Agreement, but was inferred in the clause (20(1)) which stated: “The Company shall allow any person the use of any roads, construct or built by it or maintained in connection with its operations or ordinary travel, either on foot, or by horse-drawn or automotive vehicle, free of charge ...”

However, land withdrawals for other uses and disturbances from other industrial uses were clearly anticipated in 1954. As outlined in clause 7(1) the minister was allowed to dispose of lands in the FMA for “... townsite, mining, petroleum, natural gas or summer resort purposes, or deemed by the Minister to be essential to the industrial development of the province...” This category of “multiple uses” added a major new dimension, and complexity, to forest management as described later.

By 1968 when the Agreement was extensively revised, multiple use more specifically referred to “the right of others to travel, hunt, fish or otherwise use the said lands for recreational purposes...” However, that same clause (10) clarified the relationship stating “recognizing that on the forest management agreement area, timber growing is the prime use and in keeping with the policy of providing for multiple uses of the same public land...” Although the Company was not specifically required to manage for multiple uses, it clearly tried to provide for them in practice. Des Crossley commented on the nature of the problem:

At the time of accepting the original Agreement we had no quarrel with the idea of multiple use, on the assumption that when a conflict arose between ourselves and another user, both parties would be prepared to give a bit. In other words, to work on the principle of “optimum” use for each rather than “maximum” use for either. While the Agreement did specify that the production of wood was to be the primary use, not once did we insist that this be adhered to. Unfortunately, most other users seldom seemed aware that their use could not be so regarded...

Jack Wright explained later:

It was also recognized that for sustained-yield principles to survive under a multiple-use concept, timber production must be identified as the “prime use” of the Forest Management Area with other legitimate uses of the land integrated within this “prime use” concept. This concept has been recognized and supported in subsequent revisions to operating guidelines, forest management plans and in the most recent revision (1988) to the Forest Management Agreement.

First and foremost, the Forest Management Agreement was a contract between two parties, Company and government. However, as Crossley foresaw, such a large and far-reaching partnership affected many other stakeholders, and the values of the forest landscape extended well beyond commercial use of timber. Integrating other interests became increasingly important as the Forest Management Agreement matured and expanded.

The Hinton area was relatively unpopulated and undeveloped when mill construction and forest planning began in 1955, but there were already other users and uses present on the land:

- residents and businesses in Hinton and environs;
- coal mining;

- crude oil and natural gas exploration and production;
- sawmills and logging;
- ranches, guiding, outfitting, hunting and trapping, and
- recreational activities.

The Company's pulp mill and forestry operations affected all these interests, and were affected by them. The pre-existing recreational activities, for example, were hunting, fishing, camping and horseback riding, plus the odd social event in town. The arrival of hundreds of Company employees and contractors changed all that. The social life in town blossomed. Many of the fast-growing community's new residents also enjoyed hunting and fishing, and they engaged in these and other outdoor activities—hiking, canoeing, horseback riding, wildlife viewing, berry picking, or just going for a picnic. Four other major activities came later: cross-country skiing and snowmobiling became popular in the 1970s, mountain biking and driving off-road vehicles in the 1980s.

Forestry roads meanwhile opened up access to formerly remote parts of the region. As a result, managing recreation and its impacts became an important part of forest management. One crucial preoccupation for Company and government was to reduce the risk of people causing forest fires. This early interest of Company, government and citizens in the area's recreational and wildlife resources evolved into a wider concern about ecological integrity and biological diversity, major components of sustainable forest management.

However, the first pulpwood lease text included only a passing reference to other users. The key provision was the requirement that all Company roads be open to the public free of charge. The agreement also allowed the government to set aside lands for "townsite, mining, petroleum, natural gas or summer resort purposes ... [or otherwise] deemed by the Minister [of Lands and Forests] to be essential to the industrial development of the province." The latter phrase seemed vague at the time, but in the 1960s it turned out to include greatly increased oil and gas industry activity, new coal mines and a railway line through the northwestern part of the lease.

In the 1970s, as industrial and recreational activities proliferated in the Hinton area and elsewhere in the foothills, the province established a formal process for integrated resource planning. This brought together stakeholders—government ministries and agencies, municipalities, commercial and industrial interests, environmental and recreational organizations, and the general public—to develop plans for multiple uses of each area.

At a 1982 conference on forestry and wildlife, the Company offered its forest management area as a testing ground for integrated wildlife management. A Company-government working group subsequently elaborated the concept. In 1988, Weldwood hired Rick Bonar as the first wildlife biologist to become a full-time member of a Company's forestry team in Alberta. The Company and the provincial government agreed that each had important roles to play in wildlife management—the Company would manage the habitat while the government would manage the wildlife itself. Bonar's work, along with the Company's other research activities, contributed significantly to the establishment of the Foothills Model Forest as a major research centre in 1992.

Company and government always encouraged informal contacts with stakeholders, and their advice was often helpful in planning and operations. Direct public input into forest management planning began in

1989 when the Company formed the first public advisory committee for an Alberta forest operation. The committee included government, professional, industrial, recreational, youth and other interest groups. Originally known as the Forest Management Liaison Committee, the group was reconstituted in 1993 as the Forest Resources Advisory Group (FRAG) with a broader membership and mandate. Attempts were made to select members on the basis of their perspectives on forest management issues, so that as wide a range as possible of interests were included, within a moderate group size. The Company also solicited input from the community at large through public “open house” presentations.

In 2000, FRAG included representatives of 20 stakeholder groups:

- community groups from Hinton and the surrounding area, including the forestry workers’ union and a youth group;
- non-renewable resource industries, principally coal, crude oil and natural gas;
- renewable resource users, including trapping, fishing, hunting and other recreation interests;
- environmental organizations, and
- government agencies, including Jasper National Park, the Canadian Forest Service, Yellowhead County, and the Town of Hinton.

The Alberta Land and Forest Service serves as an advisor to FRAG, and there is, of course, a great deal of overlap among the interests represented. Many people in the area could fall into several categories.

The concept of multiple use in the 1950s included the five typical forest-related forest uses: wood, water, wildlife, recreation and grazing. The assumption was that forest lands would be largely managed to sustain various combinations of these. However, on the Hinton FMA geological formations containing crude oil and natural gas along with beds of coal underlay most of the area^{li}. Ensuing activities of exploration and development of these non-renewable resources created extensive disturbances to the forest and, in the case of coal mining, significant disruption of the soil and topography – both far greater than anticipated. As a result, the concept of ‘multiple use’ has acquired a broader meaning, one in which the immediate economic value of the mineral resources gives those resources a high priority. The concept of ‘integration’, in reality, is often one of accommodation with concurrent attempts to minimize the impact on the forest.

The following pages describe how the principal multiple values – in renewable and non-renewable resources—evolved and were incorporated into forest management at Hinton.

6.4 FOREST RECREATION

Government and Company officials recognized from the start of the 1954 negotiations that outdoor recreation would be a component of forest management at Hinton, but they could not have imagined how big that component would become.

^{li} This situation is not unique to the Weldwood FMA, but is prevalent throughout Alberta to greater or lesser extents. In northeastern Alberta, extensive deposits of oil sand present an additional conflicting use.

The Alberta Forest Service, now known as the Land and Forest Service (LFS), played a leading role in forest recreation until 1998 when recreation programs and responsibility for facilities were transferred to the Natural Resource Services Division of Alberta Environment (now part of Alberta Sustainable Resource Development). In the early years of the Forest Management Agreement, the Company focused on its forest management responsibilities and left recreation planning to the government. This changed gradually as the Company realized the need to integrate recreation into its planning, and as its own employees became directly involved in many recreational activities. Then there was a major shift in the 1990s when financial restraint limited the ability of government to deliver programs.

By 1997, Weldwood's popular recreation map would identify 33 facilities such as campgrounds and picnic sites within the forest management area and another six in William A. Switzer Provincial Park, nestled within the managed forest just northwest of Hinton. There were also 33 fishing lakes, many rivers suitable for canoeing, a downhill ski area, several multi-use trails, and hundreds of kilometres of seismic cutlines suitable for all-terrain vehicle use—all brought into easy reach by more than 2,000 kilometres of Company-maintained roads.

Several key decisions in the early days helped to facilitate subsequent recreational development:

- a. Some versions of the lease area between 1952 and 1954 showed the management area extending right up to the eastern boundaries of Jasper National Park, but the final boundaries in 1955 established a buffer zone averaging about eight kilometres between the park and the forest management area—everywhere except the land immediately adjacent to Highway 16 at the park gates and at the junction of the Southesk and Brazeau rivers. The buffer zone included currently popular recreation areas such as Cardinal Divide, Whitehorse Creek and Cadomin Caves, all of which became part of Whitehorse Wildland Provincial Park in 1998.
- b. In 1957, the Company agreed to set aside, as a protective buffer against unrelenting wind and advancing sand dunes, a 1.6-kilometre area along the east side of Brule Lake. These Brule Dunes later became a favoured site for off-highway vehicle enthusiasts, although new land-use zoning in 1999 imposed some restrictions on this activity.
- c. Due to concerns about watersheds and fisheries, the Company and the government agreed from the beginning to maintain buffer zones of forest along waterways. These riparian zones enhanced the value of streams and rivers for subsequent recreational activities such as fishing, canoeing and camping.

In addition, the 1955 agreement set aside about 25 per cent of the area that would later become Switzer Park along Highway 40 northwest of Hinton. Initially earmarked as a water reservoir reserve for Calgary Power, it was also included in the reserve area for possible future expansion by the Company. The elements of the park then came together over a 10-year period beginning in 1958 when the Company backed a proposal by local sportsmen and the Hinton Chamber of Commerce to create a new provincial park near Jarvis Lake. In 1968, the government established the permanent boundaries and renamed the park to honour William A. Switzer, Hinton's first mayor and later MLA.



BUFFER ZONE ALONG BRULE LAKE, 1980S

WELDWOOD PHOTO COLLECTION

In 1959, the province established a new 555,645-hectare wilderness park in the mountains and foothills north of Jasper Park and the west of the forest management area. This was later named Willmore Wilderness Park to honour Norman A. Willmore, MLA from Edson (1944-65) and the former minister of Lands and Forests. The boundaries were altered in 1963 and 1975, and the Willmore Wilderness Park Act of 1980 reinforced the protected status of the park. In 1998 it was declared a protected area under the province's Special Places 2000 program. The park's current 459,700 hectares contain 750 kilometres of trails.

CAMPING

As roads began to reach into the areas around Hinton, more and more people started heading for hills with their tents and coolers. The associated fire risk and other land use conflicts alarmed the Alberta Forest Service (AFS), which developed forest recreation areas as a means to concentrate campers on designated sites. The recreation areas were free public campsites with picnic tables, firewood, fire pits and privies adjacent to major streams along forestry roads. Surface fuels were removed from the sites to prevent campfires from spreading into the forest. The first such recreation area was the Big Berland, built in the mid-1950s.

Probably the first impact of forest recreational use was felt at Camp 1 shortly after it was built and occupied in 1955-56. It was scenically located on the east side of Wildhorse Lake with its view of the Rockies, so attracted visitors as well as working loggers. It was not long before the local Fish and Game Association lobbied the government to stock this pothole lake with rainbow trout. The fish survived over winter and quickly grew to catchable size. Nearby Kinky Lake was also stocked but with arctic grayling on a trial basis, also successful. The result was heavy traffic and random camping during the open-water season. The AFS later developed campgrounds at both locations. Ice-fishing was permitted

on both lakes since they were potholes that would winter-kill under heavy snowfalls that would block the light and cause the aquatic plants to die and decay, removing oxygen and releasing carbon dioxide.

A half-dozen more AFS recreation areas were built during the 1960s in the forest management area, and Alberta's highways department also developed two recreation areas at Roundcroft and Johnson's Point (now Maskuta Creek) early in the decade.

By 1979, the network of forest recreation areas included 13 sites, and they were proving very popular with the public. In that year, the government approved a new set of regulations to formalize the legal authority of the AFS to manage the recreation areas. The sites were then withdrawn from the Company's forest management area. In later years, the AFS charged a token camping fee to cover some costs, but this had little effect on the recreation areas' use. Then in the mid-1990s, the provincial government decided, as a cost-cutting measure, to privatize the management of the sites. Contractors entered into agreements for their operation, and were allowed to charge for this service. The resulting increase in fees deterred some users, and there was a notable decrease in the use of the organized campsites, combined with an increase in random camping.

The original concerns about the fire risks and land use conflicts from random camping remained valid. In spring 1999, for example, a random camper's fire on the Jarvis Creek meadows north of Hinton started a wildfire that nearly destroyed a large tract of forest. Human waste and litter also became an increasing problem. Recreation areas managed by private operators often sat partially empty while random campers filled the landscape around them. Moreover, some private operators were concerned about the impact of forestry operations on their business, and therefore lobbied the Company and the government to modify or suspend operations in the area around their sites.

However, proper management of recreational use on the FMA was very much in the Company's interest. The very attractiveness of the area that led to setting up the Brazeau and Athabasca Forests in 1911, and the qualities of which Reg Loomis was aware when he outlined the 1954 FMA proposal, were shared by the growing numbers of Albertans. Not only was the area attractive in its own right, increasing restrictions on visitor use in Jasper made this neighbouring FMA a 'natural' for an alternative destination. As Bryon Muhly observed²⁸⁴, referring to the population increases in Alberta:

In combination with a move to constrain development within the national parks we're going to see more of a demand for recreational use on areas surrounding or adjacent to the park, and our FMA is really a sitting duck for that. We're seeing it now -- more and more people are spilling over out of the park and onto our landbase. There are several million visitors a year who pass through our FMA on the way to Jasper. That in itself raises concerns about visual quality along the way, which we are addressing.

Then, when people started to utilize the forest within our FMA because they couldn't get into the national park, it resulted in an increase in what we call random camping. Now we have more people in the woods and, rather than using designated campgrounds as they've done in the past, they are tending to camp wherever they please. That creates a major concern for us from a fire risk potential -- it's hard to predict exactly where people are going to be, or know where they've been, and follow up with any kind of checking to make sure that campfires have been properly put out.

By 1999, recreation areas managed by private operators often sat partially empty while random campers filled the landscape around them. These operators were not supported by funds from the

provincial government, and relied on camping charges, which many campers were unwilling to pay. As a result, the operators had difficulty providing the services people expected, and the situation worsened. Moreover, the private operators were concerned about the impact of forestry operations on their business, and therefore lobbied the Company to modify or suspend operations in the area around their sites.

A RECREATION STRATEGIC PLAN

In June 1999, Weldwood hired Aaron Jones as public affairs forester. The recreation program was assigned to Jones as part of his responsibilities. He continued to inventory existing facilities and their condition, and also began the development of a strategic plan for recreational development. Building on earlier suggestions from the Forest Resource Advisory Group, as well as results of a 1998 workshop and research by the Foothills Model Forest, he convened a team to develop a new strategic recreation plan for the Company. Key components of this strategic plan included the following vision statement and goals

Vision Statement: As ethical stewards of the land, we will provide recreational opportunities in the Managed Forest.

Goals: To maximize benefit from the forest and safeguard the integrity of the FMA by providing recreational opportunities on the FMA to:

- a. Reduce land-use conflicts resulting from the interactions of logging, and recreation and/or tourism based industries
- b. Reduce environmental degradation and wild fire, and the risk to health and safety
- c. Improve our public image and the public's awareness and understanding of sustainable forest management
- d. Demonstrate sustainable forest management and good forest stewardship
- e. Provide local employment.

As part of this recreation strategic plan, a three-year action plan (2000-2002) was also developed. This plan put into action the broad goals and vision of the strategic plan. Some of the key components of the action plan included inventories of recreational resources, maintenance and upgrade of existing sites and the development of new recreation opportunities.

Earlier, during discussions surrounding the Province's Special Places 2000 program, the Company had offered to assume responsibility for provincial recreation areas if and when they came available for bidding. Part of the strategy and action proposed in Jones's new plans included this intent. The Company already managed two sites, Emerson Lakes and Little Sundance, under a 1995 agreement with the Crown.

In 2000, the opportunity arose as two private operators declined to carry out the remainder of their maintenance contracts with the province for eight campgrounds in the Coal Branch area. Andy McCracken of Natural Resource Services approached Weldwood to help with this issue, as the return of these maintenance contracts was unexpected, and the May long weekend was fast approaching. With no other available operators for these campgrounds, the NRS asked Weldwood to consider taking on these sites for the remainder of the 2000 operating season (May to September).

After carefully examining the pros and cons of taking on such a large commitment, Weldwood accepted the invitation, as it was consistent with its overall Recreation Strategy. The maintenance contract between Weldwood and the NRS was for one season only. The NRS approached Weldwood to assume responsibility for these sites only for the operating season because there was not enough time to go through a proper “Call for Tender” process after the previous operators returned their contracts back to the Province.

The Company gave Fox Creek Development Association, an aboriginal owned and operated Company, the contract for the maintenance of these campgrounds. Weldwood also contracted the services of two Natural Resource Service (NRS) Conservation Officers to oversee security and enforcement. These officers were at the campgrounds at least one time each day ensuring the rules and regulations of these Provincial Recreational Areas were being upheld. This helped to make the camping experience more enjoyable and pleasant for everyone. These officers also patrolled random camping areas in Weldwood’s FMA area, thereby reducing the risk of poor campfire practices and environmental degradation at these areas.

Weldwood collected a nominal fee per campsite (\$5/night except Whitehorse, which was \$10) to help the Company offset the cost of the employment of the Conservation Officers. This fee was considerably cheaper than what the previous campground operators were charging, and additionally Weldwood provided firewood free of charge. Feedback from the public and from the government has been very positive. Cardinal River Coal supported this project also, with a cash contribution to Weldwood to support the maintenance of the Whitehorse Creek campsite.

The 2000 operating season ended in September, at which time the NRS advertised a “Call for Tenders” for a 5 year maintenance contract for the Coal Branch sites, the Whitehorse Creek site, and additionally, the Sundance Provincial Park Sites (Emerson Lakes Campground, Emerson Lake trails, Wild Sculpture Trail, and the Little Sundance Campground) and the Obed Lake Provincial Recreation Area. Weldwood submitted a 5 year proposal for the above noted sites. In December 2000, Weldwood was notified that the Company was the successful proponent for all four contracts and the first full season of this work began in 2001.

Because of the innovative partnerships established by Weldwood’s new recreation program, the Natural Resources Services nominated Weldwood’s recreation program for a prestigious **Emerald Award** from the **Alberta Foundation for Environmental Excellence**. Weldwood was selected as one of the three finalists in its category (large business activities costing less than \$1 million) and when the winner was announced at a gala celebration in Calgary, Aaron Jones stepped up to accept the award on behalf of the Company.

The campsite component of the recreation program continues with upgrades and new sites being planned. A new site was developed at Petite Lake in 2001, replacing an unsightly and environmentally degraded random camping area.

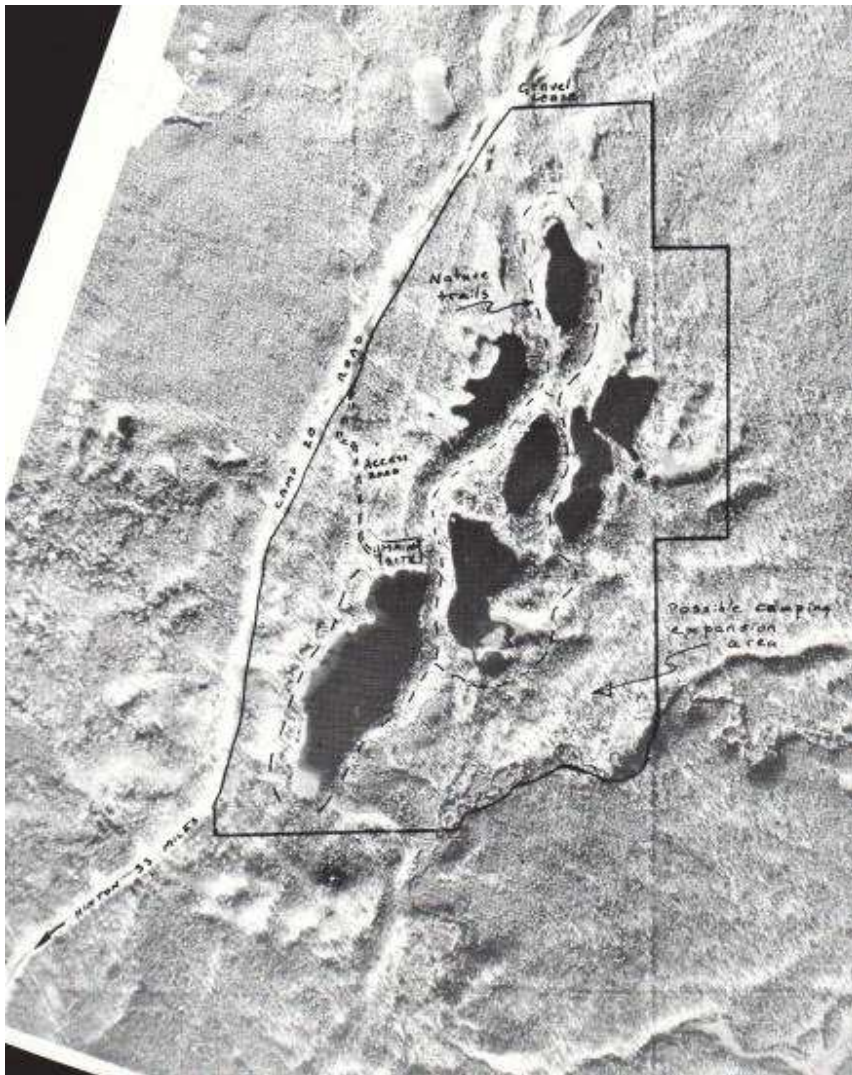
EMERSON LAKES CAMPSITE AND TRAIL DEVELOPMENT

The first Company recreational developments started with a post-meeting discussion over drinks in the Athabasca Hotel lounge in early 1969 that led to a cooperative agreement to manage recreation at Emerson Lakes, near the Athabasca north of Obed. Peter Murphy, then head of the Forest Technology School in Hinton, recalled talking with Jim Clark, then woodlands manager for North Western Pulp & Power:

During the discussions I talked about our relatively new Junior Forest Rangers work program, and that we were always looking for new opportunities. I think it was at this point Jim mentioned Emerson Lakes, which had just been saved from the new road east to the area north of Edson. Eric Marrison was quick to identify the main esker as a neat ready-made road grade. Jim suggested that we should consider a co-operative project.

Jack Macnab, then taking an advanced forestry course at the school, submitted the plan that became the basis for development. The Junior Forest Rangers began work in the summer of 1970, and continued for three years. The Company did the earth-moving and provided camp stoves and privies.

In 1982, the provincial government assumed management of Emerson Lakes as a forest recreation area. In 1995, Weldwood signed an agreement with the province to take over responsibility for the maintenance of the site and facilities. The complex, expanded to include the Emerson Creek Valley, became part of the new Sundance Provincial Park in 1999.



JACK MACNAB'S EMERSON LAKE
PLAN, 1969

COURTESY PETER MURPHY

HIKING TRAILS

In the 1970s, the Company became very active in recreational development and most of the trails it maintains today were built, or at least started, in that decade. Jack Wright, who joined the forestry staff in 1956 and served as chief forester from 1975 to 1987, initiated the program. Beginning in 1973, the Company offered its tree planters – then mostly university students—the opportunity to spend a week each summer working on development of hiking trails. This set in motion a decade of Company trail development not seen again until the reinvigoration of the program in the late 90s.

Here is how Wright described the recreation program’s significance, in 1975:

We are confident that our forest management policies will result in a continuous availability of areas of prime recreational condition that will contrast markedly with areas that are being maintained in near-wilderness conditions outside of our boundaries.... If the present policy of maintaining our national parks and our provincial wilderness parks in their so-called ‘natural’ condition prevails for the next several decades, those stands which are presently overmature will become decadent slums.... When this happens, the tourists and recreationists will cast longing glances at those healthy immature stands within the neighbouring [forest management] areas. With this in mind, we are constantly keeping a lookout for areas of high recreational value, not only to develop them for current use, but to protect them for future generations.

These were prophetic words, as Parks Canada’s subsequent restrictions on developments and activities, along with a proliferation of recreational vehicles and off-highway vehicles, would result in a virtual explosion of recreational use and activity on the forest management area in the 1990s.

The 1977 Forest Management Plan laid out, for the first time, the Company’s vision for recreational development on the forest management area. Key elements included:

- a. location and protection from damage of old forest service patrol trails;
- b. recognition, protection and development for wildland (non-intensive) recreation of certain unique areas such as Sundance Valley, and
- c. development of hiking and ski trails within operating areas to demonstrate the Company’s management program.

The first two goals were difficult to achieve. However, one successful project restored a 20-kilometre section of the Dominion Forestry Branch’s historic Bighorn Trail south of Hinton to the Gregg Cabin, an early ranger cabin built around 1917 and one of the few remaining Dominion Forestry Branch cabins on the eastern slopes. The Hinton Junior Forest Wardens club reclaimed this trail in 1971, with Company support, and the JFWs maintained the trail for some time until the Company accepted this responsibility. In 1996, Weldwood built an extension to link with the Town of Hinton trail network at Thompson Lake. The trail is used today for hiking, mountain biking, horseback riding and off-road vehicles, although there is growing concern about the impact of motorcycles and the all-terrain vehicles known as “quads.” This trail received a major upgrade in 2001.

In the 1990s, the Gregg Cabin site became the central focus of the Company’s forest resource department events such as the 50-millionth and 100-millionth tree planting celebrations. The whole Gregg Valley, with its 30-year-old reforestation, became increasingly popular for fishing and camping. In

1999, Weldwood and the provincial government, along with Foothills Model Forest, co-operated in the development of a large picnic shelter to avoid overuse of the historic cabin. In 2000, the Pine Management Interpretative Trail was upgraded with new signs and a new brochure highlighting the management of lodgepole pine.

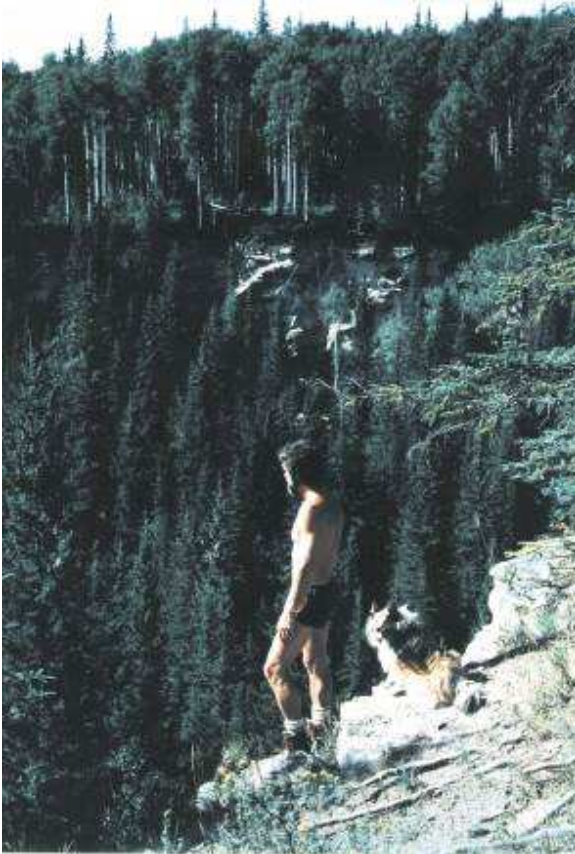


MOUNTAIN BIKING IS A POPULAR ACTIVITY ON THE BIGHORN TRAIL – STEPHEN HANUS PHOTO

The Company also interpreted photos, field-checked and mapped the Dominion Forestry Branch and Alberta Forest Service network of old horse patrol trails on the forest management area. Attempts to use these trails as cutblock boundaries in order to preserve their integrity proved impractical, except in rare circumstances. Since the locations were known and mapped, it was deemed easier, if the need arose, to re-establish them following harvest and reforestation. However, most modern recreational travel relies mainly on “quads,” which are more suited to old roads and seismic lines.

Jack Wright was particularly interested in the recreational potential of the Sundance Valley with its network of lakes and spectacular wind-sculpted hoodoos in the northeast part of the forest management area, north of Obed. The Company first became aware of the features of this valley in 1961 when forestry crews established permanent sample plots in it. Wright subsequently took the area out of the forest management planning landbase with the expectation that someday it would be developed for wildland recreation. Tree planters worked on this trail every year from 1973 until 1979 when the trail network was completed to the Sundance Creek outlet at the far end of Sundance Lake, nine kilometres from the trailhead. In 1999, this trail and the whole valley became part of Sundance Provincial Park, and the Company has agreed to a continuing role in maintaining the recreation facilities in co-operation with the provincial government.

The last hiking trail built by the Company was the Canyon Creek Trail. Development work began in 1980. A very popular day use area, this short, three-kilometre trail travels down one side of a spectacular canyon to the Athabasca River and a small picnic site. It returns up the opposite side to the trailhead on the Emerson Creek Road about 25 kilometres northeast of Hinton. This trail was also upgraded in 2000.



ALONG THE CANYON CREEK TRAIL

WELDWOOD PHOTO COLLECTION

SKIING

In the early 1960s, Company staff and local people of Hinton collaborated in the construction of a small ski hill south of Hinton. A rope tow and small chalet were erected, and volunteers helped keep the hill clear of brush and encroaching vegetation. Volunteers groomed the hill, and ran the rope tow on weekends. This hill operated until 1975 when the facilities were vandalized at about the same time that the popularity and accessibility of downhill skiing in Jasper reduced clientele and interest. Meanwhile, private operators built the Silver Summit ski area north of Edson, withdrawing about 580 hectares from the Company's forest management area for this purpose.

Cross-country skiing became another popular activity in the 1970s. In 1975, Company forester Bob Udell joined the local cross-country ski club and worked with them in maintaining their ski trail above the Pedley Dam in the Athabasca Valley just east of Hinton. However, warm chinook winds frequently melted the snow and scattered branch litter on the trail. Udell suggested to chief forester Jack Wright that cross-country ski trails would be a welcome addition to the Company's recreation program, and could also serve the need for public education and awareness.

In 1976, Udell began development of the Pine Management Cross Country Ski and Hiking Trail complex centred at the Gregg Cabin. The trail went through older fire-origin pine forests, the 1956 Gregg Burn, and various stages of reforestation, along with a series of research sites and operational trials. The core six-kilometre loop featured a series of numbered stops and a brochure for interpretation, and additional connecting loops were added in subsequent years. The local ski club, Hinton Nordic Skiers, adopted the trail as its home base for several years and held annual races there, including the Western Canada Cross Country Ski Championships in 1979.



KRISSY UDELL SKIING – PINE MANAGEMENT TRAIL SYSTEM, 1980

BOB UDELL PHOTO

In the late 1970s, when ski marathons were becoming very popular in Canada, the ski club and the Company agreed that it was timely to consider one for the Hinton area. The trail was located and clearing began in the summer and fall of 1979. Starting at Beaver Lake, 10 kilometres south of Hinton, the trail climbed to the top of the Bighorn Ridge and along the Bighorn Trail until it again descended into the Gregg and McLeod river valleys and onwards to Robb. Sixty kilometres long, with elevations ranging from 1200 metres to 1800 metres, it was the most challenging and scenic trail developed before or since in the forest management area. On February 24, 1980, the first St. Regis Marathon drew about 300 skiers from across Alberta. One participant later wrote that that until he skied this trail, he would never have said that forestry and recreation could co-exist, but his experiences on that day had forever changed that viewpoint.

For the next year, the Company and the ski club continued to maintain the marathon trail. But the scheduled 1981 event had to be cancelled due to the destruction of sections of the trail by seismic and coal exploration programs as well as the snow-destroying effects of chinook winds.



JOHN HICKEY (L) AND JACK WRIGHT (R) ON FIRST TOUR OF THE BIGHORN SKI TRAIL, 1979

BOB UDELL PHOTO



ROCKY NOTNES OF HINTON NORDIC SKIERS IS CONGRATULATED BY ST. REGIS (ALBERTA) LTD. VP KEN HALL AFTER WINNING THE 1980 MARATHON. MARGARET WRIGHT HOLDS THE PRIZE

BOB UDELL PHOTO

The success of the Pine Management Trail then led to development of the Spruce Management Trail, a similar ski trail system at "Camp 29" in the northern part of the forest management area. Oliver Hannula, woodlands superintendent and former Canadian Olympic Team skier, suggested the development and helped to design a road system appropriate for later use as cross-country ski trails. The high elevation (1500 metres) guaranteed deep snow and extended ski seasons. The Spruce

Management Trail, better known as “Camp 29,” hosted ski marathons from 1982 to 1985 and reached its peak usage in 1984 when the Canadian Cross Country Ski Championships were held there.

In 1985, a local committee began to look at sites for the Jackrabbit children’s ski program. The group comprised Jack Wright and Oliver Hannula from the Company, Wally Manchester, district ranger with the AFS and Lindsay Thompson representing the Hinton Nordic Skiers. They settled on the Athabasca Tower, at the south end of Switzer Park, as the best site. The provincial government then provided a major grant that led to establishment of the new Athabasca Lookout Nordic Centre at the same location. The high quality of its facilities and the proximity to town made the centre highly popular with local people as well as many from other areas. Use of Company trails fell off, which eventually led to the Company’s decision to step away from its own ski trail program.

To signal this change in direction, the Company gave a large grant to the ski club to help with the development of the centre. In 1988, when the AFS and the Company were redefining the forest management area boundary, the Company agreed to the removal of the Athabasca Lookout Nordic trail system from the Forest Management Agreement landbase. The forest service also played a role in the development and maintenance of the Hornbeck ski trails west of Edson and partly within the forest management area, as well as the development of snowmobile staging areas. The Company also provides financial support to the Edson Ski Club toward the maintenance of the Hornbeck system.

A small core of loyal users, led by Jack Wright, continued to champion the Camp 29 (Spruce Management) trail system after most skiers switched to the Athabasca Nordic Centre. After his retirement in 1987, Wright became the volunteer chief of maintenance on the trail system. The Company continued to plough the road and provide the use of snow machines for trail grooming. In 2000, the Company stepped up its support for the trail system and installed lunch shelters and toilet facilities, along with a new trail brochure and “you are here” signs. This trail, although not extensively used, can still be counted on for good snow when all other sites have lost theirs.

CANOE ROUTES

From the 1950s to the early 1980s, canoe outings on the Athabasca River from Hinton to Whitecourt, and Jasper to Hinton, were popular annual events. Prime movers in this activity were Bill Hanington, a former AFS ranger and keen local historian, and Company forester Jack Wright, an easterner raised by the Ottawa River with canoeing in his blood. By the 1980s, these social events became more sporadic and eventually ceased, but canoeing on the Athabasca and other rivers continued as a popular sport in the forest management area.

The Wildhay River in the north end of the forest management area became particularly well known in the 1970s through its use as a training river by the new Blue Lake Centre in Switzer Provincial Park. The Alberta government built the Blue Lake Centre as an outdoor leadership-training centre, and it became very popular with locals and many others.

A canoe club (later named the Hinton Stokers) formed in Hinton in the late 1970s, and enthusiastic paddlers and kayakers began exploring the larger rivers and streams in the area. Particularly popular were the McLeod River, Gregg River, Wildhay River, Athabasca River and Berland River.

In the late 1970s the Alberta Forest Service began a series of inventories of these rivers, classifying and mapping the rapids as well as potential campsites along them. Parks Canada’s 1974 Wild Rivers book cited use of the Brazeau River for canoeing. Travel Alberta began promoting the Athabasca, McLeod, Berland and Wildhay rivers for canoeing, as well as the Jarvis Creek to Gregg Lake route.

6.5 RECREATION AS A LAND MANAGEMENT STRATEGY

The role of recreation as a land management strategy has long been recognized, and it is appropriate that we leave the last word to one of Alberta's forestry pioneers. Speaking to the Canadian Institute of Forestry Annual Meeting in Banff in 1951, Dominion Forest Service researcher Des Crossley²⁸⁵ identified the need for effective multiple use management to meet the ever increasing needs and demands of society.

The demand will be for wood, forage, power and clear, usable water. We therefore must think ahead to the productivity of our future grazing lands, our water supply for both industrial and domestic consumption and of irrigation and hydro development and to the production of wood. These are things that are going to be needed in maximum quantities if man is to postpone the effects of this mad pressure of pyramiding populations. Perhaps for several generations we can also indulge in a few luxuries, and in this category I would place hunting, fishing and many other outdoor recreational opportunities. There is a great need for the modern business man to obtain periodic relief from the turmoil and pressure of his highly commercialized competitive form of living. For a great many people, the comparative solitude to be found in our forests, and on our lakes and streams, holds great recuperative powers. This relief from tension, whether during a hunting or fishing expedition, or simply in a quiet sojourn in the wilds, is a tremendous safety-valve, whose therapeutic effects we should not readily relinquish.

A comprehensive land-use program must therefore make allowances for the interrelationship of all resources, and provide a co-ordinated plan of utilization that will avoid making changes detrimental to any one of them, and if possible, be beneficial to one or more.

50 years later, the challenge remains to fully integrate forest recreation into a comprehensive land use and land management program on Weldwood's managed forest.

6.6 WILDLIFE

It happens that most of the species that we wanted to put on the wall or in the freezer are the ones that like early successional forests, so it was thought that if you did forestry right that that would be good for wildlife. - Rick Bonar

The early stages of forest regeneration, after a forest fire or a clearcut, provide lots of food and habitat for species such as moose, elk, deer and grouse. As a result, large-scale forest operations were seen at first as a huge benefit for wildlife. However, roads and seismic cutlines also gave a growing population of hunters and fishers easy access into formerly remote areas. Managing impacts on game became increasingly important over the decades. Ecologists meanwhile began to focus on the ways that forestry affected all species, not just the ones hunted and fished.

Chief forester Des Crossley observed that the early forest operations around Hinton created many kilometres of "edge," a favoured habitat for many species. The increasing volumes of grasses, herbs and shrubs that invaded the harvested areas provided an attractive source of forage, particularly for the ungulates, while the residual stands provided the protection they required from their predators. "The

wildlife habitat was vastly improved on the harvested areas and as a result there was a gross increase in ungulate populations,” Crossley said.

Studies by government fish and wildlife officers confirmed this. However, local hunters were unwilling to recognize any increase and in fact claimed that game was becoming more difficult to get. They failed to recognize the amount of poaching that was occurring. As Crossley put it:

The roading created by the advent of industry in the area provided easy access, particularly to those so-called “hunters” with pickup trucks who cruise the roads and shoot from the windows. Poaching rapidly became a way-of-life that the authorities were unable to control. The result of our contribution to ungulate management was a definite gross increase in populations, but a standstill or less in the net increase. This was a situation beyond our control.

Crossley’s remarks especially reflected the situation at Camp 1 -- the first harvest operation and the first to demonstrate the response of wildlife. Populations of deer, elk and moose seemed to increase markedly for the first decade during which approximately 50 per cent of the area had been harvested in a series of alternating strip cuts. Despite the continual hunting, numbers seemed to increase, or at least sustain themselves at high levels.



NORMA BONAR WITH WHITE-TAIL BUCK, CAMP 1 1992

WELDWOOD PHOTO COLLECTION

However, when seedlings became established on the cutovers, logging began on the uncut strips. Since the seedlings and other vegetation on the cutovers were not yet high enough to provide the degree of cover required by deer, elk and moose, their numbers began to decline through a combination of hunting and migration out of the area.

This situation was becoming common in Alberta, and the resulting vigorous debates among hunters, wildlife biologists, the Alberta Forest Service, the Alberta Fish and Wildlife Division and the forest industry led to the development in the 1970s of a new rule, the so-called “six-to-eight foot rule.” The rule required that the regeneration reach heights of six to eight feet (1.8-2.4 metres) before the residual strips could be harvested. The concept was that once regeneration was that high, the large ungulates would find adequate hiding cover.

The results were mixed, but the rule represented a positive step towards refinement of management techniques for wildlife. From 1975 to 1977, the Company also experimented with a so-called “continuous clearcut” in which harvesting would proceed continuously through a large block, except for

specified buffers and corridors laid out by wildlife biologists. The idea was to extract the wood from the designated area and then take out the roads. This would let succession take place and minimize human disturbance of the animals. However, subsequent exploration for oil and gas in the area precluded road closures so the theory was never fully tested.

During the Environment Council of Alberta's public hearings on forestry in 1978, some hunters argued that the "six-to-eight foot rule" should be replaced by a 15-foot (4.6-metre) standard before the second cut, but this was never adopted. Foresters noted that such a standard would require major changes in operations—including, among other things, a great deal more road building and much more rapid development of entire management units.

To prove the point that the "six-to-eight foot rule" was adequate, Crossley organized for Brent Simmonds to take a horse into a regenerated stand at relatively close proximity to Highway 40, then took photos from the road, where the horse can be barely seen.



6 TO 8 FOOT RULE TEST

MCLEOD W.C. BLOCK 27, 1973

BRENT SIMMONDS WITH HIS HORSE IN 6-8 FOOT, 12 YEAR OLD PINE REGENERATION



THE HORSE STANDS FEEDING AS PHOTOGRAPHED FROM HWY 40

WELDWOOD PHOTO COLLECTION

FORESTRY-WILDLIFE PROPOSAL FOR HINTON FOREST 1982

In April 1982, the Alberta Forest Products Association (AFPA) and Alberta Department of Energy and Natural Resources hosted a workshop in Jasper to address the theme: "Timber Harvesting in the Boreal Forest: Capitalizing for Wildlife." The keynote speaker was Dr. Jack Ward Thomas, chief biologist of the Range and Wildlife Habitat Laboratory of the U.S. Forest Service at Portland, Oregon, who explained the integration process he had developed for management of timber and wildlife in Washington and Oregon.

Jim Clark, the Company's woodlands manager, then serving a term as president of the AFPA, had been instrumental in arranging Thomas's presentation at the Jasper workshop. With Company support, Clark offered the Hinton forest management area as a pilot project for implementing a similar program in Alberta. A nine-member committee of industry and government representatives, including Clark, submitted their report, in 1986, setting the stage for the wildlife program which began in 1988. Consultants Rainer Abel and Beth McCallum, working under the direction of the committee, presented a follow-up report "Integrated Forestry-Wildlife-Fish Resource Management Approach for the Champion Forest Products (Alberta) Ltd. Forest Management Area, Hinton, Alberta," in December 1987.

In the meantime, Clark retired in 1985, and Don Laishley became the Company's manager of forest resources in January 1986. Originally from Nelson, B.C., and a graduate of the University of British Columbia forestry program, Laishley worked in 35 countries before joining Weldwood. He headed the forest resources department until 1996 when he moved to a senior position with the Company in Vancouver.

Laishley said his own epiphany to the wildlife cause occurred about a year after he arrived in Hinton, during a visit to the woodlands with Ray Ranger and Bob Udell. They saw a big clearing, full of willow, "the nicest looking piece of moose pasture I have ever seen in my life," Laishley recalled. None of them could explain why there were no moose to be seen, and he realized they would need an explanation if hunters arrived one fall and found no moose. "I think we better get into the wildlife biology business," he decided. Company executives agreed that having a biologist on staff would provide "an insurance policy." Laishley said the result of this decision "is that Weldwood probably has the strongest wildlife biology program in Canada, if not in North America."

Rick Bonar, a wildlife biologist with a solid background of experience in British Columbia, was hired effective May 1988. He was given responsibility for the Company's wildlife management, including fish, and ultimately for the broad issue of biological diversity. Bonar immediately began collecting a huge amount of information on selected species that were representative of almost all the aboveground species in the forest management area.

Along with that tangible Company commitment to wildlife, other changes were occurring. Some recommendations of the 1987 task force report were incorporated into the new set of ground rules that were negotiated after the Forest Management Agreement expansion a year later. The next step was to decide what was needed for a new program. A new government-industry committee was formed called the Integrated Resource Management Steering Committee (IRMSC) comprising Bonar and Doug Walker from the Company, Richard Quinlan from Alberta Fish and Wildlife and Tony Sikora from the Alberta Forest Service. IRMSC decided that government and Company would work on wildlife plans jointly, but Weldwood would have primary responsibility for managing habitat and the government for managing wildlife populations.



RICK BONAR

COURTESY FoothILLS RESEARCH INSTITUTE

The approach used by Jack Ward Thomas in the Pacific Northwest was based on maintaining populations of species or “life forms,” but the Hinton group decided this would not fit with the dynamic nature of the forest around Hinton. It was more important, they decided, to focus on habitats rather than individual species. “That was when we came up with the concept of taking all of the vertebrates and seeing if we could associate each species with a certain kind of habitat,” Bonar said. The group prepared a species list and looked at their association with 16 habitat types. If each species could be associated with a habitat—whether young or old stands, of various species and age—then conserving the habitats was expected also conserve the species. “At the time we were not calling it biodiversity, but our strategy was basically a biodiversity conservation strategy.”

Models and software were developed for the habitat approach, but the prototypes were not completed in time to include in the 1991 forest management plan. However, a year later, the Foothills Model Forest provided an opportunity to push ahead with the research. The work on species and habitats also dovetailed nicely with other research, gathered for forest planning purposes, on historic patterns of natural disturbance in the foothills forests. “Really what we’re looking at when we talk about habitat is various forest types and various seral stages of those forest types,” Bonar said. (Seral stages are the steps of forest development from bare ground to old growth.) The approach was incorporated fully in the 1999 forest management plan.

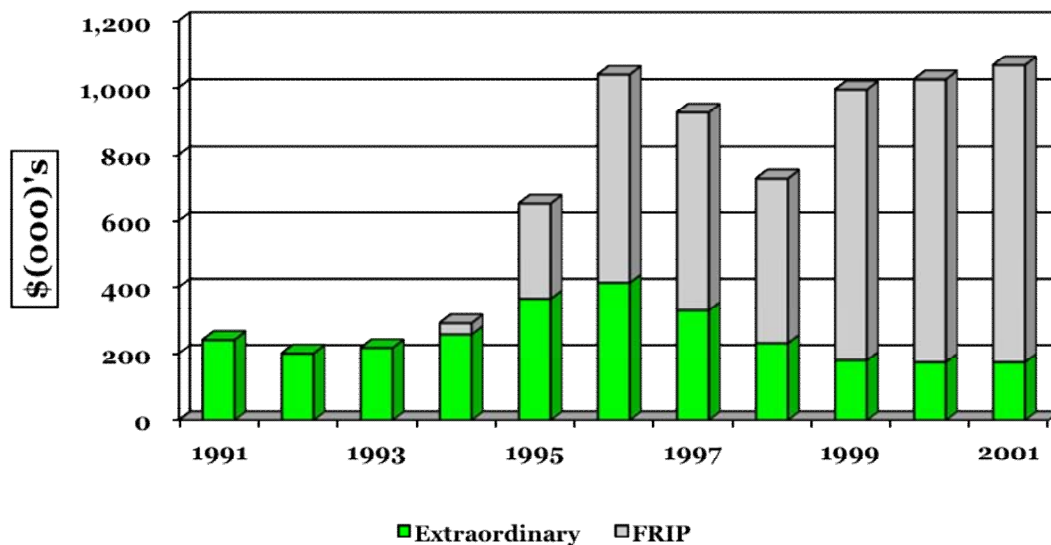


FIGURE 6-1 EXPENDITURES ON WILDLIFE PROGRAM AT HINTON 199-2001

Funding from the provincial government’s Forest Resources Investment Program supported a tremendous expansion in wildlife research (described further in chapter 2.C) on the forest management area during the 1990s. Research results were rapidly incorporated into planning and operations. In the year 2000, observed forester Rob Stauffer, manager of the Company’s Loomis District, “I can’t imagine *not* having a biologist on the team.”

TRAPPING

Trapping was another well-established use of the forests around Hinton. Traplines covered much of the forest management area in 1955, and continued through the years. In 1999, the forest management area included all or part of 64 registered fur management areas. Licensed trappers have the right to establish and maintain traplines and necessary supporting structures such as cabins. The species trapped include beaver, marten, fisher, fox, wolf, coyote, lynx, weasel, muskrat, mink, wolverine and red squirrel.

Foresters worked with trappers to avoid conflicts between their operations and to maintain habitat for fur-bearing animals. When forestry operations are planned in an area with traplines, the trappers are consulted directly to identify their needs and concerns. Trappers are also involved in integrated resource planning and are represented on the Company’s Forest Resources Advisory Group. In addition, the Company participates in the provincial program to compensate trappers for losses due to forestry activities.

In the 1990s, as Weldwood was developing its biodiversity strategy, the Company recognized that trappers and fur returns data could also provide an additional way to monitor the health of species and habitat. Analysis of this data over a 19-year period showed an average annual gross income of \$795 on the 64 traplines contained within the FMA.

6.7 WATERSHED AND FISHERIES

Both Loomis and Crossley were concerned about watershed protection. This was a reflection of their experience as well as concerned with the importance of the East slopes of the Rockies in water supply. Layout and approval of the cut block design both reflected watershed concerns. Crossley noted in 1984:

Research in both the United States and Canada has proven that clear-cutting in strips or patches definitely results in increases in water yield. In uncut stands, some of the precipitation never reaches the ground and evaporates back into the atmosphere. This is particularly evident with snow when a great deal is hung up in the foliage, particularly when it is coniferous. Clear-cuts of course do not offer any obstruction, and increase in snow-pack does result in an increase in run-off during the spring melt, which, in turn of course, increases the possibility for soil erosion. Fortunately this can be controlled by the scarification program. Close observation of our cutovers during the initial years revealed no serious erosion anywhere on the lease. This can be credited to the rough and untidy nature of the surface debris. As the melt progresses and water starts moving down the slope, it is continually encountering soil ridges, upturned stumps and broken chunks of slash. During each interruption it drops its silt load. This leaves little pans of silt of varying sizes and depths that result in excellent micro-sites for the establishment of subsequent regeneration. Haul roads through the cutting areas however, could seriously affect erosion and stream siltation. This was a bone of contention between Operations and the Forest Service, but could be avoided by putting the roads "to sleep" during the scarification process.

Loomis was also concerned that buffers of uncut forests should be left along stream and riversides. Crossley initially disagreed with this requirement, explaining:

The government insisted that we leave a permanent strip of timber on both sides of every permanent stream. This would remove many acres as a source of wood supply and therefore reduce the AAC. We were not in favour of this restriction but Fish and Wildlife officers were concerned with the effect on fish. Apparently the fishing fraternity think that overhanging trees provide the shade that is necessary to keep the water cool for good fish habitat. This is probably true in most of our country but our streams were generally of glacial origin and at this elevation in the foothills of the Rockies the waters are too cold to result in the best habitat. Fish never grow to much size as a consequence. The habitat could be improved by allowing more sun to reach the stream's surface. The residual strips that we were forced to leave, if not harvested, are going to blow down eventually, many falling into and across the stream and destroying the fishing potential. Nevertheless our concerns were not accepted.

Although the filtration value of these stream-side residuals was questioned, biologists soon identified these riparian areas of significance with respect to biodiversity for they are also important as thermal cover and food sources for over wintering animals. Riparian zones are now available to limited harvesting through partial cuttings designed to enhance habitat while minimizing impact on water courses. With the advent of the Foothills Model Forest water courses are being studied in much greater detail, as Don Lashley explained:

The Model Forest is into a huge program of (collecting information about) fish at this moment, and particularly oriented towards the problem of the bull trout. ... we had a crew with electric stunners going out in the creeks .. they are stunning these fish and then they are measuring them, weighing them (tagging also) and they are identifying the species.. and then returned to the water.

This work is providing unprecedented information on fish habitat and distributions within the model forest landbase, and is now being used by the province to guide fishing regulations and bag limits for the area.



MCLEOD RIVER – AN IMPORTANT WATERCOURSE AND BIODIVERSITY CORRIDOR IN THE HINTON FOREST

WELDWOOD PHOTO COLLECTION

Weldwood, as part of its biodiversity conservation program and the 1999 forest management plan revision, inventoried and mapped the riparian zones along all permanent watercourses on the FMA area. These are identified as Special Management Areas (SMAs) in the plan wherein management will place priority on other values above timber production. Besides buffers already removed, an additional 45,000 hectares were removed from the contributing landbase because of their sensitivity to disturbance of any kind, e.g. water source areas. These SMAs are also a component of the *Special Places in the Forest* program, linking the proposed protected areas.

The 1999 plan also included an explicit examination of the impact of planned forestry activities on hydrological resources, the first time such an examination has been found possible. This built on watershed work begun by Foothills Model Forest and expanded by Golder Associates for the plan.

6.8 GRAZING

Horses had become a traditional way of getting around in this part of the country even after the arrival of the railway and roads, horses were used for hauling as well as for riding and packing. Guiding and outfitting with horses was also an established business. When the mill arrived, the initial logging was done largely with horses, and many of the residents kept horses. Many of the horses roamed loose throughout the forested areas and some of them ranged free as “wild” horses. This was not a major concern until horses began grazing on the grass and forbs on the expanding areas of cutovers. On some sensitive sites Crossley became quite concerned that grazing, trampling and rolling were causing undue mortality to the seedlings for which they were responsible. The government responded by authorizing “wild horse” roundups, however it was still necessary to find grazing for the large numbers of domestic stock. Ray Ranger explained:

... at that time we had virtually no facilities for grazing in the Forest Management Area and we had always assumed that the corridor running adjacent to Highway 16, which doesn't form part of our Forest Management Area, would in fact be the logical place for a grazing reserve at that time. There weren't any horse owners originally other than a few outfitters over at Brule and maybe two or three people in Hinton that had horses. There was really no demand for it but as time went on and more and more people came in, especially people from the mines, the demand grew. I know Jim (Clark) had spoken to me about it and I initially procrastinated, thinking those small lots along Highway 16 would deal with the issue. For a time, they did. The AFS issued permits on an area west of where the golf course is now - where the Rodeo Grounds were later developed. Other lands adjacent to Highway 16 were also utilized on a temporary basis, but there was nothing really set up for it. We both realized that the demand would not lessen and that a proper area should be set aside for outfitter grazing, but where?

Some of the areas of natural pasture land we considered were Tie Camp Flats north-east of town adjacent to the Emerson Road; the Hay River Flats located some distance north of Hinton and a few smaller areas between Entrance and Brule. Most of the recreational riders were accommodated in small plots here and there but the commercial operators were another matter. Historically outfitters had centred their activities inside Jasper National Park or at its eastern gates near Brule. As the parks did not allow winter grazing, these herds of outfitter's horses would simply be taken to the eastern Park Gate and turned loose to graze in what later became our Forest Management Area, and more specifically our cut-over areas of Camps 1 and 2 and Camp 33. To further complicate matters outfitters were reluctant to designate the exact number of horses being deposited in the area because they were all subject to a grazing head tax. Through time there come to be quite a number of herds of wild or feral horses which were descendants of early mining horses and unclaimed outfitters' and settlers' horses roaming the areas. These horses, of course, preferred to gather in recent cut-over areas because of the increase in forage and grasses there. At first it was thought that such grazing would have little effect on regeneration but this would

not prove to be the case. While checking regeneration at Camp 33, we observed and documented extreme damage to young trees. Jack Wright and Hank Sommers took pictures of this, and at an annual operating meeting I presented them to Fred McDougall. He was concerned, and subsequently the Forest Service instigated a program of feral horse roundups which after several years alleviated the situation.

However it had not solved the problem of what to do with the legitimate commercial horses in the area. Once the feral horse question had been addressed we still had to accommodate the non-Feral horses which were largely centred around Brule, and more specifically had concentrated in our recent cut-over areas at Camp 54. We, as a Company, had made considerable effort to regenerate the areas and were reluctant to allow unregulated grazing to continue there and jeopardize the reforestation program. In the end a compromise was reached where we gave up further attempts to regenerate the (Camp 54) area and the area was fenced by the Alberta Forest Service and a Community Pasture established.



**OUTFITTER'S HORSES GRAZING IN REGENERATED CUTOVERS, MCLEOD 1 1971
WELDWOOD PHOTO COLLECTION**

The community pasture area was removed from the FMA landbase when the new boundaries were established by Bob Udell and Con Dermott of the AFS in 1988.

6.9 OLD-GROWTH

Although “old-growth” is not precisely a “use”, it represents a “value” of concern to many because of its importance to some wildlife species as well as its intrinsic qualities that, to many, represent the forest primeval. Old-growth is also a concern to the Company as it tries to balance requirements for maintaining biodiversity and visual quality as well as meeting wood quality requirements for the mills.

Rick Bonar, Hugh Lougheed and David Andison prepared a succinct abstract concerning old-growth for a workshop²⁸⁶ in October 2000 that presents an interesting perspective:

There is currently no widely accepted definition of old-growth in the Alberta Rocky Mountains and Foothills natural regions. From an ecological perspective, old-growth should be defined by a combination of attributes that include structure, composition, time since disturbance, and functional response of species. The Foothills Model Forest used tree species composition and time since major disturbance to define old-growth and a stochastic model to quantify old-growth dynamics.

Historically, most of the 'natural' forest landscape was covered by young forest due to active fires. Mature and old trees were, and always have been, in the minority. There were times historically when virtually no old-growth existed on vast landscapes, and what little did persist was in small isolated patches. Given this, it is not surprising that research so far has identified few old-growth obligate species.

If the presence of old-growth has little ecological relevance, then social demands for old-growth must be tempered with ecological arguments to emulate natural variability to conserve biodiversity and social demands to sustain values associated with younger forests. The single largest human influence on old-growth in the Alberta Foothills appears to have been successful fire control, which has produced forests today that are on average older than would be expected under natural conditions.

Managers of both protected areas and working forests are implementing or developing strategies to restore forests to more natural conditions, while at the same time managing old-growth to ensure that it remains a part of current and future forest landscapes. There are significant challenges to this. The social debate about old-growth definitions and how much to maintain in highly dynamic forests is clouded by continuing demands for fire control, more protected areas, and less logging in the working forest. Following this path could lead to both ecological and social disasters. Traditional attitudes towards old-growth and its role in sustainable forest management need to be revisited on the path to a broadly-supported old-growth strategy for the Foothills.

6.10 NON-RENEWABLE RESOURCE USES

Alberta has a rich endowment of coal, crude oil and natural gas resources, and there has always been some conflict between mineral extraction and the renewable industries such as agriculture, forestry and tourism. The fact that the Crown owns most of the mineral rights, as well as much of the land and timber, does not necessarily simplify matters. Industrial, bureaucratic and political interests all come into play. The general goal of government policy in Alberta has been to find and develop mineral resources as early as economically and technologically feasible, then afterwards restore the land to at least its pre-existing economic and biological productivity. This is easier said than done.

As the first sustained-yield forest management area, in an area where coal, crude oil and natural gas development were already well established, the Hinton operation had few precedents on which to draw when the inevitable conflicts occurred between mineral extraction and forestry. Though the relationship continued to be challenging, both sides learned to compromise and adapt.

Exploration, extraction and facilities for the crude oil and natural gas industry posed a particular challenge because they changed, and cut into, the land area contributing to the annual allowable cut. The fragmentation of forests by oil and gas activities, especially seismic cutlines, made it more difficult for the Company to meet its commitment in the 1990s to sustainable forest management. In the long run, cash payment for timber losses is no compensation for loss of forest lands and reduction of the annual allowable cut.

Yet another potential challenge loomed in the late 1990s when diamond exploration began on the Forest Management Agreement area, but to date no discoveries have been reported.

COAL MINING

The once-booming Alberta coal industry went into severe decline in the 1950s. Railways switched from coal-fired steam to diesel engines, while refined oil products and natural gas became the main fuels for homes and industries. The mines in the Coal Branch and around Hinton were all shut down soon after pulp production began in 1957. However, new demands for coal emerged in the late 1960s, along with new methods of coal mining. The coal and forestry industries had to find new ways to coexist. The compelling need for coexistence and collaboration is evident in the extent to which the FMA is underlain with coal leases. (Map 6-1)

In 1969, Cardinal River Coals Ltd. (CRC) opened a large open-pit mine in the Luscar area, mainly to supply Japan with bituminous coal suitable for steel-making. Because the government would not support development of a new one-industry “company town” in the Coal Branch, the operation was set up on a commuter basis. A new highway was built between Hinton and the mine to support buses and commuter traffic. Mining began in the summer of 1969 and the first coal train left Luscar for Vancouver in March 1970. Production increased to 1.4 million tonnes by 1973.²⁸⁷

The Gregg River mine, adjacent to the CRC mine and also producing bituminous coal for steel-making, opened in 1983. These mines were hard hit by poor markets and low prices in the late 1990s. After unexpected reduction in estimated coal reserves at Gregg River, that mine closed on August 31, 2000 with the loss of around 300 jobs.

In the 1990s, with only a few years of mineable reserves remaining at Luscar, CRC proposed the new \$250-million Cheviot mine to continue supplying coal for steel-making markets. The new mine would be located 20 kilometres south of the Luscar mine, at the old Mountain Park townsite and mine that operated from 1911 to 1950. After prolonged hearings and a court battle, the mine received approval to proceed in 2000, but in the meantime contracts with purchasers of the coal had lapsed and prices had weakened. Without assured markets to justify the development, CRC decided in October 2000 to defer the plan indefinitely and to close the Cardinal River coal mine at Luscar by mid-2002.

In 1981 Union Oil Company of Canada and Rescon Coal Holdings announced construction of a mine in the Obed Mountain field.²⁸⁸ The Obed Mountain mine, located 30 kilometres northeast of Hinton, began production in 1984. This coal was intended for domestic use as steam coal for use in thermal power plants. A unique feature of Obed Mountain was an 11-kilometre overland conveyer system carrying coal from the mine to the Canadian National Railway main line. The Obed mine was approved over the objections of the Company, which lost 3,200 hectares of productive forest land, much of it newly reforested. A similar area nearby has been identified as a reserve for future coal development.

The Coal Valley mine, located about 100 kilometres south of Edson, opened in 1978. Workers commuted largely from Edson and Robb. Its thermal coal markets were largely in Ontario. Although it

was originally located within the forest management area borders on non-Forest Management Agreement lands, subsequent expansions have affected the forest management area.

Wherever possible, the usable timber is harvested before mining begins. Engineers now use elaborate water diversion and treatment systems to reduce the impacts of open-pit mining on surface and ground water. The big issue has been—and continues to be—whether healthy forests can be re-established after the mine pits are reclaimed.

As chief forester until 1975 and thereafter as an active contributor to forestry and conservation debates, Des Crossley was very critical of the government’s “almost incomprehensible” decision to allow open-pit mining in the forest management area. He asserted that successful reclamation, including re-establishment of forests, “has never been accomplished under Alberta conditions at these altitudes.”

In 1970, the Company established a land use section under forester Ray Ranger to deal with the increasing loss of timberland, mainly to crude oil and natural gas activities and coal mining. In addition to reforestation issues, Ranger was concerned by the impact that coal mining pits up to 90 metres deep might have on ground water flows and the water table. However, he and other Company officials were unable to change the government’s policy during hearings on mine proposals in the 1970s and early 1980s. “We weren’t adverse to taking those lands back but we wanted to make sure that they were in reasonable shape for the growing of trees,” Ranger recalled.



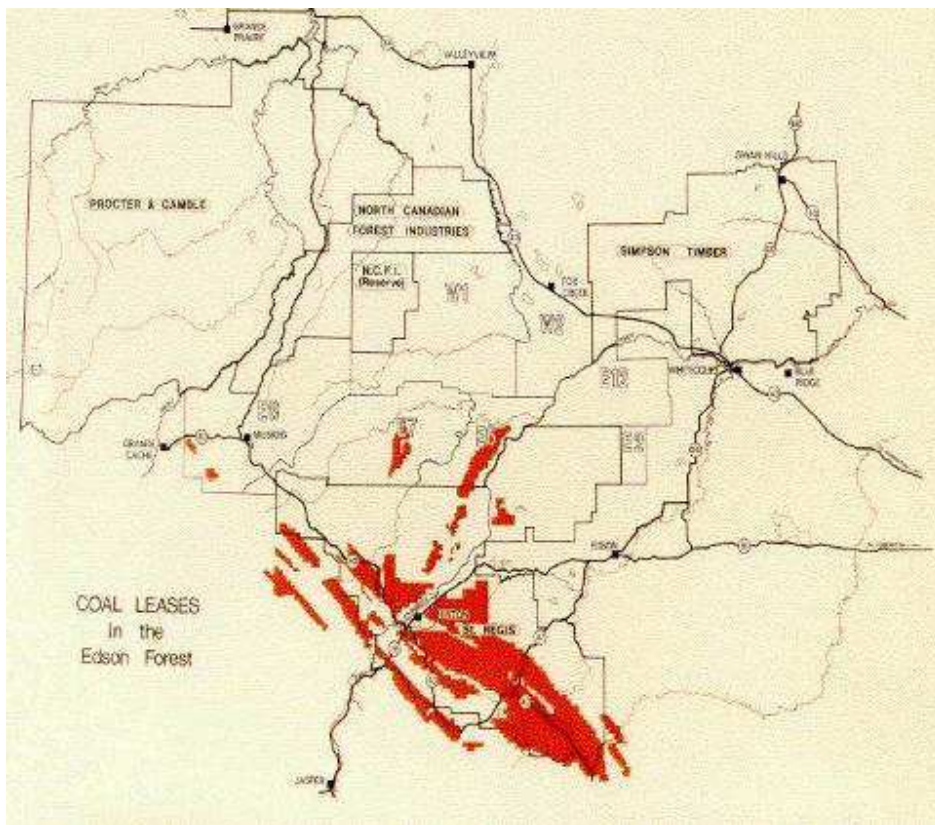
COAL MINING AND RECLAMATION SOUTH OF HINTON

WELDWOOD PHOTO COLLECTION

The issue became more crucial following the 1988 revision of the Forest Management Agreement that enabled expansion of the pulp mill and construction of the HI-ATHA sawmill. Under this agreement, the forest management area supplies only about 70 per cent of mills' wood needs, and the additional logs and chips must be purchased. For the first time, the Company needed every cubic metre of wood from its annual allowable cut, and any loss of land base added directly to costs. As a result, the government agreed that when lands had been excepted from or withdrawn from the Forest Management Agreement and again became available for disposition, such as at the end of a mining operation, they should be returned to the lease area in a "potentially productive state."

The coal industry invested substantially in research to reduce the impacts of mining and improve the success of reclamation. However, the long-term effects on land productivity are still being determined. The Coal Branch mine sites are in or near the subalpine natural region, where forests are sparse and slow-growing in any case. The Cardinal River and Gregg River mines have created some recreational lakes and have had good success in establishing grasses and shrubs on reclaimed sites. Reclamation has thus provided some excellent habitat for species such as sheep and elk, which the government has agreed should be the primary management goal in the alpine and subalpine natural subregions.

The real test of reclamation will come as more mined-over lands from the upper and lower foothills natural subregions are returned to the forest management area. In 1998, a memorandum of agreement between the Company and the Minister of Environment reaffirmed the government's intention to return reclaimed coal mining lands to the management area in a productive state when they became available for disposition. This included all coal mines, both within and outside the boundaries established by the current Forest Management Agreement.



Map 6-1 Coal Leases in the Edson Forest, 1980

THE GRAND CACHE COAL MINE AND ALBERTA RESOURCES RAILWAY

The existence of large coal resources around Grande Cache, 125 kilometres northwest of Hinton, led to another unexpected loss of productive forest in the 1960s. The provincial government was eager to see this resource developed, but at the time there was no way to get the coal to export markets. Then, in 1965 the government authorized a new coal mine at Grande cache. The government also established the Alberta Resources Railway (ARR) as a Crown corporation to build a rail line to Grande Cache from Swan Landing on the Canadian National Railway (CNR) main line near Brule, west of Hinton.

Much to the dismay of Des Crossley and his forestry staff, the ARR right-of-way cut a swath through the northwestern part of the Hinton forest management area. Very little timber was salvaged during construction because the government wanted the project completed quickly, and the land was summarily withdrawn from the Company's forest lands. Interestingly, although the provincial government removed the actual right-of-way from the forest management area, the government did not withdraw the extensive gravel pits and sidehill cuts excavated by the railway outside the official right-of-way boundaries.



ALBERTA RESOURCES RAILWAY "BORROW" PIT IN ATH 1, 1967.

ALL LAND EXCEPT THE ACTUAL RIGHT OF WAY WAS LEFT IN THE FMA, EVEN THOUGH ITS PRODUCTIVITY WAS MOSTLY DESTROYED

WELWOOD PHOTO COLLECTION

In 1969, the ARR was extended from Grande Cache to Grande Prairie. In that same year, heavy rains and flooding caused serious erosion problems along the entire grade of the rail line, including serious damage within the FMA. This became a continuing concern for Hinton foresters until the railway found better ways to stabilize slopes along the line.

By 1973 the New Town of Grande Cache was in financial difficulty for two major reasons. First, the town was planned for a larger population than materialized, and second the economic viability of the mine itself became uncertain through difficulties in mining and great fluctuations in price and demand for that grade of coal. The government appointed a Grande Cache Commission chaired by former CNR head N.R. Crump. Among other actions listed in their 30 November 1973 report²⁸⁹, they recommended to try to sustain and enhance the local economy by taking immediate steps to ensure the exploitation of the surrounding forests, with manufacturing centred at or near Grande Cache.

In a follow-up summary on 21 March 1974 of activities proposed with respect to the recommendations, H.W. Thiessen, Assistant Deputy Minister of Alberta Environment advised Dr. A.E. Hohol, Minister of Manpower and Labour of their Conservation and Utilization Committee^{lii} review. It identified the forest resource recommendation to be of “major” impact, “immediate” timing and with “major” budget implications. It was stated that there would be no decision before September 1974 because the AFS was reviewing development of timber resources in a large area extending from Grande Cache to north of Edson, of which Grande Cache was one alternative.²⁹⁰

These reports, in part, contributed to the government decision in 1978 to call for proposals to invest in the Berland-Fox Creek Timber Development Area. NWPP was among those submitting proposals, the major component of which was to be a Light-Weight Coated paper mill at Hinton, as well as a sawmill and log-home building facility at Grande Cache. However, NWPP was not successful, BC Forest Products built a sawmill as part of its successful bid before abandoning the full project. By 2000, Weyerhaeuser Alberta Operations owned the sawmill.

CRUDE OIL AND NATURAL GAS

Crude oil and natural gas exploration began in the Hinton area in 1944, and Imperial Oil Co. Ltd. drilled the first well in 1949²⁹¹. The well did not strike commercial amounts of crude oil or natural gas, but Imperial and other companies continued to explore the area and eventually found significant quantities of natural gas. The road to the first well at Muskeg became part of the Forestry Trunk Road, now Highway #40, from Hinton to Grande Cache.

Ray Ranger, who joined the North Western Pulp & Power staff in 1956, recalled that Company foresters initially welcomed the oil and gas industry presence. The roads, and especially the hundreds of kilometres of cutlines for seismic surveys, made it a lot easier to conduct the first forest surveys and inventories. However, it was also in 1956 that Imperial Oil struck natural gas at a well in the northwest portion of the forest management area. That well began a stepped-up pace of exploration and development that continues today.

^{lii} The Conservation and Utilization Committee was a government committee comprising Deputy Ministers of departments influencing and affected by resource development proposals.

In 2001 alone, Weldwood received about 675 applications from companies planning oil and natural gas developments—such as well sites, power lines, pipelines and processing plants—and about 50 applications for seismic programs. Seismic exploration during the 1990s averaged about 1000 kilometres per year, impacting an average of 500 hectares. From 1988 to 1998, an average of 80 kilometres per year of pipeline was laid in the forest management area, and twice that much in 1999. Seismic programs during the decade averaged about 1,000 kilometres per year, disturbing an average of 485 hectares of land per year.

TIMBER DAMAGE ASSESSMENT

By the late 1960s forestry staff were alarmed about the losses of both mature timber and young growth that were increasing every year. Yet the oil and gas industry was certainly a pre-existing user of the land, specifically exempted by terms of the Forest Management Agreement, and it was politically influential as the largest single “engine of growth” in the provincial economy. Change came slowly, and initially there were few controls on activity. From 1956 to 1970, there was not even any compensation paid for timber loss, nor was any timber salvaged.

Ranger said the initial contacts with the petroleum industry in the 1960s came as a rude shock to Des Crossley, who thought of himself as “master of the forest” at Hinton. He met his match in the oil patch. The oil and gas executives in Calgary were accustomed to getting their way with government. “All of sudden,” Ranger recalled, “here was this upstart from out of the north country telling them they couldn’t go cut these trees.”

The catalyst for change was a new set of aerial photographs in 1969 showing the full extent of disturbance. The five major oil companies with interests in the Hinton area argued their only obligation was to pay the government a stumpage fee for loss of timber. Moreover, the pace of development was so rapid that the companies did not even have complete documentation on how much forest they disturbed. In June 1970, after unsuccessful attempts to negotiate a settlement, NWPP asked the Edmonton law firm of Shtabsky & Tussman to begin legal action for compensation.

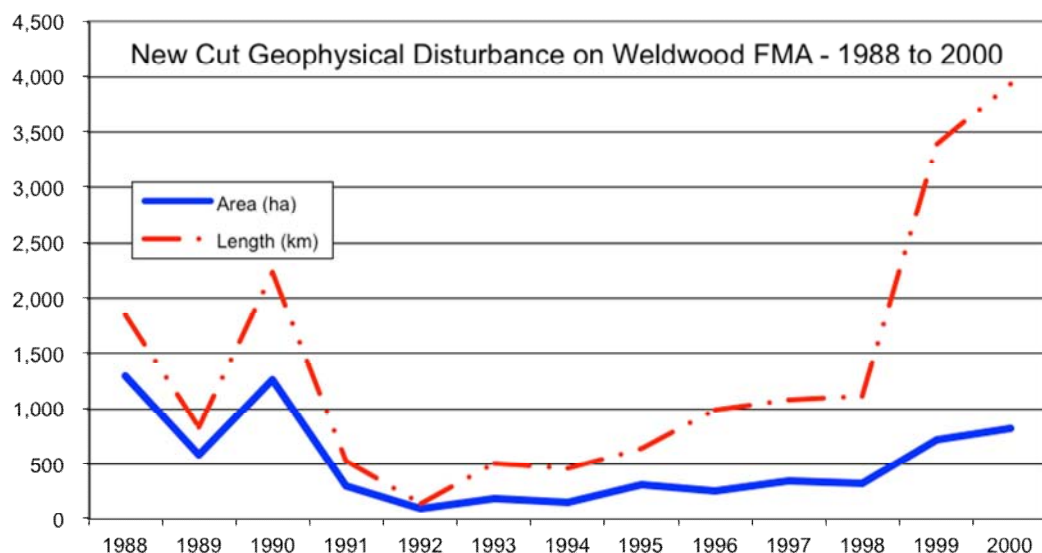


FIGURE 6-2 GEOPHYSICAL DISTURBANCE ON WELDWOOD FMA – 1988 TO 2000

During the discovery process (when witnesses are questioned by lawyers prior to trial) NWPP presented evidence from forest economist David Haley of the University of British Columbia, who used documented values for actual costs such as wood loss and reforestation. These data indicated timber values were far higher than the estimates presented by the oil and gas companies. Haley's work eventually became the basis for the government timber value tables that were accepted by both NWPP and the Canadian Petroleum Association, and he continued to review timber damage assessment methodologies into the 1990s. However, another development in 1970 signalled a change in government attitudes and also helped to settle the legal action before it ever went to trial.

At a meeting with the petroleum association, Robert Steele, the deputy minister of Lands and Forests, confirmed that the Forest Management Agreement definitely gave NWPP rights to timber and therefore to compensation. This was precisely what the oil companies had been disputing in their legal arguments, so Steele's assertion took the wind out of their sails. The legal action was dropped, although there continued to be problems about record-keeping. The actual areas disturbed by oil and gas activities often were not the same as the ones for which they had obtained permits. There were fewer disputes when NWPP, which had the most accurate maps, became responsible for collecting the government's stumpage fees as well as the Company's timber compensation.

As a result, the government revised the Forests Act in 1971 to recognize forest management agreement holders as owners of the timber, subject only to rights of the Crown. The Surface Rights Act also was amended to include forest management agreement holders as "occupants" entitled to compensation. These rights put Alberta forestry companies in a stronger legal position than they were in other jurisdictions such as British Columbia. In the meantime, the government's adoption of the timber damage assessment table created a basis for determining damages.

CONSULTATION, CO-OPERATION AND SALVAGE

The fact of compensation and consulting on records led to opportunities for further negotiations, such as on the construction and use of roads in the forest management area. Ray Ranger recalled that the oil companies "saw very readily why it didn't make sense to build 20 miles of road if there were 20 miles of road already here." By this time, in the 1970s, North Western Pulp & Power was building all-weather roads able to carry loads up to 100 tonnes—a much higher standard than the typical oilfield road. Co-ordinating schedules and planning, and sharing costs, led to savings for both the forestry and energy sectors.

Ranger said the issue of salvaging timber was another bone of contention in the 1970s. "The oil companies simply paid the timber dues [stumpage] and the timber was cut and left to one side and bucked up so it wouldn't be an undue fire hazard and away they went," he recalled. This was replaced by an agreement to recover felled timber within a "reasonable distance of a road" and eventually anything in an area where there were active logging operations. Ranger said the latter "was quite a major undertaking because you didn't always have a road." Sometimes the timber had to be skidded around swamps and ravines.

Woodlands manager James Clark finally made a flat declaration about pipeline right-of-ways: "From now on if there is any cutting [for pipelines] on our forest management area it will be utilized." Ranger said this led to a new level of co-operation with the oil and gas industry because the salvage had to be co-

ordinated with the tight construction timetables for the pipelines. As an incentive, the forest company agreed to forgo timber damage payments, other than the government stumpage.

Another form of co-operation was mandated in the 1970s and 1980s as the province introduced formal processes for integrated resource planning. One of the results was the revision of the government's East Slopes policy in 1984 to establish a forest land use zoning policy. This was intended to further reduce conflicts.

As with coal mining, the loss of forest land to oil and gas industry activity became a much more crucial issue after expansion of the Forest Management Agreement in 1988. Any reduction in land base also reduced the annual allowable cut and therefore increased the need to purchase timber from outside the forest management area, or to find ways of increasing the annual allowable cut from the remaining lands. Weldwood participated in negotiations with government and other stakeholders, including the oil and gas industry, to develop a new timber damage assessment methodology and stand damage appraisal table. The valuation system, adopted in 1995 and still in use in 2000, is based on three components:

- standing timber value;
- future reforestation costs, and
- long-term effects on annual allowable cut.

Funds collected for timber damage helped Weldwood to pursue more intensive reforestation methods on reclaimed oil and gas sites and throughout the forest management area. For example, the Company previously had not reforested seismic cutlines—because young trees would be destroyed if the cutlines were reused—but in the 1990s Weldwood decided to replant cutlines anyway if there were silvicultural operations in the area. Hog fuel (a mill by-product comprised of bark, shavings and sawdust) was used to restore the soil at hard-to-reclaim sites such as former gravel pits.

REDUCING IMPACTS

Weldwood also encouraged exploration companies to use new technologies, such as helicopter-portable seismic equipment, to reduce the impact of cutlines. By the late 1990s, this was starting to have a significant benefit. Although the number of kilometres “shot” increased dramatically, the area affected grew much more slowly. This was due to a sharp reduction in the average width of cutlines, from 6.98 metres in 1988 to 3.04 metres in 1998.

This reduction in average width of cutlines was offset by an alarming increase in “three-dimensional” seismic programs, which involve multiple parallel cutlines, and a steady increase in overall exploration activity. Activity levels for exploration and production of crude oil and natural gas on the forest management area more than doubled since 1993 and reached a historic high in 2001.

6.11 BEYOND MULTIPLE USE

SUSTAINABLE FOREST MANAGEMENT

The 1987 Brundtland Report *Our Common Future*²⁹² brought the term ‘sustainable development’ into popular use. The Canadian Council of Forest Ministers (CCFM) picked up on the concept in 1990 when it launched its Canada-wide consultations for the national Forest Strategy. This and its companion document, the *Canada Forest Accord*, endorsed at the National Forest Congress in 1992, essentially described a national consensus on how to achieve Sustainable Forest Management (SFM). The 97

commitments directed actions among the multi-stakeholder signatories to refine or develop practices to try to ensure that SFM could be achieved. The Company participated in the process and endorsed the Accord through its memberships in the Canadian Pulp and Paper Association^{liii} and Alberta Forest Products Association.

Following the 1992 United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, the CCFM initiated another national committee to develop criteria and indicators for SFM, resulting in their landmark document *Criteria and Indicators for Sustainable Forest Management* published in 1996. The Criteria defined the elements to address in developing SFM in a national Canadian context (Figure 6-3). These incorporated the components of multiple use and integrated resource management into a broader framework that included a number of values as well as national and global concerns. The Company not only endorsed these but used them as a new framework for developing its 1999 Forest Management Plan.

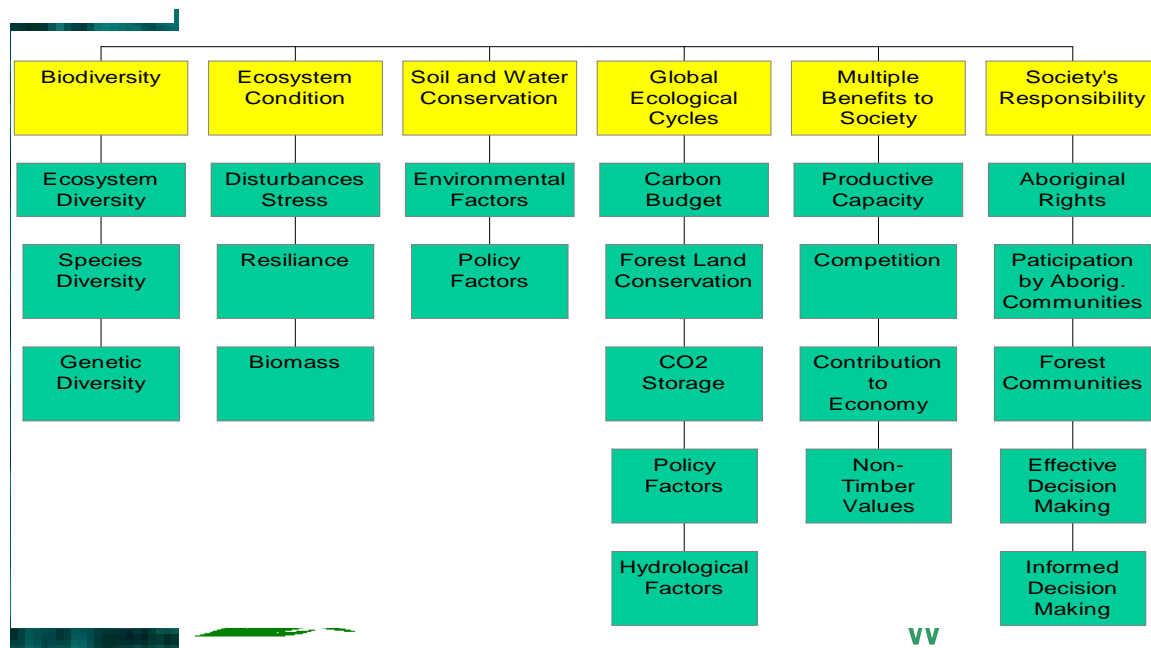


FIGURE 6-3 CANADIAN COUNCIL OF FOREST MINISTERS CRITERIA AND INDICATORS OF SUSTAINABLE FOREST MANAGEMENT

^{liii} Now Forest Products Association of Canada (FPAC).

In developing strategies to achieve SFM, it became apparent that some sites or areas of particular sensitivity or interest would have to be designated or 'zoned' for special treatment in forest harvesting or removed from the landbase altogether. One such approach was through the Special Places programs.

SPECIAL PLACES 2000 AND SPECIAL PLACES IN THE FOREST

Although Alberta already contains substantial national and provincial parks and wilderness areas, there were growing pressures in the 1990s to protect more areas for various reasons—recreation, aesthetics, cultural and historical resources, wildlife and biological diversity. This led to a provincial program, Special Places 2000, and an innovative Weldwood program to manage certain areas primarily for non-timber values, known as Special Places in the Forest.

In 1996, the government advised Weldwood that it was contemplating the removal of 60,000 hectares from the forest management area for protection under the Special Places 2000 program. The potential loss of six per cent of the Forest Management Agreement landbase was alarming to the Company.

The Company faced serious problems from the loss of both allowable cut and of areas already approved and developed for harvest. In addition, the provincial government was in difficulty because the proposal directly contradicted the minister's direction to the Provincial Co-ordinating Committee for Special Places 2000 that it was to "honour existing commitments" and "not pay compensation." However, the nominated area included sites already approved for harvest, as well as an active natural gas field development. Moreover, the Forest Management Agreement requires the province to compensate the Company for land withdrawals in excess of two per cent of the agreement area (0.5 per cent had already been withdrawn for various reasons).

The Company proposed an alternative solution—allow Weldwood to inventory its forest management area and identify sites that would meet the needs of the Special Places 2000 program while allowing the Company to continue operations with a minimum of disruption. This was accepted, and Weldwood embarked on a quest for areas.

In 1998, the Company returned to the Special Places co-ordinating committee with a proposal for the removal of approximately 12,500 hectares from the forest management area for full protection under the program. Combined with areas already nominated or removed for other purposes, the total nomination was more than 14,000 hectares. One such site, Sundance Lakes, was already being reviewed and was subsequently declared a provincial park. The proposed list of sites was accepted by the co-ordinating committee and the minister, and was then sent to a local committee of Yellowhead County representatives for consideration. The committee held open houses to gather input to its recommendations, before sending them to the minister in July 2000. Following further discussions with the Company on the impact of the proposals on its operations, the government enacted the new sites on December 20, 2000.

Weldwood meanwhile had announced its Special Places in the Forest program in 1998. This program proposed that areas with unique and special value be given unique and special management consideration ranging from official protection to intensive treatment for priority values. Special Places in the Forest was an important part of the Company's biodiversity and landscape management program and included: protected areas connected by special management zones; unique areas of historical significance; recreational trails; provincial recreation areas, and Company-developed campsites.

Among the unique features protected by Special Places 2000 and Special Places in the Forest:

Rivers and canyons—fast mountain streams, steep-banked canyons with craggy outcrops and unique collections of plants and wildlife including, on one site, the only known forest-dwelling herd of mountain goats in Alberta. (Thunder Creek/Brazeau; Pinto Creek Canyons; Canyon Creek; Solomon Creek)

Landscapes sculpted by glaciers—unique landscapes with broken, convoluted terrain, kettle and esker formations, small lakes nestled in pockets created when embedded blocks of ice melted and the land collapsed into the resulting holes. (Glacial Cascades of the Wildhay River; Emerson Lakes)

Landscapes sculpted by wind—narrow valleys with open west-facing slopes featuring an imposing array of “hoodoos,” unique outcrops, columns and caps. (Sundance Valley)

Meadows, bogs, patterned fens and ponds—a crucial part of the forest ecology and landscape, often used as gathering and resting places for travellers and for Aboriginal cultural ceremonies. (Switzer Provincial Park extensions)

Sites of historic and cultural value—small in area, but large in social value, including historic cabins, travel routes and Aboriginal cultural sites. (Switzer Provincial Park extensions; Gregg Cabin)

Weldwood inventoried the forest management area to identify and protect known assets, but some features of historic, cultural, geological or ecological importance may have been overlooked because they are small or previously unknown. Company planners and workers watch for these, and once discovered they are assessed and, if deemed important, protected and managed accordingly. One example of such discoveries is a tufa spring – a hot spring surrounded by travertine rock, formed from minerals in the water.

MEETING GOALS AND OBJECTIVES

During the first 45 years of operations, the goals and objectives of the Forest Management Agreement multiplied, as did the number of stakeholders. Fortunately, knowledge about the Hinton forest lands also increased at a phenomenal rate. This growing knowledge about both the timber resource and the environment made it possible to develop plans for achieving the goals.

NOT QUITE A MILLION HECTARES

Integrating multiple uses and values has had a major impact on forest management. Out of the 1,038,564 hectares within the perimeters of the agreement area in 2000, only about 715,000 hectares were considered “contributing landbase”—the economically useful and available forest area contributing to the annual allowable cut (Figure 6-4).

About 33,000 hectares had been withdrawn for purposes such as townsites, parks and protected areas, coal mines and other leased or freehold lands, and another 6,000 hectares were covered by water. This leaves about one million hectares in the Company-managed area. About 940,000 hectares of this area are forested, although about 130,000 hectares are not considered merchantable or “contributing” due to factors such as unsatisfactory site productivity, lowland black spruce stands and steep slopes.

Environmental, industrial and social considerations removed another 95,000 hectares. Buffer zones to protect watersheds, totalling about 53,000 hectares, account for the largest single reduction in the merchantable landbase. Oil and gas industry activity ranks second, with 6,000 hectares for facilities and pipelines, and 16,000 hectares for seismic lines. Roads—including those built for the oil and gas industry as well as forestry—were the third biggest factor, totalling more than 15,000 hectares. The other 28,000

hectares of withdrawals were due to a wide variety of environmental and social factors, from recreation to wildlife habitat to aesthetics.

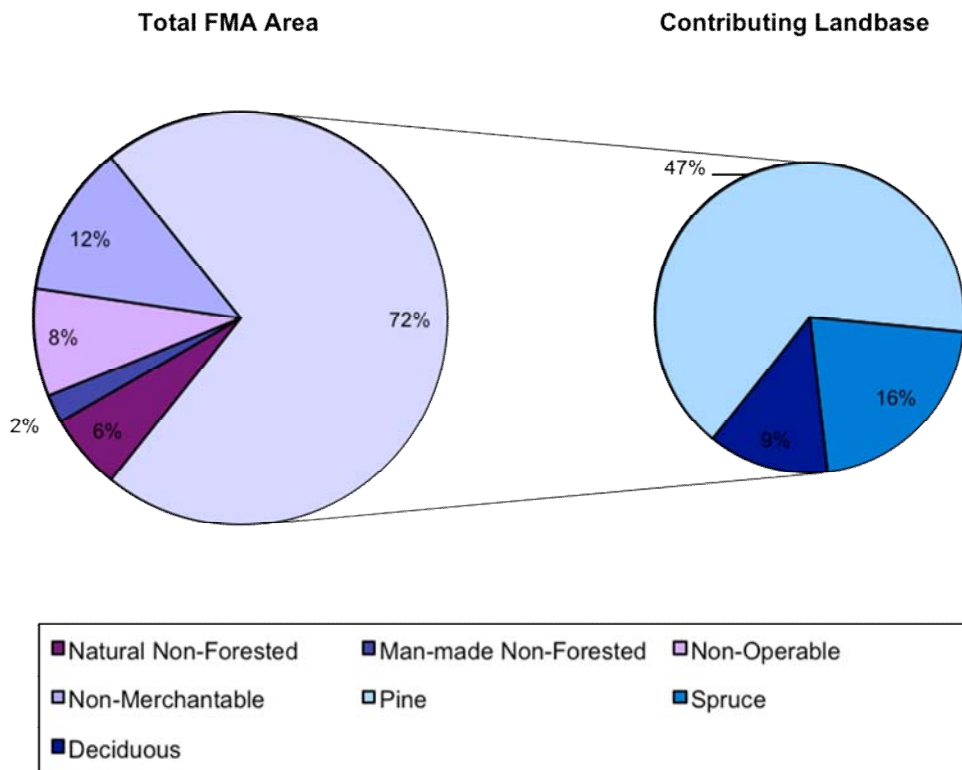


FIGURE 6-4 NET-DOWN OF TOTAL AREA TO THE CONTRIBUTING LANDBASE ON THE WELDWOOD FMA – 1999 FOREST MANAGEMENT PLAN. SMALLER CIRCLE REPRESENTS SPECIES GROUPS ON THE 72% “CONTRIBUTING” LANDBASE.

CHAPTER 7 FOREST SCIENCE & RESEARCH

It was obvious of course when we came here and started a new management program that had never been really successfully accomplished anywhere across the whole nation, that we would have to resolve many problems that would crop up as we progressed. We should be able to think ahead and decide what some of them might be. Research would of course become necessary

Des Crossley, Chief Forester 1984

PREFACE AND ACKNOWLEDGEMENTS

The positive influence of Des Crossley, first Chief Forester, pervaded most aspects of forestry practice. He let it be known from the outset that research would both be necessary and would be applied with vigour wherever needed. His initial plan was to invite the established research agencies to address the immediate problems while the Company would provide in-kind support and encouragement. This arrangement worked well, and the assistance of these collaborating agencies, identified in the text, is much appreciated.

Individual staff members were encouraged to develop “sore-thumb” projects – informal studies to investigate situations, and that might lead to more formal studies. Staff members themselves thus became participating researchers. Significant studies later evolved with Company support in such fields as silviculture, growth and yield, nursery practices, forest tree improvement and wildlife.

The advent of the Forest Resource Improvement Program (FRIP) and the Foothills Model Forest provided additional opportunities to build expanded programs of research, building on established studies and a research-receptivity among staff.

This summary was prepared by the authors with particular assistance from Rick Bonar, head of the biodiversity-wildlife program and a major researcher himself, who compiled the major projects of the Foothills Model Forest and provided data for the wildlife-related studies.

7.1 INTRODUCTION

The science of forestry had already been well established by 1955. Skills in how to plant and tend trees had been developed in ancient times in the Middle East and Asia. The science of forest management developed in Europe, especially from 1750 in Germany under Frederick the Great. Their forests had been devastated by successive wars, so during the peace that followed, major efforts were made to renew and manage their forests. Canadian foresters were influenced by European practices, for example, as passed on by Bernhard Fernow who became dean of the first Canadian faculty of forestry at the University of Toronto when it was inaugurated in 1907. A national program of forestry research on Canadian conditions began with the Canadian Forest Service (CFS) in 1914 in forest products and 1917 when growth studies were begun at Petawawa.

Although ‘Forest Science’ had been well established as a discipline, there remained important gaps in knowledge about such fundamental aspects as forest ecosystems, and how the science from other disciplines could be applied to forestry problems. The story about forest science and research at Hinton

is an interesting one that shows how both applied and basic research were incorporated as a matter of practice from the start, and how it has yielded a wealth of important understandings and applications. But first, a historical perspective.

7.2 HISTORICAL^{liv}

No knowledge beyond that of the law was required of [French foresters], hence no development of silvicultural methods resulted during the 17th and 18th centuries.

-- Bernhard Eduard Fernow (1851-1923)

In the quotation above, Bernhard Fernow was commenting on the Colbert Ordinance enacted by France in 1669 -- some 500 detailed regulations in the grand spirit of Cartesian rationality -- which remained in effect until a new law was passed in 1827. Fernow said the ordinance brought near-paralysis to French forestry, formerly the most advanced in Europe, because it “removed from the officials all spirit of initiative and desire or requirement of improving.” Only when the unfortunate results of rigid, rule-based forest management became evident early in the 19th century could a more science-based, adaptive approach begin to develop.

The establishment of the School of Forestry at Nancy, France, in 1825 is often cited as the beginning of modern forest science and education, but two forestry schools were actually established earlier in Germany -- at Ilseberg in 1768 and at Bresgau in 1795, the latter as a branch of the University of Freiburg. Throughout the 19th century, schools in France and Germany were certainly the world centres of forestry education and research. These schools and their students played a major role in the subsequent development of forestry in North America.

Fernow, born and educated in Germany, became the first professionally trained forester in North America when he immigrated to the United States in 1876. As a growing population spread across the continent -- the era known as “the closing of the frontier” -- Fernow ardently promoted fire prevention, watershed protection, reforestation and multiple use of forest lands.

His views found an eager audience among the concerned scientists and public-spirited citizens who founded the American Forestry Association in 1875 and held the first American Forestry Congress in 1882. The first Canadian Forestry Congress was also held in 1882, in Montreal. Fernow went on to become the first director of the Division of Forestry in the U.S. Department of Agriculture in 1886 and to found several university forestry faculties, including those at Cornell University in 1898 and the University of Toronto in 1907.

Along with Fernow, the other “founding father” of North American forest science was Gifford Pinchot (1865-1946), an American who studied in France, Switzerland, Germany and Austria, and then in 1892 began systematic forestry research on the estate of George W. Vanderbilt in North Carolina. He replaced Fernow as head of the U.S. Division of Forestry in 1898, founded the Yale School of Forestry in 1903, and became first chief forester of the U.S. Forest Service in 1905. He later was chief forester of Pennsylvania and served two terms as governor of that state.

Disciples of Fernow and Pinchot such as Aldo Leopold, abetted by a growing influx of European-trained

^{liv} Extracted from Bott et al: Learning 2000

foresters such as Abraham Knechtel, rapidly advanced the status of forest science in U.S. and Canadian government and academic circles through the first half of the 20th century. The lumber and paper industries were mainly preoccupied with economics and engineering during this period, and were slower to become involved in forest science until demands for sustained-yield management emerged after the Second World War. It was not until the 1950s, for example, that an industrial forester was elected president of the Society of American Foresters.

By the 1950s, a great deal of basic forestry research had been performed in Canada by the Dominion Forestry Branch (now Canadian Forest Service), provincial forest services, and the universities of Toronto (1907) New Brunswick (1908), Laval (1912) and British Columbia (1921), as well as the provincial agricultural colleges. The universities were also producing a growing number of professional foresters. New university forestry programs were later introduced in Alberta (1970), Lakehead (1971), Moncton (1985) and Northern B.C. (1993) – all of which added strength in graduate studies and research.

A key advance in Alberta forestry occurred in 1949 when Eric Huestis recruited eight graduating foresters from the University of British Columbia to the Alberta Forest Service. The group included James D. Clark, who joined NWPP in 1955 and later became the company's woodlands manager; Owen Bradwell who became road engineer for Woodlands; Charles Jackson, who helped Reg Loomis work out details of the Hinton agreement; and Robert G. Steele, later director of forestry and deputy minister of Lands and Forests.

7.3 FOREST RESEARCH AT HINTON

Despite about 30 years of forest research in Alberta by the CFS there were still a lot of unknowns that had to be addressed, as well as many region-specific understandings that would have to be worked out in order to start this first new full-scale forest management program at Hinton on the basis of forest science. Des Crossley, with his research background, was alert to the needs of and opportunities for research right from the start. As he noted, in the spirit of adaptive management:

One of the apparent pluses from my particular background was my 10 years of research in forestry in Alberta with the Canadian Forestry Service. This enabled me to understand problems that we would be encountering in Alberta, and know intimately the people involved in forest research, not only with the Canadian Forestry Service but with the other research organizations such as the Department of Forest Science, University of Alberta, the Department of Botany at the University of Alberta, and the Alberta Research Council. This enabled us to draw on their past knowledge, and also to approach them for assistance in research projects.²⁹³

When operations began at Hinton, research into inventories and growth and yield was of course fundamental to the company's sustained-yield commitment, and got under way immediately. The next priority was to find the best ways to reforest harvest sites. Des Crossley's previous research established the basics of lodgepole pine regeneration, but there were continual refinements as his techniques were applied to a large and varied landscape. Spruce silviculture was more problematic, and this became a focus for years of research by company, government and academic scientists.^{iv}

^{iv} The evolution of and research in silviculture at Hinton is discussed further in Chapter 5, Silviculture.

Crossley brought not only his own scientific knowledge but also two decades of contacts with scientists throughout government, industry and academe across North America. He knew where to find talent and expertise as it was needed, and how to share knowledge as it was gained.

Crossley encouraged company foresters to engage in what he called “sore-thumb” research to address problems they ran into during their work. “This provided some immediate results that would identify the problem and indicate how it might best be resolved,” he said. “We could then turn it over to the appropriate agency to initiate it properly and take it through to conclusion.”²⁹⁴ Examples of this kind of research included reforestation methods, stand development, commercial thinning, spacing of young regenerated stands, and alternative harvest systems, among others.

Research conferences were not plentiful in early days, but the Canadian Institute of Forestry was very active, and Hinton forestry staff were active in the Rocky Mountain Section. Research findings and field trips were a big part of RMS activities. Both Des Crossley and Dexter Champion helped establish the section, and Crossley later went on to become national President (1966).



FORESTRY AND WOODLANDS STAFF AND WIVES AT THE JASPER TRAIN STATION, RETURNING FROM THE CANADIAN INSTITUTE OF FORESTRY ANNUAL GENERAL MEETING AT PRINCE GEORGE, 1959. L-R: DES CROSSLEY, JACKIE AND BILL HANINGTON, PHIL APPLEBY, JACK WRIGHT, MARGARET CLARK, HERMAN OOSTERHUIS, DEXTER CHAMPION, STAN HART, OWEN BRADWELL, PHILIP GIMBARZEVSKY, JIM CLARK, KEN WILLIAMS. P. GIMBARZEVSKY PHOTO COLLECTION.

OTHER RESEARCH AGENCIES

The Canadian Forest Service was Canada’s leading forest research agency, with a reduced regional office in Alberta in 1930. The CFS administrative and research office remained in Calgary until 1964. At that time a new Northern Forestry Research Centre was under development in Edmonton (opened in 1967) and the entire organization moved north. The CFS established its field research centre at Kananaskis in 1934, later returning the property to Alberta in 1975, in order to shift its focus more to northern Alberta

and the rest of its region in Saskatchewan, Manitoba and NWT. It was natural that Crossley would first choose to involve their scientists. As he explained²⁹⁵:

It was obvious of course when we came here [in 1955] and started a new management program that had never been really successfully accomplished anywhere across the whole nation, that we would have to resolve many problems that would crop up as we progressed. We should be able to think ahead and decide what some of them might be.

Research would of course become necessary, and having been previously employed by the Research Branch of the Canadian Forestry Service I knew that the main concerns in undertaking forest research were obtaining input from both government and industry on the local problems needing answers, the establishment of priorities, as well as the protection of selected studies after establishing them in the field. The research scientist has to have assurance that his programs will be properly protected from damage. Otherwise his time may be wasted. Nothing irritates these specialists more when working on long range research than to find --- suddenly find --- that his field plots have been destroyed.

With these things in mind the CFS was approached. As it turned out, our timing was fortunate because a staff cut was in the offing, due, in great part, to lack of interest in forest research in the province. Our immediate problems were discussed, and the field protection that we were prepared to provide. The response was not only favourable but enthusiastic, and immediate plans were laid for a semi-permanent field station on the St. Regis limits. The Alberta Forest Service provided the land for this facility and a research program was soon under way. In order to provide maximum protection for the field plots we requested that we be provided with exactly described field locations. These were always prominently posted in both Forestry and Operations field-staff offices.

As time went on, other sources of research assistance were tapped. These included the Alberta Research Council, the Universities of Alberta, Calgary and British Columbia, as well as research facilities later provided by the Alberta Forest Service [and Canadian Wildlife Service].

The semi-permanent field station to which Crossley referred was a dedicated serviced trailer park located about 1 km north of Highway 16 on the road to Entrance, land and services provided by the Alberta Forest Service. The CFS placed lab and service trailers there for research purposes. As well, the CFS forest insect and disease survey had a field laboratory located at the north end of the Athabasca River bridge at Entrance.

Research trial areas were carefully mapped, and scientists worked with company staff to make sure the sites were protected. The chance to conduct research in suitable facilities on a “working” forest, combined with the co-operative atmosphere and the opportunity often to see their findings applied directly in operations, attracted scores of scientists to Hinton over the years.

Among some of the scientists and studies:

- Bob Ackerman and Wayne Johnston of the CFS, on lodgepole pine growth and yield;

- Bob Swanson of the CFS, on the effects of forest harvesting on watersheds and hydrology;
- Andy Radvanyi of the Canadian Wildlife Service, on ways to reduce the impact of mice that were eating seed from aerial seeding projects;
- Dave Kiil of the CFS, on use of controlled burning to reduce deep duff that was insulating the soil after harvest and presenting difficulties in planting projects;
- Stan Navratil of the CFS, on mixedwood management and silviculture;
- Stewart Swan of the Pulp and Paper Research Institute of Canada, on commercial thinning and fertilization as ways to increase productivity in mid-rotation stands;
- Herb Cerezki of CFS, on effects of *Hylobium* root weevil on pine, and
- Peter Blenis of the University of Alberta, on the impact of pathogens on forest regeneration.

There were many trials involving the Company and scientific researchers. Some of the more interesting included the following.

Bob Swanson of the CFS established experiments to examine the impact of forest harvesting on watersheds. This research later inspired the imaginative Tri-Creeks Watershed study on the FMA in 1969. In this project three adjacent basins were ‘calibrated’ to determine their characteristic flow patterns after snowmelt and rain storms. The plan was to select one as an untreated control, to log one by the guidelines of the day, and the third more intensively. The results were intended to help to quantify the effects on water yield, timing of flow, water quality and sediment. Unfortunately, the variation in characteristics among the basins tended to mask treatment effects and the trial was not conducted as planned as a result of changes of staff and administrative policy which caused many problems involving continuity and occasional interruptions in remeasurement.

Dr. Andy Radvanyi of the Canadian Wildlife Service studied ways to reduce the impact of mice which were eating the seed from aerial seeding projects. Many rodents feed on the palatable, nutrient-rich spruce seeds. Among the most prominent of these is the native mouse *Peromyscus*. During the years between bountiful ‘seed years’ most of the seeds disseminated are eaten by mice and other small mammals, leaving insufficient seed to provide regeneration. Trials of broadcast seeding by hand or aerial seeding also failed, believed as a result of their predation of the seed. Dr. Radvanyi set up a long-term study, first to determine what was happening, and to try to develop counter measures. Using radio-active treated seeds that could be traced with a Geiger counter he was able to trace most of the predation to *Peromyscus*. Although he used an imaginative variety of treatments on the seed, including dyes and repellents, none worked. Except for wide-scale poisoning of the rodents, there seemed to be no alternative, and poisoning was not an option. Planting of spruce seedlings as soon after logging as possible was therefore prescribed in areas and at times when abundant seedfall was not available.



CANADIAN WILDLIFE SERVICE RESEARCHER DR. RADVANYI – SMALL MAMMAL RESEARCH PROJECT 1960S – CAMP 29 ATHABASCA 13

WELDWOOD PHOTO COLLECTION

Dave Kiil of the CFS studied the use of controlled burning to reduce deep duff which was insulating the soil after harvest and presenting difficulties to planting projects. The deep duff was most prevalent under the higher-elevation, cool moist spruce stands. Its presence tended to insulate the soil, reducing the effective length of the growing season, retained nutrients making them unavailable for tree growth, and made post-logging mechanical site preparation difficult. The advantage of burning, a typical natural process, would be to reduce the depth of that organic layer, release nutrients, enable warming of the site and enhance establishment of spruce regeneration. Although burning achieved these beneficial results, the trials showed that successful burns could only be conducted at times of extreme fire hazard, conditions that were both too risky and infrequent for a standard practice. Modified mechanical treatments are now successfully used.

Dr. Stewart Swan of the Pulp and Paper Research Institute of Canada was a noted forest soils scientist who had conducted extensive trials in eastern Canada. He studied commercial thinning and fertilization as ways to increase the productivity of mid-rotation stands. His results showed promise for increasing growth. At the time, the AAC was still greater than the rate of harvesting, so the work was discontinued. However, his results became valuable after 1988 when projected wood needs exceeded the AAC and enhanced forest management became a necessity. Unfortunately, it was impossible to resurrect his plots, because the twinning of Highway 16 in the mid 80s had, against the protests of the Company, destroyed parts of his plots.



FOREST TECHNICIAN HANK SOMERS EXAMINES PEDLEY THINNED AREA, 1964

WELDWOOD PHOTO COLLECTION

Dr. Herb Cerezki of the CFS studied effects of *Hylobium* root weevil on pine, and Dr. Peter Blenis (U of A) studied *Cronartium* gall rust on pine. These disease and insect problems were common and posed no immediate threat, but the background knowledge these researchers provided is a valuable asset. Ongoing studies of these and other pests are being conducted.

The propagation and out-planting of seedlings in containers was pioneered at the Company's Hinton greenhouse, and other winter testing was done at the Company's executive greenhouse on Hanington Road as space allowed.

The Gregg Burn, site of an 8,000-hectare forest fire in 1956, became a particular focus for research. Very dense stands of lodgepole pine, up to one million stems per hectare, sprang up on some burned-over sites. This over-achievement by nature posed a challenge because without treatment the trees would grow as stunted and useless as carrots in an overstocked patch. Company foresters, CFS and university scientists and others studied many different methods to reduce stocking levels and improve growth. The techniques included hand-pulling the trees, thinning with brush axes and clearing saws, light prescribed burning, selective herbicide application, and applying fertilizers to dominant trees. These studies began in 1962 and the CFS spacing trials continue to be maintained and measured today, a collaborative effort of the Foothills Growth and Yield Association, the Canadian Forest Service and the Alberta government.

The results showed that thinning was effective but expensive; fertilizing appears to be a more cost-effective way to accelerate development, and research on this option continues. The herbicide trials were conducted by Professor William (Bill) Corns, noted plant scientist at the University of Alberta. His son, Dr. Ian Corns, later made significant contributions to developing an ecosystem classification for the FMA. He was continuing his innovative research at Foothills Model forest at the time of his unfortunate death in 2001.

Adjacent regenerated sites from company harvests in the 1960s and the earlier McCardle Burn of 1938 provided useful comparisons for the Gregg Burn trials. Many of these sites can be observed from the Pine Management Interpretive Trail near the Gregg Cabin, about 20 kilometres south of Hinton.



CFS THINNING TRIAL, GREGG BURN LOW SITE. 800 TREES/ACRE IN 1965 (LEFT) AND 1999 (RIGHT)

COURTESY CANADIAN FOREST SERVICE

The fires of the late 1950s, and the presence of the new forest industry growing at Hinton, led to another key development. In 1960, the AFS decided to relocate its training centre from Kananaskis to Hinton. The Forest Technology School (now Hinton Training Centre) became a leading facility for training forest technologists and firefighters, and its staff joined company foresters and other scientists for many research projects.

AN IMAGINATIVE PROPOSAL FOR FIELD CHIPPING

Crossley's imagination extended beyond silviculture and forest management alone. One of his innovative ideas was to use pneumatic pipelines to move chips from the bush to truck depots for transport to the mill. It was a well-considered proposal for which he generated a lot of support, except where it counted. The concept, as he described it²⁹⁶, was based on:

-- felling and delimiting of the trees on each harvesting site, and then running the stems through field-powered chippers and moving them by pneumatic pipeline to waiting transportation trucks stationed on nearby all-weather haul roads. It appeared feasible to blow chips up to 1/2 mile and this would cut down the cost of road building tremendously.

Chip debarking might also be undertaken in the field. If this proved to be feasible it would result in greater wood loads arriving at the mill. We struggled with the idea of a method of debarking chips in the woods, and contacted a professor at the University:

of Washington who was interested and came up to see us. He had been debarking chips on an experimental basis in the lab for sometime, taking advantage of the line of weakness that must exist between the layer of bark and the cambium layer below. Flexing such chips up and down should fracture the bond at this line of weakness. He was putting his chips through banks of rollers much like those on old washing machine ringers. The separated bark could be removed with a blast of air.

This was worked out by our forestry staff as a new approach to the movement of wood. We were able to gain the ear of the Research Branch of the Canadian Pulp and Paper Association in Montreal under Dr. Lincoln Thiesmeyer, where this approach was presented. It was thoroughly discussed and questioned by his staff of experts whose enthusiastic reaction resulted in the decision to proceed further. Manufacturers of readily transportable power units, as well as specialists in the pneumatic movement of products were invited in for discussions. The initial outcome was a joint agreement to proceed with a research study.

The Research Branch of the CPPA would provide the staff to plan and conduct the study, a manufacturer of portable power units in Montreal would provide the chipper and portable power for the study, a Vancouver pneumatic products manufacturer would provide and supervise the locating of portable pipelines. North Western Pulp and Power would provide the field site and undertake the harvesting operation. The equipment people agreed to absorb all the costs involved in equipment adaptation and operation, with the promise that should the results prove to be operational, they would expect to hold exclusive rights to the manufacture and sale of equipment. The Research Branch involved did not consider this unreasonable, nor did I.

However, when I presented the proposed study program to our Resident Manager it was turned down, mainly on the basis that the Company didn't want to commit itself to procuring equipment from any particular sources. Consequently, the whole idea was forgotten. To us this was a big disappointment. Nobody seemed to be able to criticize it effectively. Everybody thought it had a great chance to be successful and we would have liked to have seen it.

THE STRANGEST EXPERIMENT^{lvi}

Perhaps the strangest research project at Hinton occurred in 1966 at the height of the Cold War. As part of the North American Treaty Alliance, Canada had troops stationed in Germany, and the Department of National Defence wanted to prepare them for field conditions in a "European-style managed forest" after a nuclear attack. The Army attempted to simulate these conditions by first thinning a block of trees and then exploding 50 tons of dynamite in a block within the lease area north of Hinton.

^{lvi} Extracted from Bott et al 2000: Learning



THE DND BLAST SITE BEFORE (LEFT) IN THE THINNED STAND WITH MARKED TREES, MONITORS, AND TNT STACKED ALL AROUND AND (BELOW) AFTER THE BLAST, 1967



OBSERVERS HAD TO REMAIN SEVERAL KILOMETRES AWAY FROM THE SITE



AFTERMATH OF THE EXPLOSION -- AND THE AREA IN 2005



The site chosen was an unlogged stand that stood between two blocks logged in 1963. This residual block (107a, Athabasca 13) would normally have been scheduled for harvest about 10 years later. Alastair Fraser of the British Forestry Commission had agreed to come to Hinton and mark the trees for thinning, but the Canadian Army decided not to wait and did its own thinning in the chosen block, a sort

of shelterwood cut. When Fraser arrived, he observed that the result bore little resemblance to a European forest but the explosives were already in place and the Army was determined to carry on with the test. Many Hinton residents turned out to witness the dramatic blast from a lookout site along Highway 16. The site was salvaged and scarified in 1967 and regenerated with no further treatment or planting.

FORESTRY-WILDLIFE STUDIES

Biologist Dr. John Stelfox, a research scientist with Alberta Fish and Wildlife (1955-1966) and the Canadian Wildlife Service (1966-1986) established a series of research plots on some of the first spruce and pine cutovers at Camps 1, 5 and 9 (operating compartments 1, 9 and 15, McLeod Working Circle) as operations commenced in 1956. His main purpose was to determine the effect of logging on ungulates such as elk, moose and deer, but his records also included careful documentation of the vegetation and non-ungulate wildlife on the sites. He returned to re-measure these plots every 10 years, even after his retirement, and the last remeasurement in the late 1990s was done with the assistance of his son Brad, also a biologist, who hopes to continue periodic measurement of the plots in the 21st century. The study has already provided fundamental insights into the long-term response of the forest ecosystem to management activities.



**GAME ENCLOSURE, MCLEOD 1,
1962. STELFOX STUDY**

Ongoing studies by various government agencies -- Alberta Fish and Wildlife, Canadian Wildlife Service, other branches of Alberta Forestry, Lands and Wildlife and its successors, Environment Canada and other departments, and university scientists -- provided additional information about fish and wildlife, their habitats, soils, erosion and water flows on the FMA area. During periodic reviews of operating ground rules, company and government officials incorporated some of this knowledge into operations.

COLLABORATIVE STUDIES

The University of Alberta established a Department of Forest Science (now part of Renewable Resources) in 1972, the first 'forestry' class having started in the fall of 1970. This department and the Faculty of Agriculture and Forestry became another source of research and collaboration. Crossley played a leading role in establishing the U of A forestry program and often lectured there. U of A foresters became frequent visitors to Hinton, and many of its graduates came to work for the company.

Co-operative research projects became a hallmark of forestry at Hinton. One such project in the 1980s involved the AFS, the CFS, the Forest Engineering Research Institute of Canada and a number of companies. In a mixed stand of mature aspen and spruce with an understory of young spruce, the project used modified harvest techniques to cut the older trees while preserving the young trees to form a new stand. This experiment won the CFS Forestry Innovation Award in 1989. A similar trial was established by the company and the Foothills Model Forest in 1994. All together, approximately 200 scientific studies have been conducted on the FMA area since 1956.

During the 1990s the CFS was affected by severe cut-backs in its budget, as well as a new emphasis on strategic, rather than operational, research. But the company continued to draw on their remaining resources as they could be obtained. As a part of its program review, the CFS decided it no longer maintain the level of forest growth and yield research that had been conducted since the 1950s by the Northern Forestry Centre in Edmonton. Weldwood foresters did not want to lose this valuable source of basic knowledge. The federal agency accepted a company proposal to co-operate in continuing selected portions of the program. Weldwood conducted an overall review of CFS projects then took over measurement and analysis of the usable research plots. This was done with the understanding that any notable results would be published jointly with the CFS. Later (2001) Weldwood agreed to transfer its interest in this plot maintenance to the new Foothills Growth and Yield Association which negotiated a new agreement with the CFS for this program.

The Alberta Forest Service established a short-lived Forest Research Branch that flourished from 1988 to 1994 when budget cuts and staff reductions led to its dissolution. However, the branch stimulated interest in research within the forest industry and helped to bring industry and researchers together through its role as secretariat to the Alberta Forest Research Development Trust Fund which had been set up in 1974. This latter fund was discontinued at the end of the 1996/97 funding year.

The Alberta Research Council (ARC) expanded its capabilities in the forestry sector, in wood products as well as forestry and wildlife. This was achieved with encouragement of the AFS and made possible, at least in part, with funding through a series of federal-provincial forest development agreements starting in 1984. The ARC has since become a major forestry research centre and an important partner in collaborative programs.

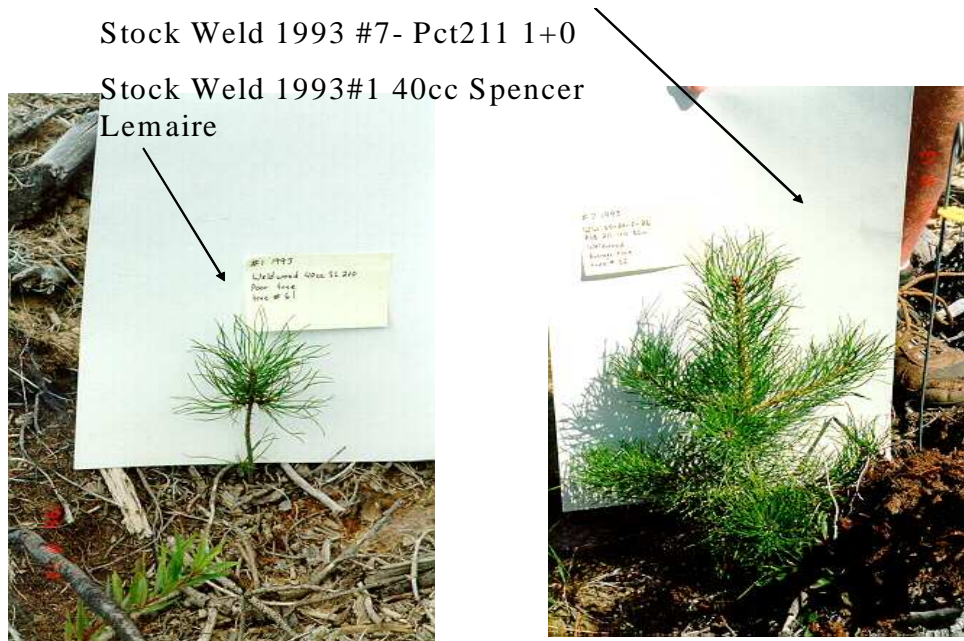
In 1994, the Alberta government and industry established a new sawlog stumpage system, linked to the selling price of lumber. As prices rise, industry pays an additional contribution to the Forest Resources Improvement Program (FRIP). FRIP supports forest improvement in areas not the responsibility of industry, for example recreation development, and is also used to fund research into forest management issues and challenges.

In 1996, The University of Alberta was awarded a major five-year grant from the National Sciences and Engineering Research Council (NSERC) to develop a National Centre of Excellence in Sustainable Forest Management, later extended for another five years. This network involved over 20 universities across Canada and was supported co-operatively by governments and industries. Research projects were being conducted throughout Canada, generating both new knowledge and graduate students who joined the ranks of forest scientists.

COMPANY RESEARCH CONTINUES

Seedling Performance

The Company also conducted a number of operational research trials on its own, with the assistance of external consultants as necessary for data collection and analysis. The most immediate concern in 1955 was how to ensure regeneration. Besides the early successful work on scarification was a series of trails and experiments with seedlings and planting techniques. Even after planting an impressive 100 million seedlings as of 1999, in-house research continued on seedling quality and site suitability.



WELDWOOD PLANTING STOCK PERFORMANCE TRIALS

WELDWOOD PHOTO COLLECTION

Fiber Quality

One of the major competitive advantages of the pulp mill at Hinton has been in the strength of its pulp. That, in turn, is dependent on basic fibre quality, particularly in the length and strength of the individual wood fibres. Fibre quality has been found to vary among various locations on the FMA. As Bryon Muhly noted in 2001²⁹⁷, Weldwood was conducting interesting research on fibre quality. He described two such studies underway at the time. The first was to add sampling of fibre quality to the plot-based inventories on the FMA. These plots, in turn, were categorized by ecosystem and ecosite as that survey progressed. The intent was to try to develop relationships between fibre quality, ecosite and possible other measurable factors. The second, in collaboration with Paprican, sampled DNA of individual trees at selected plots to ascertain possible correlations with fibre quality. The horseback cruiser of the 1920s would be amazed – as we, too, will be astonished at techniques that will be used 80 years hence.

Site Index

Another exemplary example which has been widely emulated in Alberta and British Columbia was a 1980s study, building on earlier red pine work in the lake states, examining the use of five-year or 10-year growth above “breast height” as a means of forecasting future growth and site index. Bob Udell and consultant Dick Dempster installed a series of paired-plot stem analyses, combined with permanent growth sample (PGS) plot analyses on lodgepole pine of fire origin and regenerated stands. (Figure 7-1) This work was subsequently widely adapted for site index work in western Canada. See Chapter Two: Inventory, Growth and Yield and Allowable Annual Cuts.

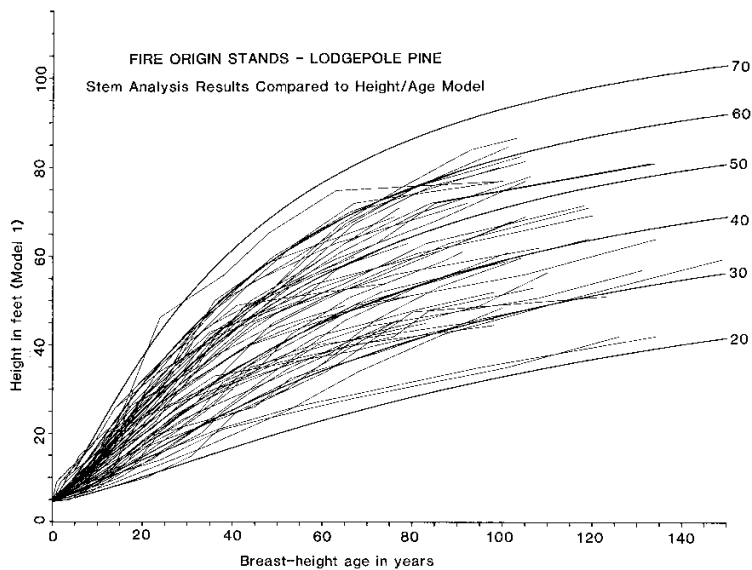


FIGURE 7-1 PAIRED PLOT STEM ANALYSIS PROJECT. FIRE ORIGIN PINE RESULTS

7.4 TOWARDS SUSTAINABLE FOREST MANAGEMENT

Although the mandate of an FMA holder is nominally timber-oriented, long term success and sustainable forest management makes the conservation of other forest values a necessity. This requires both research into these values and the development of quantitative analysis tools to forecast the future conditions of these values as forest management activities take place over time. Of particular note were the traditional multiple use values such as wildlife and fisheries, hydrology and watersheds, and recreation – but with the addition of a fundamental concern for biodiversity and the human-related needs for environmental, cultural, spiritual and economic values.

This realization was tangibly demonstrated as early as 1982. At that time the Company’s Woodlands Manager Jim Clark offered the FMA as a test site for the development of a new approach to the integration of wildlife and forestry on industrial forest lands. A resulting industry-government study report in 1987 showed that, with dedication and willingness to adapt practices, the Company should be able to sustain habitat for all wildlife species on the FMA. In 1988 Weldwood hired its first biologist, Rick Bonar, and a new chapter of forest management at Hinton began.

This led to a new emphasis on wildlife research, particularly the relationship between forest practices and wildlife habitat development and use following harvest. This research initially concentrated on the representative wildlife species among the more than 300 vertebrate species found on the Weldwood FMA area. Researchers studied wildlife habitat preferences and use. This approach, referred to by ecologists as the “fine filter” approach to wildlife management, was the basis for the initial Weldwood wildlife program. Drs. Barb and Jim Beck of the Department of Renewable Resources at the University of Alberta developed this insightful project within which they developed their CRITTER forecasting model.

In the meantime, this work, and the Company’s efforts to integrate the needs of wildlife in its harvest planning and operations, attracted the attention of others in industry and government. Eventually it became the foundation of the successful Foothills Model Forest proposal in 1992 for one of Canada’s 10 Model Forests.

The emerging needs of society for constraints, for example residual patches and deferred harvests, and withdrawals of land from the Weldwood FMA for other purposes such as coal mines and protected areas has reduced the amount of productive land which is dedicated to forest production. These reductions are being made to the FMA that was already at 70 per cent of wood needs.

Intensification of Management

In an effort to increase the productivity of the remaining land, the Company in 1996 commissioned a year long review of intensive forest management opportunities by Dr. Stan Navratil, a CFS researcher and former professor of forestry at Lakehead University who took a leave of absence for the purpose. On the basis of his findings, Weldwood decided to proceed with such a program and hired Navratil – by then retired from the CFS - to provide scientific guidance and design a suite of research trials to examine alternative treatments. Echoing the words of Des Crossley four decades earlier, Navratil said: “This is the high point of my career as a forester, to work with the Weldwood foresters and put all those years of forestry science and research into practice.”

He continued to provide scientific advice to the team developing Weldwood’s enhanced forest management program. Among the areas being pursued were: commercial thinning with and without fertilization; manual and herbicide release of young reforestation; use of fertilizers to accelerate early and late stand development; selection and propagation of genetically superior seed for plantation use, and alternative, non-traditional silvicultural methods. He spoke highly about the Weldwood support for his research and proposals:²⁹⁸

That was another feature of working with Weldwood. Once the target and final product -- yield increase -- was known and approaches approved there was the feeling of assurance and determination of doing it. True, we were pragmatic in designing trials and methodology as close as possible to operations; we never designed a scientific monster. The plans once approved were funded and brought to completion.

7.5 FOREST RESEARCH AT THE FOOTHILLS MODEL FOREST

The government of Canada introduced the Model Forest program in 1992 through the Canadian Forest Service. It was one of the federal commitments under the National Forest Strategy, and part of the government’s new Green Plan. The plan envisaged creating ten Model Forests as working models of sustainable forest management representative of the major forest regions across Canada. These Forests would represent a diversity of ownerships and that the partnership involved in the programs would

comprise a diversity of stakeholders. With joint funding of industry and government each such forest board would examine various elements of sustainable forest management, conduct such inventories and studies that were necessary, and implement research to address the major gaps in knowledge about the forest and people. By 2001, the end of the tenth year of the program, there were 11 model forests, and one adjunct model forest in the Canadian network, and 18 in an international network.

Bonar's initial research on the forest ecology and the company's efforts to apply the new knowledge in its operations led to a successful proposal for creation of the Foothills Model Forest (FMF) in 1992. One of 10 model forests across Canada, it brought together Weldwood, the Alberta government, the Hinton Training Centre, Jasper National Park, Canadian Forest Service and nearly 50 other companies, government agencies, community organizations, universities and research organizations. Willmore Wilderness Park was added in 1995 and Jasper National Park also joined in 1997 at the time of the five-year renewal.



THE FIRST FOOTHILLS FOREST BOARD, 1993. L-R (STANDING): BILL FAIRLESS (FOREST SERVICE), DENNIS QUINTILIO (HINTON TRAINING CENTRE;), FRANK CARDINAL (FISH & WILDLIFE), ROSS RISVOLD (MAYOR OF HINTON), COLIN EDEY (CDN ASS'N OF PETROLEUM PRODUCERS), GABY FORTIN (JASPER NATIONAL PARK), JIM BECK (U OF A), RON STAPLES (WELDWOOD), BOB NEWSTEAD (CFS, REGIONAL MODEL FOREST COORDINATOR). SEATED L-R: BOB UDELL, PRESIDENT, DON LAISHLEY, CHAIRMAN

A 1999 review of Canada's Model Forest program²⁹⁹ reported:

As partners in one of the world's largest forestry experiments, hundreds of Canadians have banded together to find ways to sustainably manage the forests for the benefit of all Canadians. ... [They] are working together to generate and demonstrate real-world applications of sustainable forest management, many of which are now being replicated by others across the nation. Armed with the latest in science and technology, participants ... are formulating new ideas, testing new decision-making

processes and trying new forest management techniques designed to ensure that Canada's forests remain a source of economic wealth, community stability, biological diversity and national pride for years to come.

A model forest is a place where the best sustainable forest management practices are developed, tested and shared across the country. Each model forest is run by a not-for-profit organization and, except for a small administrative staff, all those involved in the model forest not only donate their time and expertise, but usually bring additional financial support.

At the heart of each model forest is a group of partners having different perspectives on the social, economic and environmental dynamics within their forest – perspectives that are necessary to make more informed and fair decisions about how to manage these forests. The real “model” in these forests is the way the different partners ... have integrated their own interests into their common goal of developing approaches to sustainable forest management that do not sacrifice one interest for another.

The Model Forest program, and the challenges of developing a new sustainable forest management plan, led to a major expansion of research using both company and FRIP funding on the FMA and the larger model forest landbase in the late 1990s.

Bonar and FMF scientists focused initially on individual species of wildlife and their habitats -- what is known as a “fine-filter” approach to research. Although there are about 300 vertebrate species found on the forest management area, they can be divided into about 16 groupings of species that are dependent on particular habitats. With the support of the company and Foothills Model Forest, Bonar himself embarked on a PhD program at the University of Alberta. His chosen research was the pileated woodpecker, and he successfully completed his PhD in 2000.

The FMF has conducted (as of 2000) more than 60 wildlife studies, and research to date suggested that maintaining the range of habitats should also maintain the range of species. Sensitive or at-risk species such as woodland caribou and grizzly bears are monitored as “indicators” of ecosystem health.

“The data indicate that grizzly bears continue to use areas that are becoming increasingly industrialized,” observed biologist Gord Stenhouse, after the second year of a five-year study monitoring grizzly bears in the 2.3-million-hectare FMF area. Population densities appeared to be similar to those found in a study 22 years earlier. “The presence of grizzly bears is considered to be a sign of a healthy ecosystem. The assumption is that grizzly bears require a large, undisturbed area to survive. They take a long time to mature sexually, and they produce relatively few cubs in their lifetime. So they are believed to be vulnerable to stress and presumably to changes in the ecosystem.”



RICK BONAR, AS PART OF HIS PHD RESEARCH, RADIO COLLARS ONE OF HIS PILEATED WOODPECKERS, 1997

FOOTHILLS MODEL FOREST

The 1999 Model Forest review noted the importance of this type of research as well as research into the role of natural and historic disturbance in creating forests and maintaining biodiversity:

Emulating natural disturbance helps conserve biodiversity. (See Figure 3) But what does it mean to the 284 terrestrial wildlife species found in the FMF landbase? Some of these species thrive in young forests while others require habitat found in mature forests. Biologists, foresters and ecologists need to understand the habitat requirements of key species in order to ensure the long-term health of all wildlife.³⁰⁰

Since 1992, the FMF and its partners have invested significant resources in wildlife research. From this investment, the FMF was able to develop 35 habitat suitability models. When developing management plans, FMF partners can use these models to ensure the foothills forests and rocky mountains continue to provide habitat to all 284 terrestrial species. In 1999 the FMF and its partners started a world-class grizzly bear research project to study the habits and habitats of this umbrella species. The results of the grizzly bear research project will help guide the management of human activities in protected areas and in working forests.³⁰¹

As noted in the 1999 report, the Company and FMF developed a widely-recognized research program dedicated to understanding the historical patterns and role of natural disturbance – predominantly fire - that created the forest landscape and its ecosystems. This research falls into the “coarse filter” school of thinking, which holds that managing to provide the range of forest ecosystem diversity conditions which existed in the past should provide the conditions necessary to conserve biodiversity and ecosystem function today and into the future.

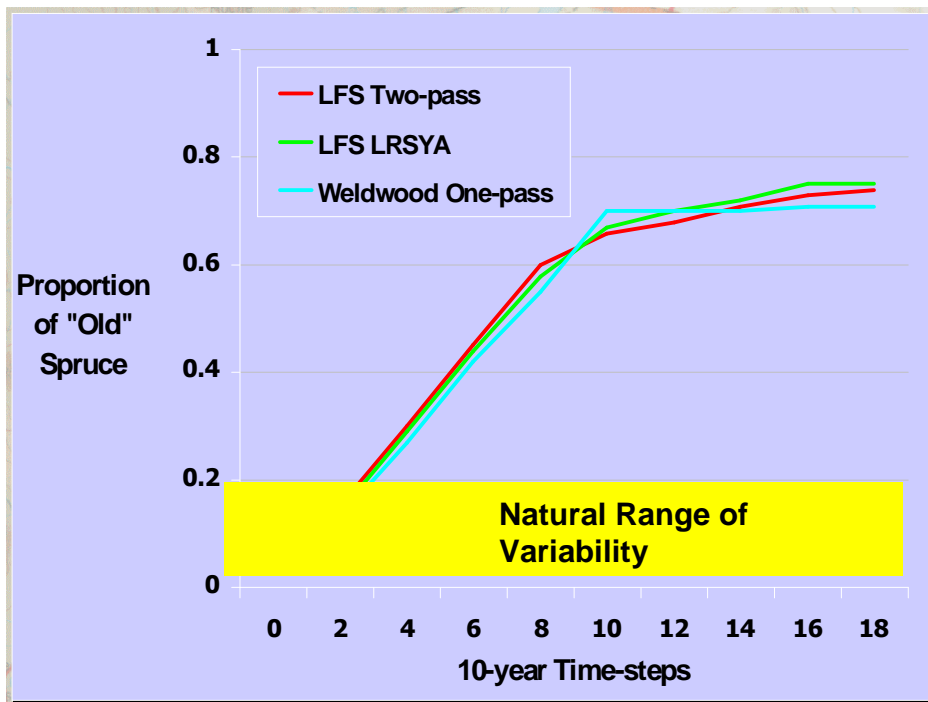


FIGURE 7-2 APPLICATION OF THE CONCEPT OF NATURAL VARIABILITY TO BIODIVERSITY CONSERVATION.³⁰² BASED ON THREE SIMULATION RUNS IN THE 1999 FMP

Scientists have studied tree rings, fire scars, lake sediments and other evidence to determine the long-term history of the forests. The research confirms that fire has long been the dominant natural disturbance in the forests around Hinton, although the nature and frequency of local impacts vary widely. Some locations might burn every few decades, others only once in several centuries, and a few sheltered spots seem to escape fires entirely. However, the historical research shows a wide range of variability -- for example, the proportion of "old growth" spruce (greater than 180 years old) in recent centuries ranged between two per cent and 23 per cent on the model forest area.

This research was further commended in the 1999 review of the Canadian Model Forest Program:

Recent research suggests that nature's own forest management plan – which makes use of fire, insects and disease, flooding and wind damage – is the best model for conserving biodiversity in the forest. The Foothills Model Forest partners, aware that wildfire had always been the principal agent of change in their forest, set out to map the pattern of past natural disturbances in the model forest – at times going back several hundred years – as a guide for harvest design, prescribed burns and other management strategies. The model forest was the perfect setting for such an ambitious project to be launched.³⁰³

The multi-year research project comprises individual studies of specific disturbance patterns at various geographic locations and at different scales. Weldwood's latest forest management plan of uses the research results to ensure that harvesting and

reforestation approximate natural disturbances as much as possible. Weldwood has also initiated an experiment to study the ecological, economic and cultural impacts of larger harvest areas. As well, Jasper National Park is using the research to help determine the intensity, location, range and size of the prescribed burns the park uses to conserve biodiversity and reduce the potential for catastrophic fires.³⁰⁴

FMF research in 2000 covered everything from songbirds to global climate change. One focus was the effect of fragmentation, linear disturbance and additional “edge” created by roads, cutlines, cutblocks and other human interventions in the ecosystem. The long-term effects are still being evaluated, but Weldwood chief biologist Rick Bonar noted two important things to remember: “There are still significant stands of ‘old growth’ timber similar to those that would have existed before settlement, and some of these will continue to be retained. And, so far as we know, we still have all the species that we started with when operations began. Our challenge is to pass them on to future generations.”

By 2001, the annual budget of the model forest had grown to around \$4 millions, covering a broad range of research into forestry, forest ecosystems and human use of the forest.

The results of this research were employed in the development of Weldwood’s 1999 forest management plan, as outlined in Chapter 11. The plan included provisions to protect aesthetic, recreational and cultural values as well as the ecological needs identified to date. Detailed ecological classifications, using a system developed in co-operation with Foothills Model Forest and the Canadian Forest Service, helped to guide appropriate management for both long and short range plans. By 2000, the company had classified 60 per cent of its FMA area using this new system, and planned to have the entire area classified by 2003.

TABLE 1 Foothills Model Forest Program Areas 2001

Development of GIS (Geographic Information System) Tools for Research and Management

Communication and Knowledge Transfer

- Forest History Project and Case Studies

Biodiversity and Conservation

- Alberta Forest Biodiversity Monitoring Program
- Fish and Aquatics Research
- Woodland Caribou
- Grizzly Bear
- Harlequin Ducks
- The Bridgland Survey: Changing Landscapes of Jasper National Park through Photographs

Forest Practices, Products and Planning Development

- Natural Disturbance Program (5 projects)
- Foothills Growth and Yield Association
- Criteria and Indicators of Sustainable Forest Management
- Ecological Classification of Juvenile Stands (Ecosite Chronosequence)
- Canadian Wildland Fire Growth Model
- Climate Change Impacts on Forest Productivity
- Impact of Climate Change Related Economic Incentives on Forest Management
- Pulp Quality from Moderate and Severely Damaged Wood
- Wood Processing Technology Training Support (NAIT)

Land Use and Traditional Ecological Knowledge

- Traditional Study of Foothills Model Forest

Socio-Economic Research

- Community Sustainability and Sense of Place
- Understanding Public Participation in SFM
- Economic Impacts of Resource Sectors on the Regional Economy
- Quantitative Measures of Local and Provincial Attitudes and Users
- The Value of Wilderness/ Wilderness Use Preferences

Dennis Hawksworth, Vice President Hinton Forest and Wood products, summarized some of the outstanding examples of how Weldwood incorporated the Model Forest research findings and planning tools into their operations and forest management plans³⁰⁵:

- a. Local Level Indicators: The LLI program of FMF responds to the Canadian Council of Forest Ministers Criteria and Indicators for Sustainable Forest management as well as the Canadian Standards Association Sustainable Forest management Certification System Z809. Weldwood is building these LLIs into its program for a Z809 Certification audit in 2000. [Company passed the audit and was Z809 certified June 2000]
- b. Natural Disturbance Program: The FMF Natural Disturbance Program, examining the range and pattern of natural disturbance through historical times is the foundation for our 1999 forest management plan now before the province for approval [approved 2000]. This plan sets forward how the FMA area will be managed to maintain ecosystem representation on the landscape in seral stages and proportions that are within the historical range of natural variability. This “coarse filter” strategy is based on the assumption that if you can maintain current ecosystems within the range of their historical presence, you will be providing the necessities to maintain current biodiversity.
- c. Wildlife Habitat/Species Research: Weldwood had included these “fine filter” checks in its new management plan. (See Figures 4-6) To our knowledge we are the only company in the province which has gone beyond the “coarse filter” strategy to examine the impacts of the strategy on wildlife species groups of interest or concern.
- d. Wildlife, Hydrology, Shelterwood Trials, Environmentally Significant Areas, Socio economic Studies: These studies have led us to examine, among other things, the role of protected areas, watercourse corridors and recreation programs on the Weldwood FMA area. One of the initiatives we have begun as a result is our Special Places in the Forest program. A series of areas proposed by Weldwood for Special Places 2000 protection (and now being reviewed by local committee after endorsement by the PCC), linked by Special Management Areas along major rivers and streams wherein modified harvest will enhance wildlife and recreational values. It includes, often along the same corridors, recreation areas developed by Weldwood or managed by Weldwood on behalf of the province, recreational trails, historic sites and so on. [The final sites passed Order-in-Council spring 2001]
- e. Fisheries Inventories, Watershed Models: These are routinely used now in harvest planning, including road and bridge crossings.
- f. Ecological Classification aids Planning: The ecological classification system originally developed by Dr. Ian Corns was adapted to the landbase of the FMF. Using this system, Weldwood has implemented a classification program of its entire FMA area, scheduled for completion on 2003 at an estimated total cost of over six million dollars. This system is now used in harvest and silviculture planning which are combined – using this system as the ecological foundation – into one integrated plan for the first time.
- g. Socio Economic Research: This research is being used in our communications and public involvement program to improve the messages we carry to the public, and the manner in which we gather and use feedback.

Habitat Suitability Index



For Each Species:

- Variable values for each stand are scored from 0 to 1
- Variable scores are combined into a **Habitat Suitability Index** score, also from 0 to 1

0 = unsuitable habitat

1 = optimum suitability habitat

FIGURE 7-3 HABITAT SUITABILITY INDEX DEFINED

Weldwood, through its own resources and through FRIP-sponsored funding, directed significant funding to its own wildlife-related research, as well as studies by Foothills Model Forest and others. See Table 2.

Work continued in the model forest program. A key area of ongoing scientific research was the comparison between the managed forest and the “natural” ecosystem that existed here prior to European settlement and modern fire control. One of the significant differences, for example, is that there is a lot more “edge” — the boundaries between clearings, young forest and mature forest — than would have existed naturally. It appears that the amount of “edge” in fires may exceed that created in harvest areas, but when roads and seismic lines are added to the equation the differences become significant. The long-term effects of these changes are still being evaluated.

In the 1999 forest management plan all seral stages were represented within the range of natural variability (RNV) although some forest types, for example white spruce, would in a few decades exceed the range for the oldest seral stage.³⁰⁶ (Figure 6). Weldwood’s chief biologist Rick Bonar³⁰⁷ noted: “There are still significant stands of “old growth” timber similar to those that would have existed before settlement, and some of these will continue to be retained. And so far as we know, we still have all the species that we started with when operations began. Our challenge is to pass them on to future generations.”

TABLE 7-2 WELDWOOD HINTON WILDLIFE-RELATED FUNDING: 1999-2000

Program¹	1999	2000
FMF ² fish/stream program	150,000	125,000
Hydrology program		22,300
FMF grizzly bear study	50,000	50,000
Caribou – WCACSC ³	27,000	43,000
Caribou – Weldwood	48,000	55,000
Pinto Creek mountain goats	34,100	13,600
Pileated woodpeckers	19,000	0
Birds	3,400	6,900
Residual patches study	34,700	19,600
FMF Ecosite dynamics	100,000	75,000
Ecological land classification (ELC)	116,100	425,000
Species database	0	50,000
FMF Wildlife Model Integration	11,100	
Compartment wildlife	14,600	17,600
FMF Natural disturbance	101,300	100,000
Sub Total Research by FMF	412,400	350,000
Sub Total R & D by Weldwood	296,900	650,300
Total Research and Development⁴	709,300	1,000,300

Notes

¹ Funding Includes Weldwood Core Budget and Weldwood-Sponsored FRIP Funding

² Foothills Model Forest

³ West Central Alberta Caribou Standing Committee

⁴ Not including staff salaries

HSI Score Examples

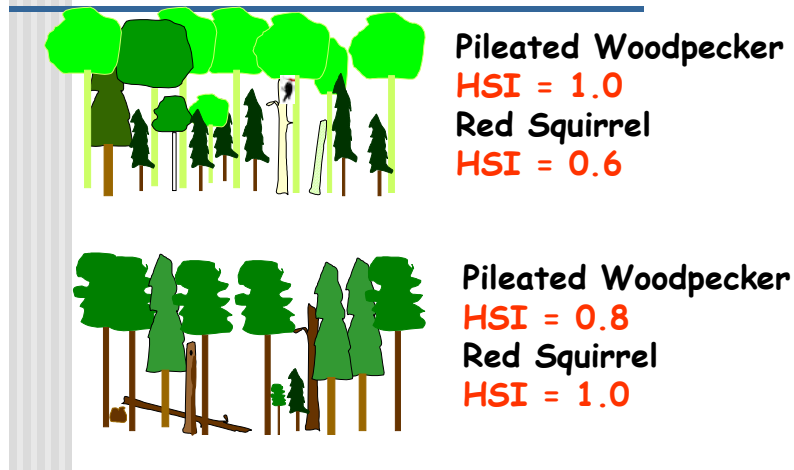


FIGURE 7-4 HABITAT SUITABILITY SCORES FOR TWO SPECIES IN TWO STANDS. ³⁰⁸

Habitat Supply Forecast

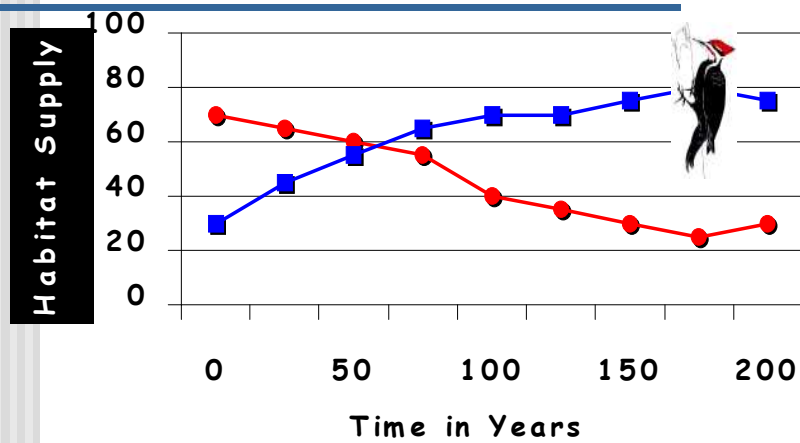


FIGURE 7-5 EXAMPLE OF HABITAT SUPPLY FORECAST FOR PILEATED WOODPECKER AND RED SQUIRREL ³⁰⁹

FMA Seral Stage Forecast

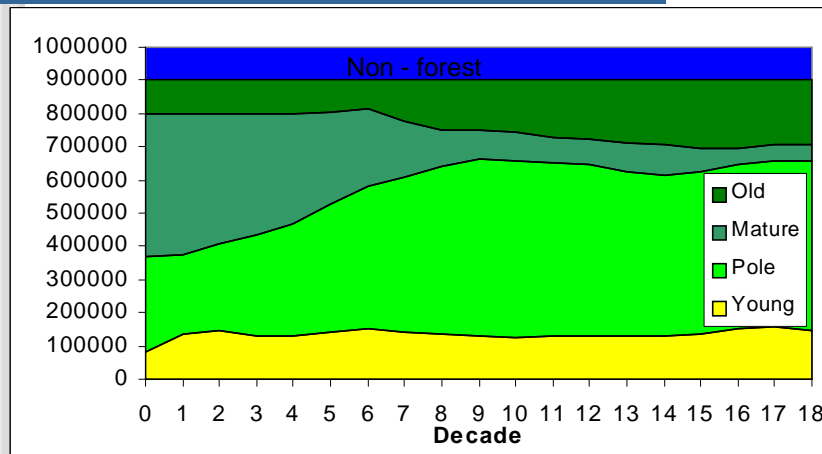


FIGURE 7-6 FORECAST CHANGES IN PROPORTION OF SERAL STAGES OVER 180 YEARS. ³¹⁰

In 2000, research by the Company and Foothills Model Forest focused on developing information and tools relevant to these values, especially as related to sustainable forest management. This research can be summarized as follows:³¹¹

1 Traditional Forestry Research to Maintain or Increase Allowable Annual Cuts:

- forest fertilization trials
- pre-commercial and commercial thinning trials
- tree/ stand growth and yield modelling
- tree improvement

2 Research to Ensure Conservation of Non-timber Resource Values

- natural disturbance
- wildlife and fisheries
- habitat suitability research and modelling
- hydrology research
- watershed modelling

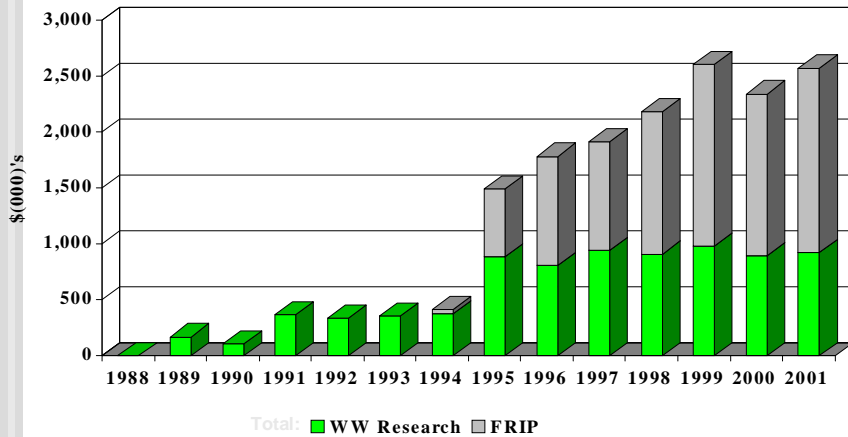
The end result of research is to apply the results in plans, both strategic and operational, and put them to work in practice. This application requires the development of analytical tools which are increasingly complex, and the ability to manage, integrate and process large amounts of spatial and tabular data. Emerging computer memory capacity, modelling programs and technology in Geographic Information Systems are critical to the success of this management challenge, particularly in the modelling and forecasting of values which are spatially and temporally dependent, for example habitat needs of certain species.

Don Lashley spoke positively about the ongoing Company support of research,³¹² noting that the company had conducted a lot of research using credible scientists. No attempt was made to stifle or influence their conclusions. The Company used the information in its efforts to adapt and improve practice. Many of these projects over the years, over 200, had been done by the Canadian Forest Service with whom the Company had a long-standing and mutually beneficial relationship.

The company philosophy towards forest research was reflected in the summary of investments (Figure 7). Research up to 1988 was largely conducted by agency-financed research organizations, to which the company would often provide in-kind support through its own operations. The need for a major focussed company-supported program became evident with the 1988 Agreement. The new Agreement enlarged the FMA but it was nominally capable of supplying only about 70 per cent of the long-term wood needs for the expanded pulp mill and new sawmill. The 1994 Forest Resource Improvement Program (FRIP) enabled the company to further expand its research investments, as evident in the graph.

As tangible, and significant, indicators of a sustained commitment to support of research and scholarships for future researchers, Weldwood invested in two major programs at the University of Alberta. In 1999 Weldwood of Canada made major financial contributions to the University of Alberta for graduate scholarships in forestry. In 2000, in partnership the National Research Council and Weyerhaeuser Canada, the company established the NSERC/Weldwood/Weyerhaeuser Chair in Enhanced Forest Management, held by Dr. Vic Lieffers.

Research Investment



Weldwood

FIGURE 7-7 COMPANY INVESTMENT IN FOREST RESEARCH FROM 1988 TO 2001

The green bars represent direct investment by the company, the grey bars represent funds from the Forest Resource Improvement Program contributed by the company and then approved for use by the company in research initiatives.

7.6 SUMMARY

Forest research has been an inherent component of the forestry program at Hinton since its inception in 1955. Initially focussed on the immediate problems associated with regeneration, its scope was soon expanded to include virtually all aspects of forest management; and by 1988 expanded again to embrace the responsibilities demanded to achieve sustainable forest management.

Dr. Stan Navratil, a respected forest scientist with a remarkable career with academia and research agencies, who made a significant contribution to the company's program in enhanced forest management provided a fitting summary of this commitment in a 2001 interview.³¹³

What was very noticeable was the visionary decision-making and planning for the future. No other organization in Alberta in the last 5-10 years has advanced research on intensive silviculture, thinning and fertilization more than Weldwood. My translation of the book on thinning is another example. This seems to be a lasting attribute of Weldwood. If you look at the history over past 30 or 40 years, there were always visionary people there, thinking ahead. Whatever they produced in silviculture was new, they were always ahead. That's the spirit, I think, in the Weldwood's Hinton division. I don't know the other divisions but the Hinton division was never behind.

CHAPTER 8 MILLS & PRODUCTS

PREFACE AND ACKNOWLEDGEMENTS

Alberta's first pulpmill at Hinton began as an inspiration to **Frank E. Ruben** in 1949. The story started when Ruben first visited his newly-purchased coal mine near Robb, southwest of Edson. Frank Ruben had come to Alberta in 1936 from California where he had been active in construction and wildcatting for oil. He helped to develop Alberta's oil and coal industries. In 1949, Ruben first visited his newly purchased coal mine near Robb, southwest of Edson, and was impressed by the vast, seemingly untouched forests in the region. When the coal market slumped soon after, he envisioned a pulp mill to combine his coal power with the forest resource. In 1951 he incorporated North Western Pulp and Power Ltd. to pursue these two interests.



COMPANY FOUNDER FRANK RUBEN

1982 PHOTO COURTESY THE RUBEN FAMILY

On June 8, 1951, the Alberta government approved Ruben's request for a pulpwood lease to support a mill at Edson. With this agreement in hand, Ruben invested in studies to survey the timber and to determine the best processes and products for manufacturing. Among those he consulted was Reg Loomis, a forester who had been hired by Eric Huestis to lead the new forest inventory program for the province. Loomis applied his knowledge of the forests and forestry in redrafting a lease area that would provide a better wood supply. This was completed in 1952.

Finally, in April 1954, Frank Ruben met **Roy Ferguson**, president of the St. Regis Paper Company of New York – the first potential partner to show interest. Ferguson was impressed and arranged to send teams to evaluate the proposal. In June, St. Regis announced a joint venture with Ruben's company, North Canadian Oils Ltd., to build a bleached sulphate pulp mill in Alberta. A revised Forest Management Agreement was signed with the province on September 14, 1954, and detailed planning got underway.

Tests showed that the water supply in the McLeod River near Edson would be inadequate for the mill. In addition, the ground was too unstable for the plant footings, coal power was too expensive compared to natural gas, and coal specks too risky for the quality of pulp. Fortunately, Ruben remembered travelling west on a previous visit to the area and noting a small settlement where the road, the larger Athabasca River and the railway all intersected. He and his son Robert joined H.V. (Pete) Hart, St. Regis' senior forester, and **Justin McCarthy**, St. Regis' senior engineer for a fateful jeep trip from Edson to Hinton in January, 1955. They found that the location offered ample water supply, suitable soil, and rail access — in the midst of a superb timber resource. They quickly changed plans to build the mill there instead, and construction began that spring.

The principal players for mill design and construction included **Justin McCarthy**, St Regis vice-president and chief engineer, assisted by **U.J. Westbrook**, supervisor of all St. Regis pulp mills. They contracted

with **H.A. Simons Ltd.**, a Vancouver, B.C. based engineering consulting firm to do the major portion of the engineering and drafting, and to coordinate construction on site.

8.1 INTRODUCTION

"We need industry, the type of industry that is going to hire a lot of people."

-- Eric Huestis, 1972^{lvii}

Eric Huestis, who retired as deputy minister of Lands and Forests in 1966, gave a wide-ranging talk six years later at the Forest Technology School in Hinton. While the oil and gas industry provided short bursts of employment, he pointed out, the forests brought long-term jobs to the province, in both the bush and the mills. This would continue as more of the forest resource was utilized and more value extracted from each tree felled. He noted that pulp, panelboard and lumber could all be produced from the waste burned or buried by traditional sawmills. "If you have a pulp mill, you're utilizing everything except the bark," he said. "Maybe something can be done with the bark."

He correctly foresaw the enormous growth, in both utilization and value, that would occur in the Alberta industry over the following decades. In 1972, one important step had just been taken at Hinton with the construction of a sawmill adjacent to the pulp mill, and a second pulp mill was about to begin production in Grande Prairie. The number of jobs created over the next quarter-century was perhaps not as great as Huestis expected, because productivity per worker also rose very rapidly. However, the quality of the jobs -- especially the comfort and safety of the work -- improved dramatically too.

From the 1940s through the 1970s, the oil and gas industry so dominated the Alberta economy that the forest products industry developed relatively slowly. In fact, for many years, the oil and gas companies cut more timber annually than the forest companies. The FMA and quota systems created a progressive framework for further development. Sawmills modernized and expanded after 1966, and the second Alberta pulp mill was built at Grande Prairie in the early 1970s. However, the modern, integrated industry was shaped by a series of economic, political and technological events in the 1980s: a severe recession, a sharp decline in crude oil and natural gas prices, changes in government policy, growing environmental awareness, and new methods for manufacturing products from "waste" wood and "weed" species. By the 1990s, the industry was effectively reborn. See Table 1. Hinton was affected, directly and indirectly, by all these developments.

^{lvii} Much of the text and format is derived from Bott et al. *Learning from the Forest*. The text has been augmented by the authors for background, stories and details. This has been a collaborative project. PJM.

TABLE 8-1 ALBERTA FOREST PRODUCTS TECHNOLOGIES

Pre-1950	1950s	1960s	1970s	1980s	1990s
tie hacking, portable sawmills, central saw, re-saw and planer mills	portable sawmills, central sawmills, kraft pulp, plywood	permanent sawmills, kraft pulp, plywood	integrated lumber and pulp operation, second kraft pulp mill, large central sawmills, plywood	use of aspen for chemithermo-mechanical pulps (CTMP) and oriented strandboard (OSB), softwood for medium density fibreboard (MDF), kraft pulp, large central sawmills integrated with pulp and panelboard industry, laminated stressed beams, log home manufacturing, plywood	paper production (newsprint), hardwood and softwood kraft and CTMP pulps, advanced emission and effluent control systems, phasing out chlorine bleach, FORESTCARE certification, custom sawing lumber for dimension and quality, MDF and OSB mills, central sawmills, plywood, remanufacturing by-products (e.g., finger-jointed lumber), log home manufacturing, energy from waste, increased integration of entire industry

8.2 ALBERTA’S FIRST KRAFT PULP MILL

Between 1951 and 1954, North Western Pulp & Power apparently considered several types of pulp mill. Capacity between 32,000 and 64,000 tonnes per year was mentioned in early versions of the lease agreement. After St. Regis joined the project in 1954, the agreement was revised to specify annual capacity of at least 96,000 tonnes. By the time plans were drawn up and the mill site relocated from Edson to Hinton early in 1955, the design capacity increased to 128,000 tonnes annually. The mill actually exceeded this figure every year after 1959, and continuous fine-tuning brought the facility’s output to a peak of 192,558 tonnes in 1988 before a major modernization more than doubled capacity in 1990.

The goal from the beginning was to produce a high-quality bleached kraft pulp that would appeal to papermakers on the basis of its strength and whiteness. (Kraft is the German word for “strong.”) Product quality would help overcome the high startup costs of a new venture in new territory – \$42 million at the time, equivalent to more than \$270 million in 2000 dollars -- and the relatively high cost of rail transportation from Hinton. One reason St. Regis rejected Frank Ruben’s original plan to use coal for fuel was the risk that coal specks would affect the whiteness and brightness of the pulp.

In 1954 and 1955, samples of timber were sent to St. Regis facilities for testing to determine the best process, and the technology chosen was state-of-the-art for the day. Two Kamyr continuous digesters, the first in North America, would separate most of the lignin and pitch from the wood, and a series of chlorine bleach baths would remove the remaining impurities from the long, strong cellulose fibres of northern conifers.

Although sulphate pulping was invented in the late 19th century, this modern kraft process was developed in Germany during the 1930s and only came into wide use after the Second World War. Previously, most pulp mills produced either “sulphite” pulp or groundwood pulp. The fibres in sulphite pulp were not as strong, and the mills were notorious for odours and pollution. Groundwood pulp was literally ground-up wood, the predecessor of modern chemithermomechanical pulps, and was used mainly for newsprint and other low-value papers where the high lignin content was not a consideration. Lignin has a brownish colour; papers containing lignin yellow in sunlight and deteriorate over time.

The heart of the kraft process is the digester. Wood chips are cooked there in “white liquor,” an alkaline solution of sodium hydroxide (caustic soda, NaOH) and sodium sulphide (Na₂S). These chemicals dissolve most of the lignin, the glue that holds the wood fibres together, but leave the cellulose strands intact. In the Kamyr digesters used at Hinton, there is a continuous flow through the vessel. Wood chips, softened first by steaming, are fed into the top, and cellulose fibres emerge at the bottom. Careful control of the temperature, pressure and chemical composition is essential to make the process work properly. There were many problems fine-tuning the process during the first two years, which explains why production was well under capacity until 1959.

What made the kraft sulphate process economical was the invention of methods to recycle the chemicals and recover the energy from the lignin. The lignin-and-chemical mixture is known as “black liquor” when it comes out of the digester. Evaporation then concentrates the liquid and removes most of the water. This thickened black liquor becomes the main fuel for the plant’s boiler. As the lignin is burned, the spent chemicals flow out the bottom of the combustion chamber. These spent chemicals are dissolved in water again to form “green liquor.” Through chemical reactions with calcium oxide (lime, CaO) the green liquor is reconstituted into a new supply of white liquor.

The kraft pulp from the digester is strong enough for papermaking, and in fact it can be used to make products such as paper bags and cardboard – which have the characteristic brown colour of unbleached pulp. However, it takes further processing to get the pure white cellulose fibres required for fine papers, sanitary products and the like. In the original Hinton mill design, and continuing until 1993, this was accomplished by a series of bleaching treatments using elemental chlorine. The bleaching removes the remaining lignin and other impurities without impairing the strength of the fibres. The pulp is then spread on a moving wire screen, dried with forced air and heat, cut into sheets, then pressed into bales. Since 1993, chlorine dioxide has been used as a bleaching agent.

8.3 HOW THE HINTON PULPMILL BEGAN

When Frank Ruben, Calgary oil and businessman, negotiated his first pulpwood agreement in 1951 he arranged for forest surveys and studies on pulping and marketing. He especially began a search for a partner or partners, since the estimated cost of the project was more than he could afford. After three years of unsuccessful searching, he finally met Roy K. Ferguson, then president of the St. Regis Paper Company.

The St. Regis Paper Company was then the third largest paper company in the United States. It was a major integrated pulp and paper company with about 19,000 employees, and mills in 61 locations in the U.S., Canada, Europe and South America. The company then had timber reserves in the U.S. and Canada of 2.9 million acres. The opportunity to add some 4.0 million acres of timber in Alberta must have had some appeal.

Interestingly, St. Regis was founded in 1899, the same year in which the Dominion Forestry Branch was established and Elihu Stewart appointed as its head. St. Regis started as a small newsprint firm. Operations began with two paper machines in Deferiet, New York in 1901. Since the founders had extensive timber holdings along the upper reaches of New York's St. Regis river, they chose that for their name. When the U.S. Congress removed its protective tariffs in 1913, there was a major shift of the newsprint industry to Canada. St. Regis converted its mills to other types of paper, including lightweight paper. It expanded its operations to produce a diversified range of products including craft pulp, paper, multiwall bags and packaging. It also operated two fine paper mills, one at Sartell, Minnesota that was increased in size in 1956 to produce 60,000 tons per year. Under the direction of Ferguson, St. Regis had embarked on an expansion design to maintain its position as a long-time leader in multiwall bags and bleached craft pulp. As Fred Price, author of the 1957 "Hinton Trail" story³¹⁴ noted, Roy Ferguson described his basic philosophy as one of "awareness of opportunity". Ferguson clearly recognized this when Ruben came to call. See Appendix Four for the full Hinton Trail article.

The catalytic meeting between Ruben and Ferguson was in April 1954. Ferguson was "immediately impressed" with Ruben's ideas and acted quickly. By early May a reconnaissance party, led by St. Regis forester George Able, had brought back a positive report. A series of inter-company meetings led to an agreement by mid June. This was confirmed on June 17, 1954 through a joint announcement by St. Regis and North Canadian Oils stating that their plans were finalized for the financing and construction of a bleached sulphate pulp mill in Alberta.

The agreement stipulated that each should provide half of the equity capital required for North Western Pulp and Power, with special financing to be arranged through the Royal Bank and Bank of Nova Scotia. St. Regis was to direct the design and construction of the mill, to manage its operations and to sell its pulp through the international connections of the St. Regis sales organization. St. Regis also proposed using some of the production in its own paper mills.

The mill design was immediately started under the direction of Justin H. McCarthy, the St. Regis vice-president and chief engineer; assisted by U.J. Westbrook, supervisor of all St. Regis pulp mills. They contracted with H.A. Simons Ltd., an engineering consulting firm in Vancouver, B.C., to look after the major portion of the engineering and drafting on site at Hinton.

Although the mill was originally proposed to be built at Edson, preliminary surveys showed that the site was not sufficiently stable for a mill of that size, nor was the water supply in the McLeod River adequate. Once the change in location to Hinton was confirmed, in early January 1955, the engineering design was completed by March. Since this was a large project, they decided to do the construction through individual specialized contractors and have Simons coordinate them. Tenders were called for the construction camp and necessary support buildings in March, and then construction began on the 23rd of May 1955.

The mill was designed around two Kamyr continuous digesters, each with an ultimate rated capacity of 250 tons per 24-hour day. The Kamyr process was perfected in Sweden after 15 years of research and pilot plant trials. The intended pulp was to be of a high quality bleached craft pulp to be sold under the label of Alberta Hi-Brite. Both whiteness and strength were important qualities. Production was planned to be 150,000 tons per year, or about 420 tons per day. The more typical digesting process at the time was to cook in batches.



PULP MILL UNDER CONSTRUCTION, 1956

COURTESY S.G.V. HART

Batch production of pulp began on 17 April 1957. As expected, with this new process there were many technical problems to work out. However, the mill was working well enough for the official opening on 28 July 1957. The continuous process created some problems when any one part of the system failed, causing the entire system to go down. Harry Collinge, a consulting engineer, was brought in to make improvements. Among his refinements were strategically located surge tanks to add a production-buffering capability within the system. Collinge became resident manager on 15 May 1958. Progress in reaching the mill's operational goals was reflected in announcements in three early NWPP Bulletins:

- 10 April 1958 – pulp production was 451 tons of Alberta Hi-Brite, and production had materially exceeded the 400 ton mark on several occasions over the last 12 days.
- October 1958 – pulp production for the six days ending 2 October averaged 436 tons per day, six tons over the rated capacity.
- 11 November 1958 – pulp production “soared over the top” as 464 tons rolled off the layboy – cigars and chocolates were passed around.

As Price noted in “The Hinton Trail”, this was not a conventional type of sulphate mill as generally understood at the time:

First, it was designed for a primary purpose: to make the highest quality bleached pulp at the lowest possible cost; it was designed to operate with the local conditions in mind; it was also built with future expansion in mind and laid out for that eventuality.

The plant is designed to operate with the lowest manpower per ton of any mill now producing. The plant is staffed with high quality personnel, all of whom have passed through a standard training program. With excellent equipment, first-rate design and top operators the mill should produce a top grade, high brightness, high quality pulp of complete uniformity.

Besides the basic feed stock of pulp wood, there are two other important components of the pulping process: water and energy. Water was drawn from the Athabasca River. Water for the pulping process had to be absolutely clear of impurities lest the pulp quality be reduced. A water treatment plant was built, capable of handling 30 million gallons per day. Treatment comprised chemicals to purify and coagulate particles, settling basins and recarbonation. The water was purified to domestic water standards, and the town of Hinton has drawn its water from this plant since its construction.

Pulping also needs a great deal of energy, especially to power the machinery and to dry the pulp. Ruben's original intention was to use his high-grade coal, but was quickly dissuaded by the high cost of handling and the inherent threat of contamination of the pulp with carbon specks. A suitable source of gas was found in the Wabamun area that was capable of delivering 60 million cubic feet per day. This meant building a 218 km pipeline of 10 inches in diameter. It was located as closely as possible to highway 16 for ease of access for construction and servicing. Of particular concern were crossings on three major rivers and six crossings of the trans-mountain oil pipeline. Heavier gauge pipe was used at the river crossings and the line was buried at least eight feet deep at those points. The pipeline serves both the mill and the town of Hinton. It was later extended to Jasper.

Papermakers across North America and around the world have blended the "Hinton Hi-Brite" with other pulps to create consumer products as varied as the paper pull strips on chocolate kisses, the backing on photographic paper, facial tissues, Easter egg "grass," the paper for many magazines, wrapping tissue, flooring and wallpaper backing, coloured construction paper, shooting targets, party hats, sandwich bags, paper plates, ordinary waxed paper and the green waxed paper used by florists.

In the early days, when pulp buyers were not familiar with the quality of lodgepole pine fibre, some purchasers insisted on pulp made solely from spruce. As a result, species were separated in the woodyard to serve these customers. "Special K" was a spruce-only pulp used by Kodak for photographic papers. In 1963, there was also a test run of poplar. The deciduous wood produced a good-quality pulp, although with shorter fibres, but this option was not pursued at Hinton. The reason, in part, was that the shorter fibres could not hold together as well as the longer conifer fibres. This caused the wet sheets of poplar pulp to break apart in the high-speed dryer.



SIGN AT THE ENTRANCE TO THE MILLSITE AND OFFICES, 1960S

WELDWOOD PHOTO COLLECTION

For several years, the company operated an experimental digester that could process four kilograms of chips at a time, allowing technicians to examine various wood and process combinations. Studies there showed that good pulp could be produced from fire-killed timber, but the company was reluctant to risk compromising pulp quality with possible carbon flecks and did not use any fire-killed wood until after the mill expansion in 1990.

8.4 WOOD YARD AND WOOD ROOM

So-called short wood logging systems prevailed in the mid 1950s. The traditional length of pulp log in eastern Canada had been four feet, or 50 inches to include a “broomage” allowance for loss during river drives. A four-foot length had less tendency to jam in the smaller streams on which the wood was driven in the spring, and could also be readily handled by pulp cutters. Eight-foot or 100-inch wood had become more popular as mechanization in woodlands began, and as more wood was hauled by truck. Eight-foot wood could be loaded across the truck bed to create loads of greater stability than two rows of four-foot wood. Cutting of eight-foot (100 inch) wood was the basis on which the agreement was negotiated. Further, before all-season roads were common, it was the practice to do most of the hauling during the late fall to early spring. Between “freeze-up and break-up”. The wood yard was therefore designed to hold about a one-year supply of 100-inch wood.

The initial program of cutting was to produce 175,000 cords of pulpwood in the bush before the hauling season of 1956-57. This was to assure the mill of sufficient wood to operate from the time of its proposed start-up in the spring of 1957 until the 1957-58 hauling season. Plans for the next year were to produce 300,000 cords, the requirement to support a full year of operation.

The wood yard was designed to hold four 50,000-cord piles of wood, two each on either side of a log flume. Trucks were unloaded by Manitowic cranes with 110-foot booms. Wire slings were placed around the ends of the wood stacked between bunks on the truck beds and lifted out and stacked in the storage piles. These stacked-wood piles were planned to be a maximum of 45 feet in height.

The log flume was steel lined, three feet in width, and ran about 1,800 feet into the wood room. Pulpwood bolts were loaded into the flume by the same cranes, but with a grapple. Water in the flume

was recirculated and screened to remove wood chunks and bark. During the winter when the flume could freeze, some of the loaded trucks were directed to a transfer deck at the wood room so the mill ran on freshly hauled wood during that time.



LOG FLUME AND YARD, DATE UNKNOWN

WELDWOOD PHOTO COLLECTION

Bark was removed by means of three drum barkers 12 feet in diameter and 67.5 feet long, each divided into three sections. The middle section had bulkheads so the wood could be submerged to enhance bark removal. Clean barked logs were run through a Carthage Norman chipper with 21-inch knives rotating at 400 rpm to produce uniform chips of 5/8ths inches thickness.

The gate at the wood yard at the mill site represented the point of transition of responsibility from the woodlands division to the pulp mill division. All wood was manually scaled on the truck as it passed by the scale house at the gate. Truckers were paid on the basis of the scaled volume in cords. Measurements changed to metric units on 1 November 1979 following industry-government discussions to establish protocols. Scaling by weight has now become the norm; studies were conducted to develop conversion data, and manual check scaling is still done on a sampling basis.

By comparing the scaling records at the gate with the processing records in the wood room, an ongoing inventory of wood in the yard could be estimated. However, a wood yard inventory was usually done annually as a check. These involved actual measurement of height, width and lengths of the piles, a practice that could be dangerous from falling wood or unstable piles. Ray Ranger told about one such incident in which he was involved: ³¹⁵

One of the more dangerous jobs we were called upon to do in the early years was the year-end wood yard inventory. It had to be done towards the end of December. They come up with this idea that Forestry should inherit that job because we were in the inventory business. We came up with a plan where we would simply get guys to go up on top of the pile – we would run contour profiles of the log piles using 2.5 chain tapes and determine elevations by climbing the 50-foot water gun spray towers.

We would chain them out on top, and at the end of each tape on our chaining, the guys on the water gun towers would go up or down on the towers so that they could sight on us through a level and in that way determine the height. They knew what height they were on the tower at a level sight. So in that way we would get a profile of each pile. Some of them were up to 65 feet high.

Well you can imagine what the wood yard would be like in December. Wind down there and colder than all get out.

We were out for two or three days and everything was going swimmingly. Then we got on this one pile – Jack Wright, Hank Summer were on the water towers taking levels, and Dick Frowen and I were on top of the piles chaining. There were cranes operating and trucks rolling in, so there was a lot of racket to start with and the wind was howling so we couldn't hear anything. And it was cold. I had on every stitch of clothing I owned. I had on a summer jacket and my parka on top of that and two pair of pants and a set of two underwear and hard hat and liner. A lot of the times in the early days I did not wear a hard hat in the bush because I am prone to headaches. However on this occasion it was a prerequisite inside the mill and in the wood yard and thank God I had it on!

We were going along on top of this pile and Jack and Hank began motioning. I thought they meant they needed another level out there. The pile looked kind of shaky. I didn't know why they couldn't estimate the level, but at any rate if that is what they wanted, that is what they wanted. So I started out and all of a sudden that pile just slid away from underneath me. Well Dick Frowen jumped. There was a log sticking out of the next pile and Dick grabbed that and was left hanging, but I was gone! I went down with the logs. And I will never forget -- it was just as if in slow motion. I couldn't do a thing. The logs went out from underneath me and I am dropping and I am this way and I am that way and I am upside down going down this log pile and I looked up and here come this damn 8-foot bolt, end over end and I thought: "I will never get home now." And it was just the last day or two before I went home for Christmas.

And "Lights out", eh! The next thing I knew, I could hear: "There he is! There he is! He is not moving." I had come-to and I couldn't move. Jack and Hank are on top of the logs and they have got an 18-foot pike pole and they are digging around down there and looking for me. A log had hit me right on the side of the head and just

smashed the hard hat all to hell and knocked me out, and I was covered with logs. My glasses are gone. And here old Hank and Jack are up there and they have got the crane operator by this time and they are throwing logs like mad men.

They got down to me and they figured for sure I would be all busted up -- and when I get up I've got nothing broken -- but I just feel like somebody hung the worst licking on me you ever saw. Well they chased me right over to the clinic -- the doctors were all in that little clinic there where the personnel office was -- and they stripped me off and I was just beat all to hell but no broken bones. So Jack said to me, "Well I don't think you better come back." Then he phoned me later in the day and said, "No. We have talked it over and the doctor said you go on home to Lloydminster for the holidays." That is where I went.

As it turned out, Jack and Hank were waving because they could see that the pile was undermined, and they were trying to say: "Go back. Go back." But I couldn't understand. We had no prearranged signals set up.



EIGHT FOOT LOG DECKS, WATERING TOWERS AND FLUME, 1968

WELDWOOD PHOTO COLLECTION

Philip Gimbarzevsky, the forester responsible for aerial photography and mapping, was very adept at estimating tree heights from stereo pairs of photographs. After Ranger's experience he experimented with measuring heights of the stacked piles from vertical aerial photographs that he took over the mill yard. His measurements were quite acceptably precise and his system replaced the hazardous manual method. Gimbarzevsky was presented with an award for his paper that was later published in a trade journal.

With the advent of mechanization in logging and trucking of tree-length logs, the wood yard operation was completely rearranged. Mobile 'carry-lifts' unloaded trucks in one lift and piled them in bunches in the yard. Since the bundles could not be piles as high as before, the woodyard had to be expanded to the west. Then, as year-round hauling became possible, woodyard inventories could be reduced. Opening of the HI-ATHA sawmill in 1993 required another major modification in wood deliveries and wood yard operations, described later.



**BEGINNING OF A NEW ERA, 1968: UNLOADING TREE LENGTH LOGGING TRUCK USING "CARRY-LIFT"
THE LAST PILE OF 8-FOOT WOOD IS IN THE BACKGROUND**

WELDWOOD PHOTO COLLECTION

8.5 REDUCING ENVIRONMENTAL IMPACTS

The original Hinton pulp mill was clean and efficient by the standards of the 1950s, especially compared to the old sulphite mills. However, by today's standards, it was smelly and polluting. The quantities of nutrients, solids and chlorinated compounds released by this one mill into the Athabasca River during the 1950s and early 1960s were considerably greater than the amounts released by all seven Alberta pulp mills during the 1990s.

The Alberta government recognized that pulp mill discharges could have a significant impact on rivers. According to Peter Hart's recollection in a 1976 interview, this was a major reason for relocating the mill from Edson to Hinton. "The government wouldn't let up," he said. Because of the low water flows in the McLeod River, "the pollution would be too heavy, and it would make a sewer out of it." The Athabasca

River, with more than four times the water volume, would dilute the discharges considerably. “We had plenty of water in the Athabasca.”

The company provided water and sewage treatment for the town as well the mill, and the treatment facilities were upgraded several times as technology improved and standards were raised. The government began monitoring water quality in the Athabasca in the early 1960s, and the licence requirements changed at least once per decade over the next 40 years. The main concern was the impact on the river in mid-winter, when the surface is frozen and the water flow barely one-tenth of its summer peak. See Figure 1.

In the early 1980s the Company constructed a new recovery boiler as part of its response to comply with new environmental standards for water and air emissions. Paragraph 59 (4) provided that if the capital cost of facilities for control of water pollution, air pollution and odour abatement as needed to meet requirements established by the provincial Board of Health exceeded the sum of \$4.1 million in total, then the excess costs would be borne by the Government of Alberta. The cost of the project was approximately \$41 million, so under terms of the Agreement the Company requested a roughly \$37 million cost share from the Alberta government. The government argued that those costs included a large proportion of engineering that had operational benefits to the mill, such as in cost reductions or production increases – that were well beyond what was required for reduction of emissions. The Company agreed, in an out-of-court settlement, to accept a payment of between \$2 to 3 million and absorbed the balance of the cost itself. One of the terms of settlement was deletion of the pollution-abatement cost-sharing clause from the Agreement in 1982.

As the mill became more efficient, more water was recycled and more solids and nutrients burned in the boilers. Treatment ponds were enlarged so that there was more treatment capacity and more solids settled out before water was discharged. The solids were dredged out occasionally. Aerating the water during treatment encouraged bacteria to digest the organics. By the 1980s, chlorine compounds were the principal water quality issue for bleached kraft pulp mills. The compounds, resulting from use of elemental chlorine in the bleaching process, included trace amounts of highly toxic dioxins and furans.

When the mill was rebuilt and expanded in 1989-90, a new process called oxygen delignification was added. This removes a substantial amount of lignin between the pulping and bleaching stages. As a result, it was possible to use alternative bleaching agents such as oxygen and chlorine dioxide. After 1990, the chlorine compounds in effluent dropped sharply, and the quantities of dioxins and furans were below regulators’ measurable limits. The pulpmill ceased using elemental chlorine in 1993 and was labelled “elemental chlorine free (EFC).” This further reduced effects on the river and made the pulp more marketable, especially in Europe.

Between 1991 and 1996, the Alberta and federal governments launched a major scientific study of the province’s north-flowing rivers. The Northern River Basin Study included about 150 research projects on such diverse topics as river flow, hydraulics, nutrients, dissolved oxygen, contaminants, fisheries, ecosystem health, traditional knowledge, cumulative effects, modelling, drinking water, resource use and human health. See Figure 2. The study found that, on the whole, the condition of aquatic ecosystems in the northern basins was good. Dioxins and furans in fish were declining, and most basin residents had access to good quality drinking water. The governments pledged to continue research and address problem areas.

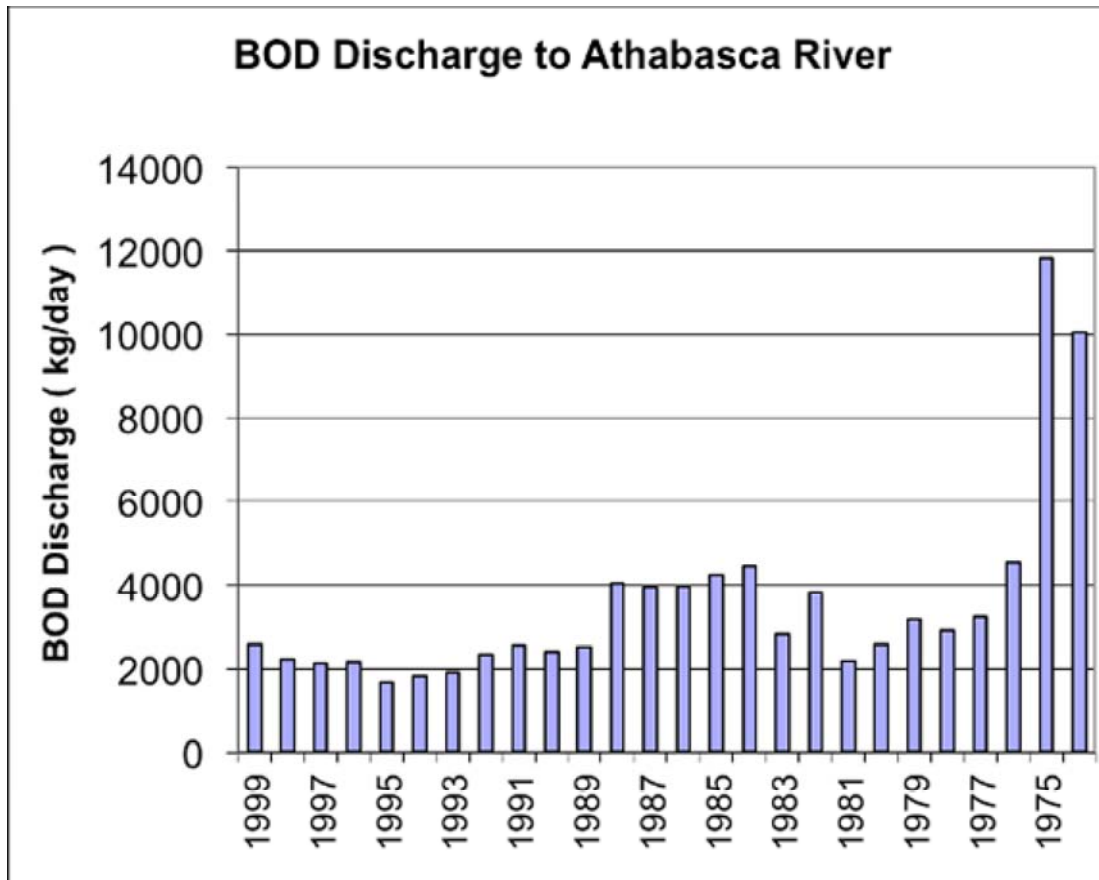


FIGURE 8-1. BIOCHEMICAL DISCHARGE TO THE ATHABASCA RIVER 1974-1999

Oxygen demand (BOD) is an indicator of the amount of waste to treat in effluents; BOD affects fish and other aquatic life by reducing the amount of oxygen available to them. Enlarging the mill’s waste treatment facility in the mid-1970s, and continual improvement since then has substantially reduced BOD discharges.

Air quality issues at Hinton mainly involved sulphur compounds in the plant’s emissions. While the total amount of sulphur was less than the releases from a medium-size natural gas processing plant or coal-fired generating station, the emissions included highly odorous substances such as methyl mercaptan. These emissions were reduced by improving process controls and emission treatment facilities. Directing process vent gases through the power boiler for combustion reduced odours. As with so many environmental issues, management systems and worker training were key factors in improving air quality.

Solid wastes included bark, woodyard debris, green liquor dregs and lime mud. Most of these materials were disposed in a landfill until the 1970s when the power boiler was expanded and adapted to burn “hog fuel” bark and wood wastes. This produced steam and electricity for the lumber and pulp mills, with excess power fed into the provincial grid, and simultaneously reduced solid wastes. In the 1990s, a new device called a “reclaimer” recovered woody materials from the woodyard and also reduced landfill requirements. In addition, woody wastes were used for soil remediation projects, and the company

joined in research to find alternative uses for lime mud, boiler ash and secondary treatment sludge. Recycling efforts were stepped up throughout the operation, and a new engineered landfill was built in 1992 for the remaining solid wastes. There were aggressive programs to reduce and safely dispose of hazardous wastes. Spill prevention and response programs were upgraded throughout woodlands and mill operations.

Pulp Mill	Startup	Product	Receiving Water
1 Fletcher Challenge	1972	bleached kraft pulp	Williston L.
2 Finlay Forest Industries	1969	mechanical pulp, newsprint	Williston L.
3 Louisiana-Pacific	1931	bleached chemi-thermomechanical pulp	not applicable
4 Fibreco	1988	bleached chemi-thermomechanical pulp	Peace R.
5 Weyerhaeuser Canada	1973	bleached kraft pulp	Wapiti R.
6 Daishowa-Marubeni	1990	bleached kraft pulp	Peace R.
7 Weldwood of Canada	1957	bleached kraft pulp	Athabasca R.
8 Millar Western Pulp	1988	bleached chemi-thermomechanical pulp	Athabasca R.
9 Alberta Newsprint Co.	1990	thermomechanical pulp, de-inked paper	Athabasca R.
10 Slave Lake Pulp	1931	bleached chemi-thermomechanical pulp	Lesser Slave R.
11 Alberta Pacific Forest Industries	1993	bleached kraft pulp	Athabasca R.

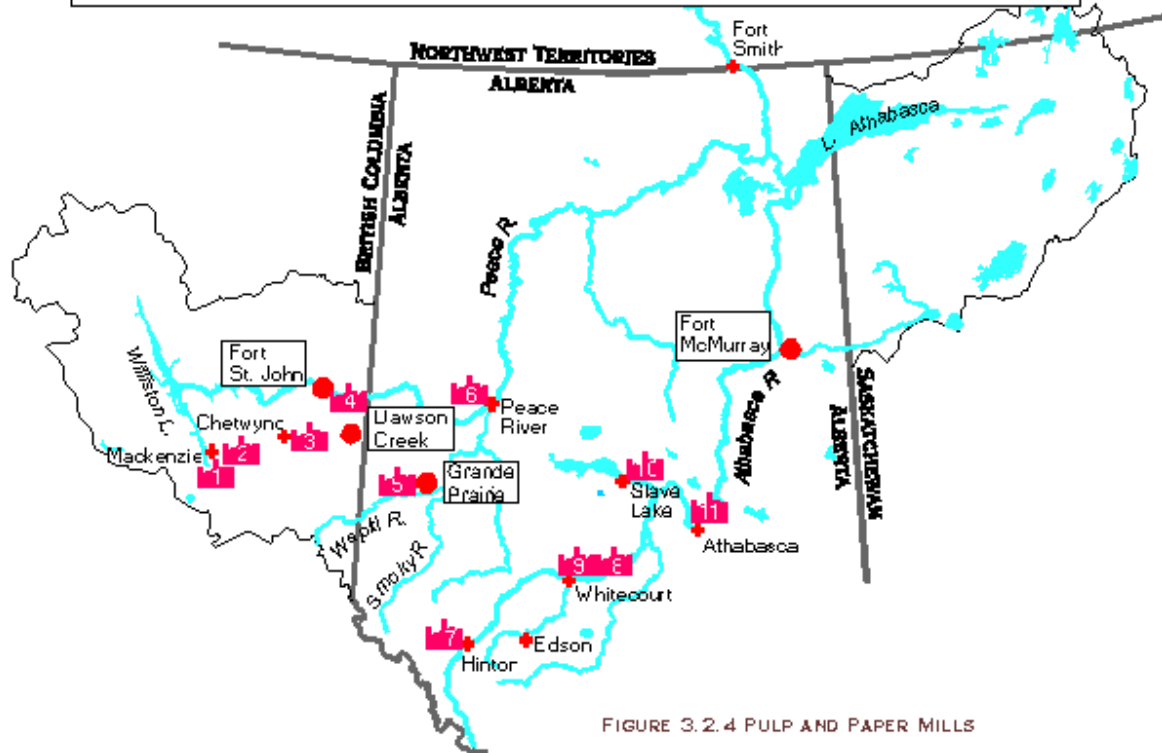


FIGURE 3.2.4 PULP AND PAPER MILLS

FIGURE 8-2 MILLS AND RIVERS: NORTHERN RIVER BASIN STUDY, 1996

To address environmental issues in the 1990s, the company established a Public Advisory Committee and a joint company-union environmental committee with Local 855 of the Communications, Energy and Paperworkers Union of Canada (CEP), which represents hourly employees at the pulp mill and saw mill. The company also joined the West Central Airshed Society (WCAS), a voluntary air quality

monitoring and improvement initiative involving government, industry and non-government organizations in Alberta.

The mills' environmental management systems passed demanding external audits in the 1990s for certification under the Alberta Forest Products Association's FORESTCARE program and in 2000 for certification under the International Standards Organizations ISO 14001 standards.

8.6 INTEGRATION AND EXPANSION

St. Regis always focused on its main business, pulp and paper, and was not very interested in other products such as lumber or panelboard. However, a significant quantity of potential sawlogs were being cut under the "oldest first" approach to forest management. As a result, there was continuing pressure from the government to extract more value from the timber.

In the early years, this was addressed by allowing some area sawmill operators to harvest larger timber. At least one sawmill operator, Bill Nigro, cut railway ties and sent his small-diameter logs and tops to the mill in 1957. As Jim Clark, then Woodlands Manager, described:³¹⁶

One sawmiller [Bill Nigro] was operating an LTB and there was some large lodgepole pine timber outside of his LTB in our Company's FMA. [He] visited our woodlands manager to see if he could get the patch of pine timber to manufacture railway ties. Our manager deferred Bill's request until we field-inspected the timber. Then Bill was offered the timber provided he produced pulpwood from the small-diameter timber cut to a five-inch diameter stump and a four-inch diameter top. It was a payment-on-delivery contract. Bill accepted the deal, delivered the pulp wood and even admitted he thought he made more profit on the pulp wood than on railway tie production.

Clark noted that this demonstration was the catalyst that prompted many of the other LTB operators to produce pulpwood from the tops and small-diameter wood on their sawlog operations.

Then in 1965 David Benbow, a NWPP employee, recognized the possibilities for cutting fence posts from the FMA. He arranged an approval from the Company and set up an operation on the McLeod Working Circle, enhanced by dual use of the Company road system. As Jim Clark commented:³¹⁷

... our FMA had thousands of acres of stagnated lodgepole pine that resulted from previous forest wildfires. These stands could produce fence posts. Our Company's FMA could be improved if the stagnated stands, those that were growing trees "as thick as a hair on a dog's back" could be removed and replaced with a new stand of more widely-spaced regeneration of pine. This was a win-win situation. One company got a supply of saleable fence posts while our company got increased forest growth on the forest stand areas harvested for the posts.

One NWPP study in 1959 also examined the sawlog potential of the provisional reserve area, and another in the mid-1960s looked at wood quality throughout the pulpwood lease area. These studies, and the government's prompting, led to the 1968 agreement for expansion of the pulp mill, construction of a sawmill and doubling of the lease area. However, the company was unable to meeting a June 30, 1971 deadline for beginning the pulp mill expansion, a new provincial government was elected in August 1971, and the 1968 agreement was cancelled in February 1972.

Although the Company remained focused on pulpwood, it was apparent that many logs of sawlog quality were being run through the chipper that may have been better utilized as saw timber. Dr. J. Donovan Ross, minister of Lands and Forests during the late 1960s, commented on this following a tour around the Hinton operations and mill, as Clark described:³¹⁸

He was very insistent we discuss the idea of operating a sawmill in the future as he could not accept the fact we were wasting large sawlog timber material in making pulp. After his visit, he wrote a thank you letter and made directed reference to our using large timber harvested from the FMA where the manufacture of lumber, rather than being wasted for pulp production. Our management group discussed this development. We then did a forest resource profile analysis to determine the most efficient size of sawmill we should consider. ... the cost-benefit analysis indicated the sawmill should be sized at 50 to 70 million board feet per year with the 60-65 million FBM production indicating the least-risk facility. Ivan Sutherland asked me to visit the vice-president of Solid Wood Products for our corporation in Tacoma, Washington to discuss the government pressure on us for a sawmill. I visited him armed with all our analysis data and draft design proposal for the sawmill and ancillary handling equipment, including a capital cost estimate and operating cost projection to profitability. Bill Haselton gave me a pleasant and encouraging audience and I left with his exhortation "include it in your current capital budget and I'll guarantee you my support of it in New York next month. I'm surprised you people have waited until now to ask for a sawmill; you've got a wonderful forest resource."

The foundation for a new stud mill was poured in June of 1971. It produced 20 million board feet in 1972 and over 50 million in 1973.

In the meantime in 1971, the Company tried a railway tie venture based on a portable sawmill in the wood yard. As Jim Clark explained:³¹⁹

At our monthly management meeting, Ivan Sutherland discussed the subject of railway tie manufacture in our sawmill. The Canadian National Railway had talked to him about their critical shortage of number one and two ties, whose depth and width dimensions were seven by eight inches and six by eight inches. Their price offered was good and he had promised them 240,000 ties over the winter months of October to March. He advised me to make sure the sawmill had lots of pine logs to manufacture the ties. This generated lots of discussion about revisions to cutting plans and government review and approvals. Woodlands delivered lots of good, large pine logs to the sawmill and it produced 240,000 railway ties and sold them to the CNR. The whole Alberta forest industry that year produced 360,000 railway ties; we had produced 67 percent of the provincial total and made a negligible profit for all our effort. We never made railway ties again.

The stud mill was profitable and, together with the tie operation, partially satisfied the government's demands for greater utilization. The stud mill was also Alberta's first integrated lumber-pulp operation, the forerunner of much greater integration across the province in the 1980s and 1990s.



STUD MILL, 1976

WELDWOOD PHOTO COLLECTION

Another attempt at diversification was a plant to extract “tall oil,” a soapy mixture of fats and resins, from the pulp stream. The plant operated from 1967 to 1991 and was shut down after the mill expansion because there was no demand for tall oil in the marketplace.

A downside to the direction of quality logs to the sawmill was brought out at hearings of the Expert Panel on Forestry by pulp mill technician Randy Lickacz.³²⁰ While the importance of wood quality in the sawmill has been emphasized, it is also important in the pulpmill, he explained. They were concerned with pulp quality and worked closely with their customers in that respect. But with respect to wood supply, he said he had the impression: “... that people treat the pulpmill as a ‘garburator’; what anybody else doesn’t want, give it to the pulpmill, they will take it. The prime example is with the overmature standing dead wood. You can’t make two-by-fours or railway ties or two-by-sixes or whatever out of it, so give it to the pulpmill.” He went on to explain that chip quality was poorer, fibre quality and quantity suffered, that decay added to the load on the recovery boiler, and there was a loss in by-products such as tall oil. He agreed that poorer quality wood should be utilized but the costs of doing so should be recognized.

Kenneth Hall, vice president and resident manager at Hinton from 1977 to 1987, was determined to realize the undeveloped potential of the Alberta foothills around Hinton – an underutilized forest resource, a favourable social climate, mills too small to compete globally, new technologies to improve efficiency and reduce environmental impacts. He led the company’s two major expansion projects, unsuccessfully in 1978-79 and successfully a decade later.

The first bid aimed to utilize the Berland timber development area north of the Hinton FMA area. The St. Regis proposal included a major pulp mill expansion, a two-machine lightweight coated paper mill at

Hinton, a sawmill producing 40 million board feet annually at Grande Cache, and a log-home manufacturing plant at Grande Cache. Instead, an FMA was awarded to British Columbia Forest Products (then 28 per cent owned by the Alberta government), which proposed a newsprint mill and sawmill near Whitecourt and a sawmill at Grande Cache. Ultimately only the Grande Cache sawmill was built, the Berland FMA was rescinded, and St. Regis built its coated paper mill at Sartell, Minnesota.

Hall was disappointed by the “politics” surrounding the Berland decision. For the time being, the only new development at Hinton was a 40 per cent expansion of the stud mill in 1981 to produce 70 million board feet annually. Further plans were delayed for several years by the severe recession of the early 1980s, record low pulp prices, and major corporate battles for St. Regis. After fending off takeover attempts in 1983 and 1984 by Sir James Goldsmith and Rupert Murdoch, the venerable paper company arranged a friendly merger in 1984 with Champion Corporation.

In 1984, the Alberta government published a major “white paper,” *Proposals for an industrial and science strategy for Albertans 1985-1990*, which emphasized forest industry development as a key element in reducing the province’s dependence on the oil and gas industry. Encouraged by this, Hall prepared a new strategic plan that won approval by Champion in late 1985. He and Champion president L.C. (Whitey) Heist met in April 1986 with Alberta premier Don Getty and Don Sparrow, the minister of Forestry, Lands and Wildlife, to discuss the possibilities. Hall retired as vice president and manager in March 1987 to become expansion project leader until the new pulp mill opened in 1990.

On May 5, 1987, Champion announced the beginning of a \$3-million feasibility study. This set off a year of intense planning and negotiations leading to the new Forest Management Agreement signed on June 16, 1988. Key considerations included railway freight rates, federal and provincial taxes, a provincial loan guarantee, utilities, roads, wood resources included directed wood chips, forest management and environmental standards. Three key elements of the new Agreement were the commitments to expand the pulp mill to a rated capacity of 424,000 tons annually, increase the sawmill capacity to a rated 150 million board feet annually, and to expand the forest management area by approximately 25% to supply necessary fibre to the new mills.

Final details of the agreement were nailed down in early 1989, and the pulp mill construction began in April. The \$415-million project included a new Kamyr digester, oxygen delignification, chlorine dioxide bleaching, a new recovery boiler, and advanced pollution controls. The mill’s capacity increased to 380,000 tonnes per year. Ken Hall retired on March 14, 1990, as the project was completed. The Alberta Chamber of Resources named him the 1990 “Resource Person of the Year.”

8.7 DESIGN AND CONSTRUCTION OF THE HI-ATHA SAWMILL

The second mill commitment in the 1988 Agreement was for a sawmill with a rated capacity of 150 million fbm per year. This was the size stipulated in Weldwood’s proposal and was the basis on which negotiations were conducted. When the Agreement was signed, Ken Hall, vice-president and resident manager who had led the negotiating team, left that position to assume on-site responsibility for renovations and addition to the pulp mill.

Sawmill construction was delayed by economic recession and the need for detailed analysis of timber supply, wood quality, mill technologies and lumber markets.

In the meantime, Dennis Hawsworth, Weldwood’s general manager at 100 Mile House operation - a UBC graduate forester - had successfully led several sawmill modernization projects for Weldwood in

B.C. In 1987 he was asked to visit Hinton to assess the sawmill project and wood supply. As he described it later:

That expansion initiative met the commitment in the new Forest Management Agreement that the existing sawmill here had to be expanded to 150 million board feet. The stud mill at that time was processing in the area of 80 million feet, so it would in effect be a doubling of the mill. I was asked very early to come up and have a look around and give my impressions of what I thought could be done to meet the undertaking. There were two things that struck me right at the onset. First of all, considering the quality of the wood that was being harvested here, I couldn't believe why we were turning it into studs. I felt right off the bat that we should be looking at a random length, random width mill. And secondly, I was also very impressed by the information available on the quantity, size and quality of timber that would be suitable for such a random length mill. This suggested to me that we could easily build a mill in the area of 200 million board feet, and should do so.



In 1988 Hawksworth moved to Hinton to take charge of the sawmill design and construction, reporting to Vice President Leon Pond in Vancouver. The pulpmill was about 95% completed before work began on the new sawmill. Hawksworth took the time to carefully plan the design, then to work with unions to ensure in advance that the concept of a team approach and labour flexibility in the operation would be acceptable. And a further delay was induced by a market slump that affected availability of capital.

DENNIS HAWKSWORTH

BOB UDELL PHOTO

The design phase incorporated a very detailed study of the wood supply and involved integration inventories, planning, logging and wood deliveries. The wood supply and log characteristics were among the first to be studied, as Hawksworth described:

We were a little bit nervous about the forest inventory to the extent that the information wasn't as specific as you get out of an operational cruise. If you don't deal properly in design with things like sweep, taper and lengths, you can find yourself having built a mill that really doesn't fit the characteristics of the wood supply. We felt very good about the overall supply of wood and such characteristics as size and lengths, but needed to get a better understanding of other important aspects of the

wood supply. This was critical to us. The stud mill, with its relatively low output, had no problems meeting its requirements from a pulpmill-driven planning and harvest profile. But today, the reverse is the case, and planning and harvest is driven by the needs of the sawmill, with the pulpmill taking the residual in terms of small logs and residual chips from the sawmill.

It was critical for us to understand sawmill-related aspects of the estimated million meters of potential sawlogs over 8.5" stump height diameter. To get this information, we measured a sample of about 600 stems that represented the stand and stock table from the FMA. Using transits, we measured this sample in the yard to get important details on taper, sweep, oval-ness, length, crook -- every attribute that we felt was important was included in that information data base. Then we used a very powerful tool called SAWSIM to run the resulting log profile through a "virtual" sawmill. SAWSIM is a sawing simulation modelling program that basically - through a conceptual design - takes your sample data, the characteristics of your tree profile -- and produces an estimate of your resulting lumber production including width, length, piece counts at machine centres, and even grade. It is used as well to balance flow in a sawmill. Part of SAWSIM is called BUCKSIM. We took these 600 stems and said on an average day out of these 600 stems there will be a representative log group that goes into that mill. We basically rebuilt the stand and stock table using real stem data, and simulated what would happen with those logs going into the mill before it was even built. SAWSIM modelling is a powerful tool, and we continue to use it to assess the outcomes of new projects, or even changing the sawmill cutting parameters in our existing mill.

There were two other design features that were also noted by Hawksworth:

The other interesting thing about this mill, which has never been tested, is that we have full capability to produce metric products either on an individual run basis or simultaneously. It was designed into the mill with the vision that should we ever experience a major downturn in the North American market, we have some other options.

Another interesting and exciting thing about this mill is our analysis of the fibre quality. We even went to the extent of bringing European graders over to look at the Hinton fibre and give us an idea of its grade potential in European terms. Much if it was rated as joinery grade, i.e. suitable for high quality industrial manufacture.

The \$72-million HI-ATHA mill, designed to produce 215 million board feet annually, was completed under budget in August 1993. It included the latest computerized equipment to reduce waste and obtain optimum value from each log. The mill start-up was the next step, one for which the team had also thoroughly prepared as Hawksworth described:

George Richards described the start-up as like having a baby. Until you go through one you wouldn't get what he is talking about. But we were well prepared, we built a team and hired quite a few individuals who had gone through start-ups. I had done a lot of research into start-ups - what they were like, what the pitfalls were, and what they can do to people -- and that helped a lot. we still went through hell in the start-up.

but at least we were mentally and physically in shape for it and knew what to expect. And we had a very successful start-up. This mill has made money every month since it opened its doors. It's a very good mill, served well by an outstanding wood supply. And over the last several years, we have been able to really synergize the wood flow to provide maximum benefit to both the pulpmill and the sawmill here.

The mill was designed to produce 212 million board feet of lumber. We passed that level of production in our 17th month of operations and we are now [1997] producing at a rate about 10% over design. This year we will put over 230 million board feet through the mill. We think the current mill, without major modifications, is capable of about 248 million. We have the log profile, we have the quality and we have the know-how to deliver those logs to the mill. Our consumption today is roughly a million cubic meters with utilization to a 7 cm top. We merchandise each full tree through the mill, sawing various lumber lengths and products based on a computer-linked value equation at different break points.



HI-ATHA SAWMILL

WELDWOOD PHOTO COLLECTION

Because of trade restrictions affected the traditional U.S. lumber market, HI-ATHA produced both U.S. and metric dimensions and was able to meet the demanding Japanese Agricultural Standard (JAS) lumber criteria. In 1997, the mill's output reached 230 million board feet.

The importance of that strong link between planning and operations was again emphasized by Hawksworth:

We have developed a very close relationship between the Forest Resource department and the mill. The Forest Resource department understands our business and understands what makes HI-ATHA work. It understands what the issues are and what can happen if the log profile isn't properly balanced, not only to HI-ATHA but as well to the yard which serves both Hi-Atha and the pulpmill.

We have to balance our bush and yard inventories to maintain them at very low levels, because this supplies fresher wood to the mills, resulting in higher quality lumber and pulp, and higher quality chips. Low level inventories also allows much more flexibility

to respond to a slight change in log profile that can really affect us. We are a big mill, but we are also a specialty mill in that we produce a unique variety of differentiated commodity products. We have a customer base that requires specific lengths within a grade tally. If we do not sustain a predictable and desirable mix of quality, size and species into that mill, we will not be able to meet the customers' needs and they will go elsewhere. So we are very sensitive to what goes into the mill .

From a planning and operations mode, that works very well because the Forest Resource group understands our business fairly well. The sawmill business, from a log supply perspective, is much more complicated than feeding a pulp mill. In feeding a pulp mill it doesn't matter the size of the log, you make chips out of it --bearing in mind the issue of fibre characteristics and other chip quality influences, obviously. But from a sawmill's point of view many other factors become important, including how the logs are handled in the bush, how they are inventoried, how they are taken out of inventory, to what is in front of the mill, to how we turn the inventory over, to what species we run at certain times of the year. As such, it is critical to maintain close understanding, communications and linkages between the plans and activities of the Forest Resource Department and those of Hi-Atha.

Hawksworth's comments about optimizing the value of wood cut on the FMA and trading for value are reflected in Figure 3. Until 1991 the pulp mill was largely supplied with wood harvested from the FMA. As the graph shows, the percentage of wood from the FMA used in the pulp mill declined from about 70 percent to a low of 20 per cent in 1999. Higher quality logs from the FMA were either used in the HI-ATHA sawmill or traded with other industries. The balance of the wood needed in the pulp mill came from sources outside the FMA through trade or purchase.

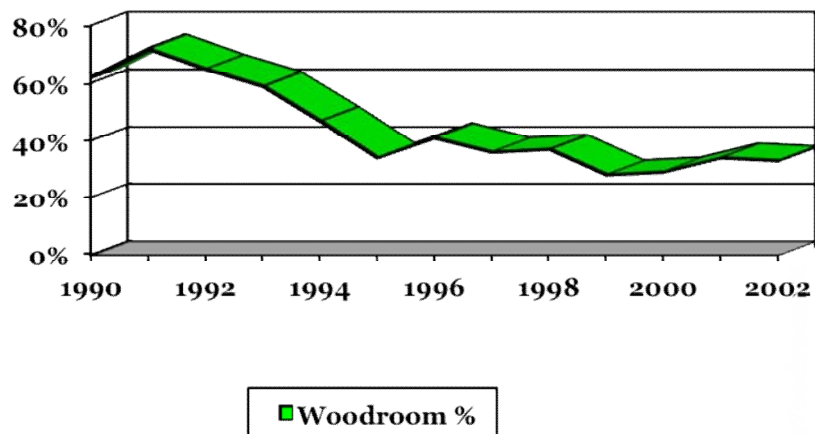


FIGURE 8-3 PER CENT OF CONIFER FROM FMA USED IN PULP MILL.

8.8 THE JACQUES REPORT 1996

This report was developed as an Alberta government initiative through its standing policy committee on natural resources and sustainable development, a sub-committee chaired by Wayne Jacques, MLA from Grande Prairie-Wapiti. Its 1996 report contained ten recommendations developed, as indicated in the report: “in consultation with existing FMA holders.” It re-emphasized the importance of the basic principles of sustainability, fairness, security of tenure, stability and maximizing value from the timber resource. However, the recommendations suggested a more politically-driven agenda to try to increase revenues to the province, increase corporate investments in the forest and value-added production, and sharing the value of the forest through strategic partnerships with other forest tenure holders.

In concept the Jacques report and subsequent government endorsement stipulated that in order to renew an agreement a company had to show more than just adherence to the previous terms. Requirements for renewal included further investment in manufacturing capacity for value-added production and greater economic activity, enhanced forest management to ensure sustainability and increased social benefits, or some combination of these.

Another of the more significant requirements that followed was for a form of ‘evergreen’ clause that called for a mid-term review of the agreement at 10 years which, if both parties concurred, would result in a 10-year extension of the agreement. It also provided for a 20-year renewal at the end of the nominal 20-year term. This was intended to ensure that a company would have an assured term of agreement of between 10-20 years at any one time. Most agreements have now been converted to an ‘evergreen’ format, and renewals have been accompanied by commitments to further investments.

8.9 MILL PRODUCTION

One of the fundamental conditions of forest management agreements is construction of a mill of sufficient size to fully utilize the allowable cut on the proposed FMA. When the Hinton mill was being negotiated, the requirement stipulated a pulp mill. More recently, FMAs have been granted to support integrated mills, not necessarily including pulp mills. Table 2 presents a summary of the capacities specified in the various agreements.

Annual production of pulp and lumber is summarized in Table 3 and illustrated in Figure 4. Charts illustrating investment and production respectively for the pulp mill from 1990 and HI-ATHA from 1995 are shown in Figures 5 and 6.

TABLE 8-2 CHANGES IN AGREEMENT AREAS AND MILL REQUIREMENTS

Agreement		FMA Area	Pulp Mill Required Capacity	Pulp Mill Required Capacity ^{lviii}	Sawmill Required Capacity
Year	Date	km ²	tonnes/day	tonnes/yr	Mfbm/year
1951	8 June	4,900	180	64,000	
1952	12 July	5,200	90	32,000	
1954	14 September	7,700	270	96,000	
1955	13 July	7,700	270	96,000	
1956	26 April	7,700	270	96,000	
1968	30 August	16,317	910	323,000 ^{lix}	
1972	4 February	7,700	270	96,000 ^{lix}	
1988	26 May	10,120	1190	423,000	196,000

^{lviii} Conversion estimated 355 operating days per year

^{lix} Rated minimum capacity for an expanded mill -- it was not built

^{lx} Rated minimum capacity reverted back to original after cancellation of PRA

TABLE 8-3 PULP, STUD AND LUMBER PRODUCTION AT HINTON 1957-2000

Year	Pulp tonnes	Studs Mfbm	HI-ATHA Dimension Lumber Mfbm
1957	34,371		
1958	93,894		
1959	121,345		
1960	147,815		
1961	146,364		
1962	138,320		
1963	159,199		
1964	167,642		
1965	172,460		
1966	177,313		
1967	166,447		
1968	166,198		
1969	176,702		
1970	179,151		
1971	174,667		
1972	179,684	20,078	
1973	177,459	50,856	
1974	176,371	43,679	
1975	166,696	46,533	
1976	174,860	52,712	
1977	169,679	56,066	
1978	167,476	59,357	
1979	173,163	53,038	
1980	167,873	46,152	

1981	171,095	54,469	
1982	173,276	60,764	
1983	181,150	67,603	
1984	186,963	72,167	
1985	183,568	73,713	
1986	187,132	74,244	
1987	192,230	77,032	
1988	192,558	74,020	
1989	167,624	82,386	
1990	232,283	81,628	
1991	346,683	83,534	
1992	371,288	90,815	
1993	364,279	62,323	31,949
1994	377,888		190,568
1995	395,241		207,256
1996	406,543		223,402
1997	414,130		233,410
1998	371,122		216,370
1999	376,318		242,531
2000	375,603		245,317
TOTALS	9,442,123	1,383,169	1,590,803

Pulp and Lumber Production Weldwood Hinton

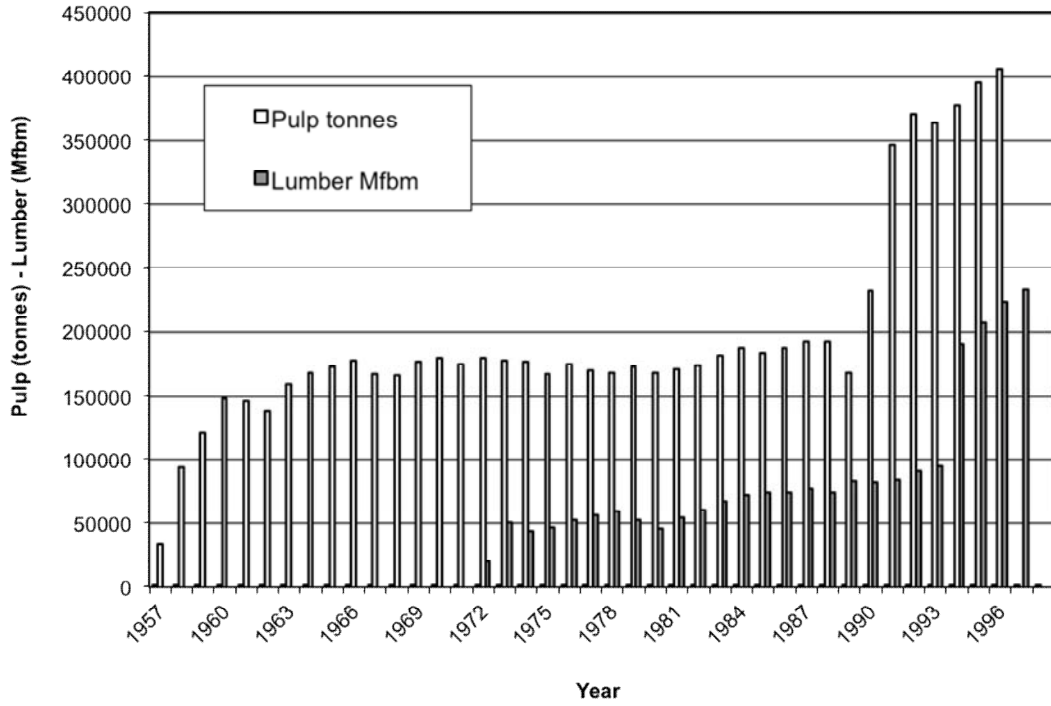


FIGURE 8-4 PULP AND LUMBER PRODUCTION 1957 TO 1998

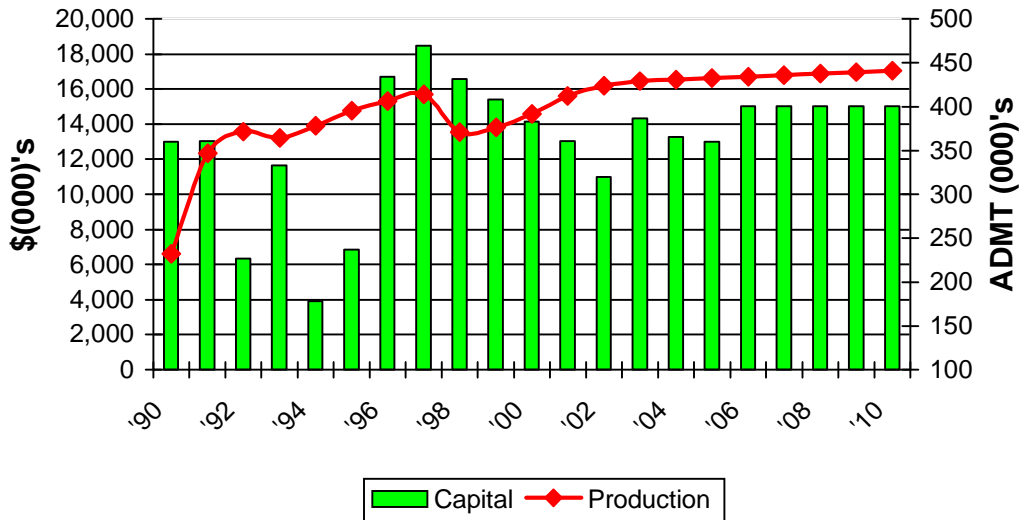


FIGURE 8-5 PULPMILL INVESTMENT AND PRODUCTION 1990 TO 2000

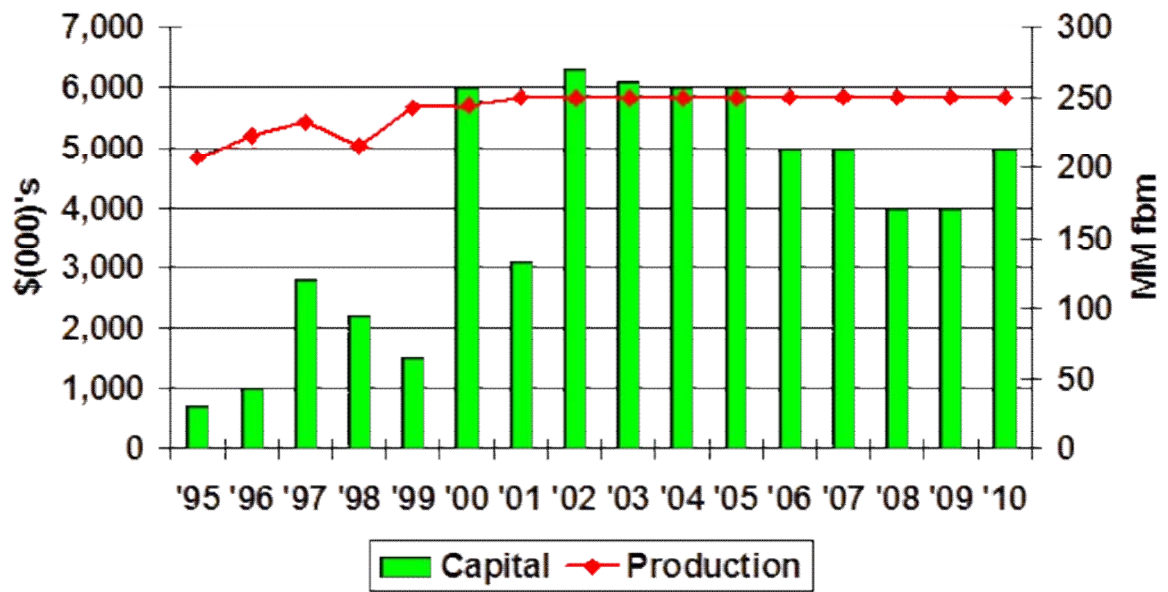


FIGURE 8-6 HI-ATHA INVESTMENT AND PRODUCTION 1995 TO 2000

CHAPTER 9 COMMUNITY CONTRIBUTIONS

9.1 BUILDING THE COMMUNITY

Once the decision had been made to build the mill on the level bench along the Athabasca River at Hinton, it was evident that a construction camp would have to be built. This was going to be a major project. The existing town with a population of about 200 and only one small hotel could not possibly absorb the numbers of construction people who would be needed. Secondly, there would have to be some family-type accommodation provided for married men in supervisory positions on the construction projects as well as for the first forestry and mill staff. Thirdly, there would have to be a community constructed to house the families of those who came to work full time with the pulp mill operation and in local businesses.

The company first arranged in early 1955 to contract with Poole Construction Company Ltd. of Edmonton to build a construction camp for about 1,000 workers. They then contracted with Canada Catering Company Ltd. to run the camp and to provide meals. Ray Ranger, a forest technician who became head of the forestry department's land use section, was an early resident of the Canada Catering Camp. His experiences were described in Chapter 1.

Concurrently, the company also rented the cabins at the Bar-B-Q Ranch Motel in the valley for its first staff. These cabins were augmented by a trailer park. Unfortunately, in the haste to service them in time for staff arriving that spring and summer, water and sewer lines were not properly installed. Doubly unfortunately, the winter of 1955-56 was severe and plummeting temperatures created havoc with the water works. Typical adventures of the first employees – the 55ers -- were also described in Chapter 1.



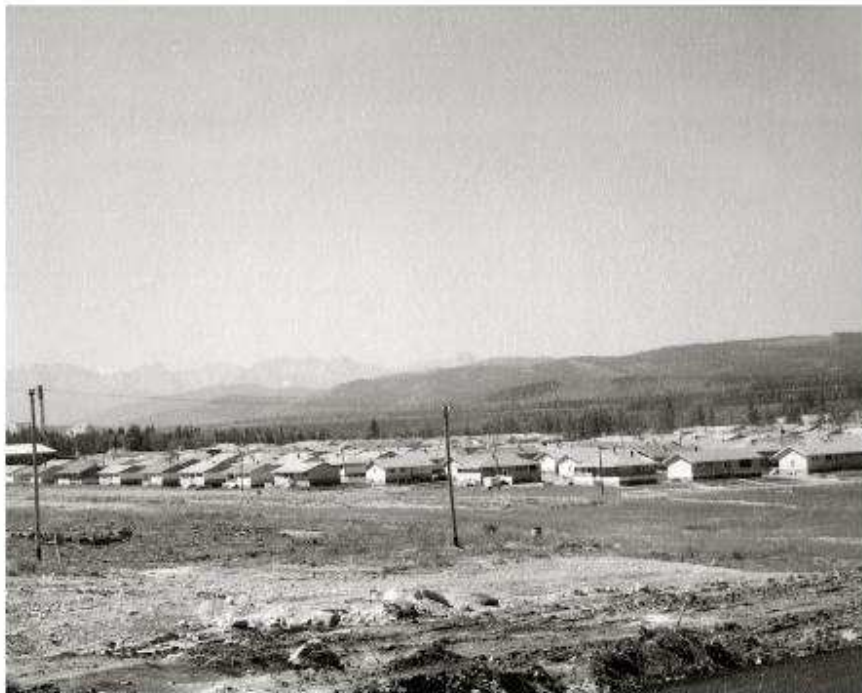
PHOTOGRAMMETRIST
PHILIP GIMBARZEVSKY
AND SON AT RENTED
CABIN COMPLEX, WINTER
1955-56

PHILIP GIMBARZEVSKY
COLLECTION

In the meantime, plans for a new town site were being developed. The Alberta government had had experience with several “instant” communities that had sprung up as a result of the oil boom starting in the late 1940s. The Department of Municipal Affairs was designated to oversee the start-up of what were termed “new towns.” The “New Town” of Hinton was originally planned on a single site surrounding the existing hamlet along the highway by the hotel and railway station. The rationale was that this site, upwind from the prevailing westerlies, and with views of the mountains, would be the logical place for the new community.

An early decision by the company was that this new community should not be a traditional “company town”, such as many of the coal mining communities where housing was built and owned by the mines and rented to the miners. Instead it was agreed that private home ownership should be encouraged, but that some rental accommodation should also be made available. Further, the company was not eager to get into the housing business so they formed the arms-length Athabasca Valley Development Corporation (AVDC) to acquire land, develop the infrastructure of roads and utilities and construct the houses and other buildings. The AVDC was headed by Robert Ruben, son of NWPP’s Frank Ruben.

Although the original plan was for a new community to be built on the hill, AVDC purchased land from two ranches in the valley for its new town site, just to the east of the mill site. It is not clear just how that happened -- some feel that there were problems with acquisition of adequate land on the hill, others who suggested that AVDC preferred to start its own development from scratch. Whichever, Municipal Affairs agreed that there would be two distinct subdivisions to the town -- the original one on the hill, the other in the valley. AVDC then proceeded to develop the valley town site. Their understanding with the company was that there would be a variety of well-built homes constructed and that they would be offered first to mill employees. AVDC was also to build a hotel, shopping centre and, in consultation with the “New Town” and Municipal Affairs, to build schools and provide sites for churches and parks.



VALLEY TOWN 1956

PHILIP GIMBARZEVSKY
COLLECTION

Plans for the valley town site were approved in March 1956 and the first homes were ready for occupancy that fall, much to the relief of those families who had to struggle with the winter of 1955-56. In the meantime, the hill town site was also surveyed and many families built their own homes there, some moving homes from then-closed mining communities.

9.2 EDUCATION AND MEDICAL SERVICES

Temporary school facilities were provided by NWPP in its new pulp storage and shipping shed, which was available pending mill start-up. Schools were ready for use by the fall of 1957. By 1957 the “New Town” status was revoked and the town became self-governing. Popular druggist William A. (Bill) Switzer was elected as first mayor.

Frank Ruben undertook to build a natural gas pipeline from Wabamun to service the mill and townsite.

The Company and the New Town of Hinton grew up together. The community was needed to support the mill; mill management also recognized that it had a responsibility to its employees and the community.

Of course, the economic activity was the most clearly evident initial contribution. It changed Hinton from 200 people and a cluster of small buildings in 1954 to 10,000 people and a major service and supply centre by the early 1990s. By 1995, when both new facilities were under full production, the Company had 1040 full time employees in its two mills and the Forest Resource Department, along with 410 full time equivalent contractors in the woods. Salaries, wages and benefits were \$71 millions, and goods and services purchased a further \$265 millions.



HINTON'S FIRST BANK – IN 1955 STAN HART, ASSTANT WOODLANDS MANAGER DONATED THIS “SKID SHACK” TO THE BANK OF NOVA SCOTIA AS TEMPORARY QUARTERS FOR THE TOWN'S FIRST BANK

COURTESY BANK OF NOVA SCOTIA, HINTON

But there was much more to it than this. It had to do with a spirit of corporate support for the community engendered by Tom Easley, the first resident manager, and by his successor Harry Collinge.

Dr. Ian Reid was a recently-graduated medical doctor in July 1956 when he went to fulfill a contract which the Edson Medical Centre had with H.A. Simons to provide medical services to the construction project as Dr. Reid explained:

In that community everybody knew everybody else -- the community and the pulpmill. What happened originally was that there was no community in Hinton. There were a few little houses along the highway. There was the old Hinton hotel. Ray's garage and Skog's store plus the Mah's Café down at Bliss -- and everybody arrived in town before there was housing. So the families all moved in together once the Rubens had built the houses and the apartments in the valley. But everybody by that time was getting to know everybody else. And of course everybody was as poor as church mice -- it was all young people with no assets.

The resident manager -- a fellow called Tom Easley, an American -- was a super guy. I think he realized that for this community to fly, which was to the advantage of the company as well, that the company was going to have get in there in spades. And he was very supportive. You know, when we volunteer-built the swimming pool the people who provided the reinforcing rod for the building of the pulpmill provided the reinforcing rod for the pool. The people that provided the concrete provided the concrete for the swimming pool. St. Regis provided everything they could think of and I think probably half paid for these contributions. They provided the water supply for the town, and still do. And at one stage there was no charge whatsoever because they needed 40 million gallons a day or more of treated water for their pulpmill. The town's consumption was peanuts. But they also put in the major lines to supply the Valley, and later on the Hill. The hotel that was built by the Rubens and bought by the pulpmill, the Athabasca Valley Hotel, they provided facilities there for anybody who wanted it. The New Year's party -- we didn't have to pay the hotel for the room and things like that. The ambulance was owned by the pulpmill. It was available. It took people into Edmonton who weren't even associated with the pulpmill directly by employment. It provided the driver and attendant and me being the doctor, went with it. It was a benevolence that you would seldom see in commercial entities -- and that was started by Tom Easley -- and continued under Harry Collinge.

There was a concept -- it was like a family of 3,500 people and if anything happened, everybody helped out. The pulpmill would help out. Wayne Sawyer, [Industrial Relations Manager] who had some experience in the funeral industry in Ontario helped out -- because there was no funeral home in Hinton. If somebody died Wayne would be there and he would spend a whole day looking after the family's emotions and everything else. It was hard. I think that is why so many old-timers from Hinton look back at those days very fondly. Nobody locked their door.

This public-spirited attitude was also reflected in the initiative to establish a health clinic. Again, as Reid outlined:

In April of 1957, when Simons turned the mill over to St. Regis, Tom Easley came to me and said, "Look, what we need for our people, we need good health care. What I would like to do have you develop a clinic that will be able to provide that care. I have watched you over the last nine months and you are the kind of doctor that we want.

So what I would like to do is offer you any financial assistance that will help to provide that.” This is the way Tom Easley thought. It was a while later before it happened, but to start with we just ran the clinic at the pulpmill as the community health centre. And then when we wanted to build that clinic in the valley, we got a commercial mortgage from Sun Life -- but the difference is-- we didn’t have any assets -- the difference was a second mortgage from the pulpmill at 1% per annum and to “pay it off as you can when you can.” The whole idea was to try and get a community with the services and facilities that they needed. I think they really regarded it in the office as being a part of the operation of the pulpmill to make sure that the community was well established.

The medical doctors in Hinton operated a clinic at the mill under contract to serve health and emergency services for employees; they also operated public clinics in the community. However, the public had open rights of access to the mill clinic as a result of company policy, making it available as a drop in and emergency centre for all residents of Hinton and district. It was a marvellous contribution to the community.

An example was the shared pleasure when the mill overcame its start-up problems and began to increase production of quality pulp. As Reid recalled:

I can remember the absolute delight -- we had a big party down at the hotel and the whole crew was invited -- the day we made 430 tons for the first time! It proved the equipment worked because every ton of it was top grade. None of it was off grade. It showed that when the place ran smoothly it produced what it was supposed to produce. That was a big party all over town. The place works! ... So it was a very different community because it was Greenfield. There was really no community there before at all. It was an old coal mining town long gone. It gave people a sense of belonging. And even if you ran a store in town, they still were hooked into the system at the pulpmill and were interested in how it was doing because that was their livelihood. And also the pulpmill would provide all kinds of facilities and necessities.

Harry Collinge also had particular interest in the young people of the community and their education. Scholarships were offered to high school students planning to leave Hinton for post-secondary education. Collinge also provided company sponsorship of bus rental and accommodation at a leading Edmonton hotel for high school students who wished to attend the open houses offered at the University of Alberta and Northern Alberta Institute of Technology.

9.3 MUNICIPAL GOVERNMENT AND SERVICES

Hinton’s “New Town” status enabled it to receive assistance in covering some of the initial infrastructure costs. As a “new town” there was no elected town council, affairs being managed by an appointed board. As Jim Clark³²¹ recalled:

Hinton’s first municipal elections were held in 1959 for a mayor and council. Our resident manager issued an Employee Information Bulletin urging all employees to vote on election day and telling employees if they wished to run for office the Company would support their holding office by allowing them time off from work to attend to town business and by pledging the Company to allow the employee freedom of decision on town matters without any Company interference. Six councillors were elected. Five were company employees and I was one of them for six and a half years.

Over the years, many company employees have continued to serve their community through elected service on town council, including some who were elected as mayor including Owen Bradwell (Forestry), Stan Fritter (Pulpmill) and Fred McArdell (Pulpmill).

The community service of Jim Bowersock, a mill engineer who later became mill manager and went on to a distinguished career in the forest products industry, was particularly recognized by Dr. Reid:

Jim Bowersock did a lot of the triggering on community projects. They got a golf course. The swimming pool was another one. But the golf course -- if it hadn't been for Jim's drive and his ability to get the equipment from the woodlands contractors as well as everybody else, the golf course would not have been there. How could you afford to build a golf course with 3,500 people? That is why it was nine holes to start with -- because that was within reason and was all that was needed. You know, people played two nines. For the number of people that was all that was needed. That was another example of sort of a community effort. So was the curling rink, another community effort. And it wasn't put up by a contractor, it was put up by volunteer labour ... and with scrounged and donated materials!

... Barney Bertholin ... did the tile work and stone work at the pulpmill. When we were building the swimming pool Barney was in charge of building the changing rooms out of donated concrete blocks. Somebody donated the trucking from Edson -- because the thing was to get it done reasonably quickly in the short summer that was available. So there were two of us that were providing Barney with mixed cement and with blocks. It took two of us to keep up to him. He had huge hands -- he could pick up a concrete block in one hand ... and of course the rate he could go at -- he could put on the cement up the side and place the block right against it and give it a couple of little taps, on with his level, on with the next one. The way he went at it was just amazing.³²²



ON MAY 29, 1982 JIM BOWERSOCK (R), NOW A VICE PRESIDENT OF ST. REGIS RETURNED WITH ST. REGIS VP RALPH WEHMHOFF (L) TO JOIN ST. REGIS (ALBERTA) LTD. VP AND GENERAL MANAGER KEN HALL AT THE 25TH ANNIVERSARY CELEBRATIONS OF THE HINTON MILL

WELDWOOD PHOTO COLLECTION

9.4 JUNIOR FOREST WARDENS

The Junior Forest Wardens were introduced to Alberta in 1958 by Company staff, at the instigation of Des Crossley and with the support of Robin Huth of the Industrial Relations Department who did much of the leg work in organizing the club. For many years thereafter, employees in the Forestry Department served as club leaders and many sons (and later, daughters) of company employees joined the club. The JFWs later became a province-wide organization, adopted by the Alberta Government in 1960 when AFS forester Terry Whitely was appointed Chief Warden with headquarters at the Forest Technology School in Hinton.

The first members of the club were Bob Crossley, section leader; Terry Hale, patrol leader; Cory Maurik, patrol leader; Tom Tomkiw, patrol leader; and Ted Armstrong, Noel Armstrong, Campbell Huth, Brian Holman, Alois Plaustainer, and Rick Dempsey.



ROBIN HUTH (L), DES CROSSLEY AND HARRY COLLINGE (WITH BOW TIE) WITH THE FIRST JUNIOR FOREST WARDENS, 1958

WELDWOOD PHOTO COLLECTION

The Company's Opening Committee – with the addition of Dexter Champion, the Company's Fire Marshall - agreed to continue active as the council for the fledgling club. Ralf Olin, a former Olympic athlete, was named as JFW supervisor and liaison between the club and the council. In June, 1959, the Optimist Club took over the project. In 1960, the Alberta Forest Service assumed responsibility for the Junior Forest Warden program in Alberta, with Terry Whitely as Chief Warden for the province.

About 1964, the government started the Junior Forest Guards for girls, but JFWs were fully integrated soon after to give the organization a stronger family orientation. In October, 1966, the administration of the JFW was transferred to the Department of Youth, but it was returned to the AFS in 1976. Cutbacks in the early 1990s reduced the level of direct support but by that time a volunteer JFW Council for

Alberta was able to take charge of programs and extra funding needs. The Junior Forest Warden movement in Alberta remains a strong outdoor oriented experience for young people.

Many of the men initially recruited for logging operations were immigrants who needed this kind of opportunity for a first job. The spirit of the community is reflected in this story told by Jim Clark:

In my new job I had exposure on a regular basis to many immigrant employees in the logging camps. Many of them spoke little English. At dinner one evening at home I mentioned this peculiar circumstance of language difficulty among the workers to my family, including my mother-in-law who lived with us.

“You know, Jim, I’m willing to go to the camps and teach the men English if you can arrange it”, she immediately said after my telling the story. I was a bit dumbfounded but I could tell she was sincere. I told her I would look into the problem and get back to her.

I discussed the situation with my manager, Adrien Provencher. He immediately grasped the problem and was understanding of it. He telephoned our industrial manager about it. “He’ll be right over so we can talk about it”, was Adrien’s invitation for me to stay. We three talked about the language situation. Wayne Sawyer said he thought we should do something about it with the volunteer help from Mrs. Scott available. The camps in my district were canvassed for interest; two indicated a high attendance. A class schedule agreeable to the teacher was proposed and it met the students’ need. An employee of the Industrial Relations department took Mrs. Scott to two camps each week for two-hour classes. She dedicated herself for three years of this teaching experience. Years later many employees she taught would often ask me about her, the Florence Nightingale of logging camp education.

9.5 FOX CREEK DEVELOPMENT CORPORATION

The original lease area in 1955 did not include any permanent Aboriginal settlements or reserves, but there were quite a few Aboriginals among the population. These included descendents of Métis families who settled in the Entrance area early in the 20th century as well as other Aboriginal people who came from elsewhere in Alberta, and across Canada, to work in the sawmills, railways, coal mines and related businesses such as trucking. Subsequent migration, and expansion of the forest management area, brought in more Aboriginal people.

There were always some Aboriginal people among the employees and contractors, and the company made a specific effort to recruit Aboriginals around the time mechanical skidders replaced horses in 1968. Rosaire Lacroix said he had six or seven Aboriginals on his crew in the Berland area at that time. One faller and two skidder operators were brothers – Jerry, Fred and Tom Beaverbone – who were among the crew’s top producers.

The first formal relationship with an Aboriginal community began in the early 1970s. About a dozen Aboriginal families, originally from the Rocky Mountain House area, had been logging timber berths in the northwestern part of the forest management area since the 1950s. In 1972, they formed a co-operative that would later become the Fox Creek Development Association Limited to perform contract logging for the company. Woodlands manager Jim Clark and former AFS ranger Sam Sinclair worked with the group to obtain funding for additional equipment, and one of the company’s staff, Norm Teskey,

helped with training. Fox Creek Development started with six horses for skidding and eventually owned six mechanical skidders.

“Their contract situation allowed them to work independent of the company’s operation,” Clark observed. “If some fellow needed time off work to hunt or attend a Sun Dance ceremony, he arranged his time off without a problem. Their work accommodated their traditions and ancestral way of life, while they accommodated to the work’s need. It is a Native Peoples’ success story and they are rightly proud of it.”

In the 1980s, as the company moved to newer harvest methods, the Fox Creek group -- most of whom had moved into Hinton -- continued to use power saws and cable skidders, which enabled them to work on steeper terrain and sensitive sites not accessible to heavy equipment. In 1994, when hand logging with power saws was largely discontinued, Fox Creek Development got out of the harvest business and became one of the company’s leading silvicultural contractors.

Fox Creek Development generally employed about 14 or 15 workers in logging, and this increased to about 20 workers doing silvicultural work in the late 1990s. Most of this work involves brush removal and pre-commercial thinning. In addition, Fox Creek Development also performs campground maintenance for Weldwood, supplies an eight-person firefighting crew to the forest service when needed, and employs an Aboriginal forest technician to perform consulting services. Including non-Weldwood projects, Fox Creek Development now provides work for up to 45 Aboriginal people in the Hinton area.

9.6 PUBLIC CONSULTATION

ABORIGINAL CONSULTATION

In 1999, Company manager Ritchard Laboucane formed an aboriginal roundtable of representatives of a number of aboriginal peoples resident within, or having a previous relationship to, the landbase contained within the FMA. Representatives included: Nakcowinewak Nation, Aseniwuche Winewak Nation, Mountain Cree Camp (Smallboys), Marlboro Métis Community, Hinton Métis, Fox Creek Development Corporation, KAYAS Employment agency, Hinton Friendship Centre, Sunchild First Nation, O’Chiese First Nation, and the Alexis First Nation. This was a major step forward in aboriginal consultation for the company, and several meetings were held to sort out how the company and the committee would work together.

In June 2000, this roundtable endorsed Weldwood’s SFM plan for CSA certification. Continuing attendance was a problem so Laboucane began to explore other avenues for effective aboriginal involvement. One aspect of this involved Foothills Model Forest, where he proposed to the Board in early 2000 that they embark on the development of a program in the model forest, initially to meet with the roundtable and explore involvement opportunities. This led to a proposal that the model forest take the lead in developing and later implementing a consultation process for traditional use within the model forest landbase. In January 2001, the model forest hired elder Jimmy O’Chiese to work with the elders of all aboriginal interests in designing and endorsing a protocol for traditional use studies. This work continued until fall and on October 19 & 20, 2001 about 150 elders and other representatives gathered in Hinton, where they endorsed the work of Ritchard and Jimmy and individually committed to taking it forward through a traditional use study.

Meanwhile, the roundtable had been suspended through lack of attendance, and Weldwood was continuing to build its own linkages to the aboriginal community. The first of these was with the Aseniwuche Winewak Nation, with whom it signed a Memorandum of Agreement on May 9, 2001 in a ceremony in Edmonton with guest speaker Minister of Aboriginal Affairs Pearl Calahasan. Dennis

Hawksworth signed for Weldwood, and AWN President David MacPhee for the AWN. The agreement describes how Weldwood and AWN will work together to increase awareness and understanding of each other's interests and businesses.

FOREST RESOURCE ADVISORY GROUP (FRAG)

The company and the government always encouraged informal contacts with the general public and other stakeholders, and their advice was often helpful in planning and operations. Direct public input into forest management planning began in 1989 when the company formed the first public advisory committee for an Alberta forest operation. The committee included government, professional, industrial, recreational, youth and other interest groups. Originally known as the Forest Management Liaison Committee, the group was reconstituted in 1993 as the Forest Resources Advisory Group (FRAG) with a broader membership and mandate. Attempts were made to recruit members on the basis of their perspectives on forest management issues, so that as wide a range as possible of interests were included, within a moderate group size. The company also solicited input from the community at large through public "open house" presentations.

In 2000, FRAG included representatives of 19 stakeholder groups:

- community groups from Hinton and the surrounding area, including the forestry workers' union and an Aboriginal co-operative;
- non-renewable resource industries, principally coal, crude oil and natural gas;
- renewable resource users, including trapping, fishing, hunting and other recreation interests;
- environmental organizations, and
- government agencies, including Jasper National Park, the Canadian Forest Service, Yellowhead County, and the Town of Hinton.

The Land and Forest Division of Alberta Sustainable Resource Development served as an advisor to FRAG, and there was, of course, a great deal of overlap among the interests represented. Many people in the area could fall into several categories.

9.7 OTHER INVOLVEMENT

INDUSTRIAL, WOOD AND ALLIED WORKERS (IWA) – ORIGINALLY INTERNATIONAL WOODWORKERS OF AMERICA)

Two unions, IWA and Lumber and Sawmilling Workers, expressed interest in unionizing woods workers in April 1957. Negotiations with IWA started on 16 July, and the first contract for woodworkers was signed 24 August 1956. Stan Hart believes one of the catalysts for the union formation was the low piecework rate as compared to eastern Canada. The rate for cut and piling 8-foot wood was \$4.25 per cord.

On 17 June 1968, the IWA started a short-lived legal strike. The tree planting program was curtailed as a result of the strike, Forestry staff finished planting some blocks that had been started and the remaining seedlings were sold or given away.

PROFESSIONAL CONTRIBUTIONS

Hinton foresters and technologists have served have served their professional communities in a number of important ways. Des Crossley was a founding and executive member of the first Rocky Mountain Section, Canadian Institute of Forestry (1949), as was Dexter Champion. Many others served, and continue to serve their profession whether as presidents of the Canadian Institute of Forestry (Des Crossley, Jim Clark), or the Rocky Mountain Section (Des Crossley, Jim Clark, Jack Wright, Jim Bocking, Bob Udell), chairmen of the CPPA woodlands section or forest management committee (Don Lashley, Jack Wright, Bob Udell), as domain experts in government expert panels (Des Crossley, Bob Udell), presidents of the Alberta Forest Products Association (Jim Clark, Dennis Hawksworth) or as presidents of the Alberta Registered Professional Foresters' Associations (Bryon Muhly). Few if any companies can point to such a distinguished contribution.

9.8 SUMMARY

These kinds of contributions and initiatives have continued to the present (2000). However, since the town now has a population (2000 basis) of about 10,000 and is the site of other major companies, the Weldwood contributions alone were no longer as necessary. However, corporate philosophy was still to support the community and, of course, company employees participated in its diversity of activities.

Chapter 10. Forest Management Plans

10.1 KEY PLAYERS IN MANAGEMENT PLANNING 1955-2005

This Chapter is a tribute to the many individuals who responded to the challenge of science-based forest management planning. Their names appear throughout the text as their contributions are described and discussed. Their achievements are acknowledged with great appreciation.

- Reg Loomis Recruited from eastern Canada to design and implement Alberta's first forest inventory in 1948, he also did preliminary inventories for two early versions of the company's forest management area. Loomis also influenced the wording of the Agreements to try to ensure they would lead to sustained yield. He and Charlie Jackson , a UBC forester, were actively involved with Des Crossley and his team in shaping the philosophies and form of the first forest management plans.
- George Abel A St Regis forester from the southeastern United States regional operations, he led inventory and management teams to the candidate forest management areas in 1954 to assess available timber and operational challenges for the new operation. His report was, in essence, the first management plan that confirmed that the chosen area could support a pulpmill.
- Des Crossley Recruited from the Canadian Forest Service in 1955 as the first chief forester, he oversaw the design and implementation of the early forest inventories and their application to the sustained-yield forest management plans until his retirement in 1975
- John Miller A St. Regis forester from the northeastern division, also a member of the 1954 assessment team. Seconded to Hinton in 1955, his expertise and experience in the use of permanent sample plots for continuous forest inventory were applied to design and put in place the first PSP-based management inventory. Miller led the start-up of the management program, designing it after the Judeich Stand Projection system. With Jack Wright, he prepared the 1958 preliminary forest management plan. He returned to the St. Regis US operations in 1958, to set up a CFI system in the New Hampshire/Vermont division.
- Jack Wright Recruited from the CFS in 1957, he took over from John Miller in 1958. Jack built on his CFS experience to develop the first set of aerial stand volume tables for forestry application in Alberta. He developed many innovations to the permanent sample plot system, converting it to a growth and yield-focused program in 1970. He conceived and implemented the photo-point sample system for forest inventories, both management and operational. He prepared the first detailed forest management plan in 1961 and the first revision of 1966. Appointed Chief Forester in 1975 he led the Forestry Department until his retirement in 1987.
- Bob Udell Recruited from the University of Toronto graduating class of 1966 he worked in inventory, silviculture, forest protection and harvest design and planning. Leaving in 1970 to work with the Ontario Ministry of Natural Resources he returned in 1975. Under his direction, many advances in growth and yield forecasting occurred,

particularly in the areas of fire origin and regenerated lodgepole pine. Building on the use of PSP analysis to improve growth and yield forecasting in timber supply analysis, he wrote the 1977 and 1986 FMP revisions leading to major growth and yield-based increases of AAC in 1986. He succeeded Jack Wright in 1987 and is presently responsible for forest policy and external relations.

Doug Walker Recruited in 1987 to replace Udell as management forester, he continued the adaptation of PSP growth and yield information to management planning and working with silviculturist Bill Rugg, developed the first regenerated stand inventory. He adapted the FORMAN model to the Hinton FMA as author of the 1991 revision. He left the company in 1992 for the consulting field in which he has earned an excellent reputation.

Hugh Lougheed First joining the Company in 1989, he worked with Walker in adapting the FORMAN model to the Hinton management system. He left in 1990 to take over management forester responsibilities at Northwood in Prince George. Recruited again in 1992 to replace Walker as management forester, he implemented many changes in conventional forest inventory and growth and yield analysis, as well as overseeing the integration of a wide range of new non-conventional inventories necessary for sustainable forest management (SFM) planning. As author of the 1999 FMP revision he oversaw the major reorganization necessary to embrace the principles of SFM and was, for the first time, able to incorporate the quantitative analysis of non-timber values into the evaluation of AAC alternatives. Under his direction further advances in growth and yield forecasting were incorporated in the 1999 forest management plan.

Colin Bamsey organized an initial draft of this Chapter which was extensively rewritten and expanded by Bob Udell. The authors drew heavily on the advice and corrections of colleagues, especially Jack Wright, Stan Hart and Hugh Lougheed, during the extensive revisions and subsequent drafts. The exercise highlighted our appreciation of the major contributions to advancement of forest management by the previous authors of the forest management plans, and of their associates who help to fulfill their objectives.

10.2 INTRODUCTION

This chapter examines the evolution of forest management planning for the Hinton Forest Management Area (FMA). Forest planning in Alberta has advanced considerably in the almost 50 years that the Hinton operation has been producing plans and implementing them on the landscape.

The forest management plan is the single most important document for directing activities in the forest. Only by working within the bounds of the thoroughly reasoned plan can sustained yield and protection of forest values be assured.

Forest management plans on FMAs are prepared by industry and approved by government as required in the Agreement. They are continually reviewed, the results are monitored and they must be updated at least every ten years. Their primary purpose is to describe and justify a sustainable harvest level, or allowable annual cut, which can be maintained over a planning horizon of 80 years with projections for up to 200 years. But they also set forward for consideration the company's goals, objectives, and strategies for managing a broad range of forest values, with expected outcomes. They provide an

interesting picture of the forest management technology and systems of the day, as well as the landbase status, resource inventories and technical management systems.

A fundamental requirement of the Agreement is a commitment to sustained yield. As senior forester Bob Udell noted: "Sustained yield was here from Day 1!" This commitment began with the enabling legislation in 1949 in which a new clause enabled long-term leases, stating (Section 96) that the government may:

enter into an agreement, to be described as a forest management license ... for the management of public lands ... reserved for the sole use of the licensee for the purpose of crops of forest products to be harvested in approximately equal annual or periodic cuts adjusted to the sustained yield capacity of the lands ...

This stated philosophy required a commitment by the licensee to practice forest management on a sustained yield basis. It also implied that the licensee would be responsible for forest renewal, an implication that was later made specific. Frank Ruben's first Agreement for NWPP, approved on 8 June 1951, contained these two clauses (emphasis added):

15. The Company agrees, before cutting operations commence on the cutting area, to submit to the Director of Forestry for approval a detailed working plan covering the cutting area which shall define the intentions of the Company to handle such cutting area **in the best interests of forest conservation.**

16. The Company agrees to have its technical forestry officer, at the request of the Minister, meet the Director of Forestry and the technical forestry staff of the Department of Lands and Forests to discuss a management plan of forestation of denuded and untimbered lands in the area reserved so as **to guarantee a perpetual yield** of the Company's requirements of timber.

The 1954 Agreement, on which the investment commitment was based, reflected Reg Loomis' further influence. Loomis played a major role in Alberta's first forest management agreement. A graduate of the University of New Brunswick forestry school, Loomis had developed a deep concern over the failure of provincial administrators to commit government and industry to sustained yield management in the east, where he had worked in several provinces. This concern was apparent in his contributions to the NWPP Forest Management Agreement, as he explained about the 1954 Agreement:³²³

The drafting of the first document had been done by Ruben and a government official who was not a forester and did not know about sustained yield. Then it was turned over to the Alberta Forest Service and to me. There was nothing in it about regenerating the forest, so I managed to get in a clause about sustained yield. That opened the door to good forest management. Des took over and did a damn good job.

In the meantime, before detailed planning got started, the two principal foresters were making representations to try to ensure that forest management plans would truly commit to and achieve sustained yield. The two foresters were Reg Loomis, supported by his Director of Forestry Eric Huestis and assisted by forester Charles Jackson; and Des Crossley, the company Chief Forester backed by H.V. (Pete) Hart of St. Regis Paper Co. Ltd.

For example, in a 1955 memorandum to Eric Huestis, the Director of Forestry, Reg Loomis³²⁴ expressed some of his views on forest management and the more detailed planning needed to sustain the timber yield.

I feel that in handling forest resources because of the time required to grow a forest crop to maturity, it is imperative to have long-term forest management plans which have a consistency of purpose. Now that we have the provincial forest inventory nearly completed, we should make full use of the information thus obtained. This initial inventory survey provides broad basic information needed to indicate areas of most importance and in greatest need of attention. It also indicates how the forested area can be broken down into management units and the possible cut by species, which an entire management unit can sustain. It does not however, provide sufficient detail for the development of detailed management plans.

While forest management was still being defined for Alberta, Loomis³²⁵ wanted it to include forest protection.

By forest management is meant the application of all phases of forestry including forest protection as well as timber administration and cutting practices. We cannot see why the above suggestions are not a continuation of what has already been done and is being done.

Loomis³²⁶ realized that forest protection was a very costly endeavour, thus it needed to be focussed on the most important areas:

In spending money for the development of a forested area we must deal with facts, facts about the actual state of our forests. In particular we must consider factors such as the productivity, age structure, species composition and quality of the forest. In long-term planning the inherent productivity of any area ultimately governs the allowable cut, it governs also the amount of money that can be profitably invested in the area for the purpose of growing wood.

If rational expenditures are to be made for permanent improvements and other phases of forest management they must be directed toward areas of higher potential productivity and above all, to areas which are going to remain as permanent forest land. It is not wise to spend much effort on protecting areas of young growth or areas which are gradually restocking if these areas are later to be opened up for settlement.

Des Crossley³²⁷ (1985) recalled his invitation to join the North Western Pulp and Power management team:

Bob Ruben, Frank's son, was the man in charge of North Western Pulp and Power, but coal and oil were his fields and he had no knowledge of forestry. He was working closely with Pete Hart, the woodlands manager for St. Regis in Maine and the Lake States.

I said, 'I'm very interested, but with one consideration which is very important to me. You've got to assure me that you are going to carry out meaningful forest management. Pete Hart looked at me and said, 'Why shouldn't we?' I said, 'Well,

nobody else in Canada does.’ Obligations to sustain the yield were generally being ignored without reprisal in other provinces.

Hart said, ‘Well, the government insists on it, under the agreement.’ So I told them, ‘OK, under those circumstances I will be happy to join you.’ Several people had expressed surprise and concern that I would leave the shelter of a good position as a civil servant to enter a hazardous employment in a province with no track record for enlightened forestry. But from my point of view this was an opportunity to satisfy my obsession to demonstrate that our forests should and could be managed as a renewable resource without pillaging the land. The fact this could be undertaken on the finest piece of timberland in Alberta was an obvious plus.



Des Crossley

*Winner of Canadian
Institute of Forestry
Achievement Award,
1969*

This was to remain Crossley’s³²⁸ obsession for years to come, and it is the backbone of forest management plans even today.

“We wanted the staff to be involved from the start in the planning stages so they’d be firmly committed to objectives,” he said. “We encouraged initiative but used the team approach.”

Crossley recalled that when he started forest management at Hinton few people understood its meaning or intent. “We were haunted by the historical image of the ruthless timber exploiter who was allowed to tie up too much land, pollute the water, erode the soil, and fail to regenerate the forest he logged. We could have done without this burden. Public suspicion eventually goaded the Ministry of Lands and Forests to commission a study. We managed to satisfy this critical review and proved we could sustain the yield.”

From the beginning, Crossley³²⁹ insisted that financing of forest management be included in operational costs rather than capitalized, as was the industry approach up to that time. This was a major factor that contributed to the success of forest management over the long term.

The failure to conduct effective management could be traced not only to lack of tenure—the lack of assurance a company could reap what it sowed—but to the spectre of prohibitively expensive capital costs for forest renewal. We were not about to accept this widely held misconception. On the contrary, we reasoned that the existing stands ready for harvesting should fund the cost of forest renewal.

Forest management in other parts of Canada usually foundered on fluctuating budgets, so I felt it important to establish a fixed forestry budget at Hinton. This was set at about ten per cent of the cost of providing harvested wood to the mill. It was no munificent sum. We had to use our imaginations to cut expenses without sacrificing quality.

The Hinton FMA has the distinction of being the first in Alberta to have a detailed forest management plan (FMP) prepared for it. Following a 1958 preliminary forest management plan, this first volume of a five-volume detailed FMP was submitted in 1961. The Agreement stipulated that this would be revised, nominally at 10-year intervals. However, major revisions were made more frequently to meet emerging needs. Revised plans were completed in the following years:

1966: first revision --change in rotation age from 100 to 80

1977: second revision -- scheduled update

1986: third revision -- scheduled update

1991: fourth revision -- first plan for the expanded FMA area

1999: fifth revision -- scheduled update, first plan for SFM.



FOREST MANAGEMENT PLAN AUTHORS IN 2002: L-R: HUGH LOUGHEED (1991 ANALYSIS, 1999 AUTHOR), SHARON MEREDITH (FUTURE AUTHOR, BUT RESIGNED BEFORE THE NEXT PLAN WAS DONE), BOB UDELL (1977, 1986 PLANS), JACK WRIGHT (1960, 1966 PLANS). MISSING – DOUG WALKER, 1991 PLAN.

WELDWOOD PHOTO COLLECTION

10.3 INITIAL ESTIMATES OF ALLOWABLE CUTS AND HARVEST LEVELS

One of the prerequisites for achieving sustained yield, besides forest regeneration, is establishment of an AAC level that does not exceed the annual growth of wood from the forests in lease area. The calculation of AAC is part of the planning process, and it is the leaseholder's responsibility to calculate the AAC in a manner satisfactory to the Province.

Before the 1961 forest management plan could be prepared there were several decisions that had to be made about the ability of the proposed lease areas to support the mill and about annual harvest levels. These considerations would normally be made in connection with a FMP, but there was not time available to prepare a formal plan. Instead, decisions were made based on quick inventories, rules of thumb and reasoned estimates, with the understanding that a FMP with data-based AAC calculations would be submitted later, but as soon as possible. The principal decision points occurred twice in 1954, once in 1955, and twice in 1956.

1954 – FEASIBILITY OF THE PULPMILL PROPOSAL IN ALBERTA

Frank Ruben's long search for partners finally led him to New York to a meeting with Roy K. Ferguson, president of the St. Regis Paper Company early in 1954. St Regis was the first Company to show interest in the proposal³³⁰. By this time, Reg Loomis had designed a proposed lease area centred on Edson (Figure 1) and, with permission from the Province, had prepared an initial inventory estimate for the area based on the existing provincial inventory maps. Ferguson was impressed and, as Stan Hart^{lxi} reported, sent a seven member cruising party to Edson 18-28 May 1954 led by St. Regis forester George Abel. He also contracted C.D. Schultz, a forest consulting firm from Vancouver BC, to do an independent evaluation, and their representative Robin Caesar was also there as a member of the party.³³¹ Stan Hart, a member of the initial party, recalled³³²:

After the "Alberta Project", as St. Regis initially called it, was approved for further study, a fairly large group of St. Regis foresters was assembled and sent to Alberta in the spring of 1954. They came from Company operations in New Hampshire, New York, and Florida. George Abel from Florida headed up the crew. We made our base at the "Sunset Motel" in Edson. Telef Vaasjo flew in with a Bell 47J helicopter from Associated Helicopters in Edmonton and that was our main access to the woods. We rented some rather beat-up power wagons and jeeps too, from local people. Our objective was to check out the area in general, particularly the accuracy of the stand typing and volume estimates shown in the government^{lxiii} cruise. It was really a very superficial look but it served the purpose at the time.

George Abel's report³³³ of June 1954 to W.R. Adams, St Regis Vice-President, was very positive, as he noted: "The timber resources of this reserve offer a splendid opportunity for a sustained yield operation considerably expanded over that now contemplated." More specifically, he concluded: "Assuming maximum deficiency in estimated volume and no allowance for growth, there remains an excess of

^{lxi} Stanton G.V. Hart was a forester with St. Regis Paper. Stan was on the initial St. Regis survey crew sent to Alberta in 1954, moved to Hinton in 1955 and later became Woodlands Manager, returning to St. Regis USA in 1968.

^{lxii} Presumably the "cruise" was the estimate prepared under contract with R.D. Loomis. PJM.

30,000,000 cords - or an adequate pulpwood supply for a 300 ton daily capacity mill for the next century and a quarter.”

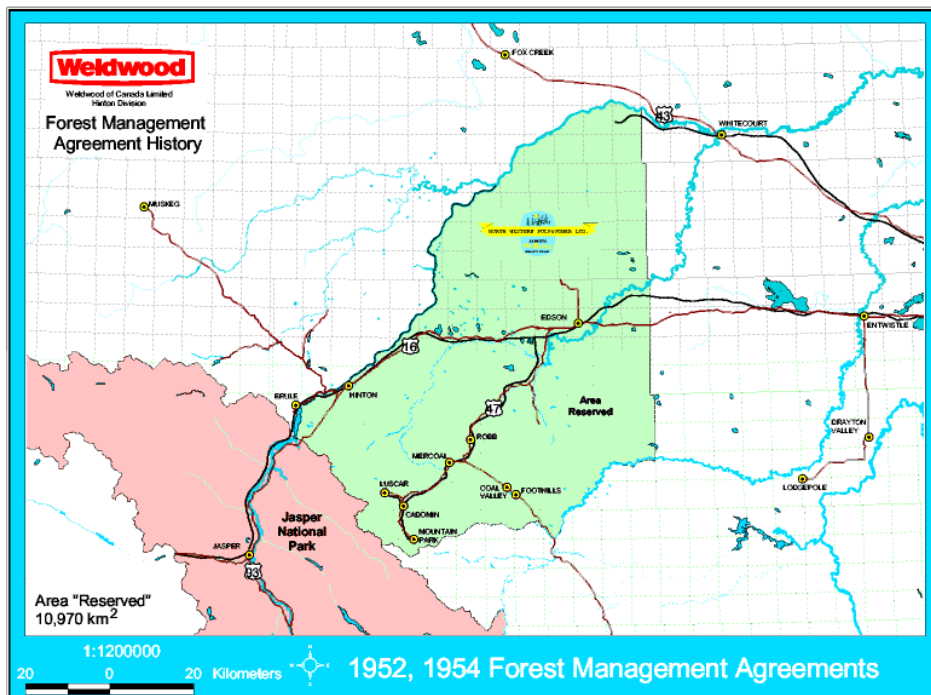
As a result, in a joint announcement 17 June 1954 St. Regis and North Canadian Oils stated that plans had been finalized for financing and construction of a bleached kraft sulphate mill in Alberta.

Abel’s report was, in essence the first, though very simplistic, “forest management plan” confirming that such a mill would be sustainable, at least through the first rotation. Of course, his approach disregards both growth and depletions by fire, but his point was to show that an adequate wood supply existed and that the land was capable of growing wood. However, an analysis of his figures is interesting. A 300 ton-per-day (tpd) mill is based on an average figure, equating roughly to 110,000 tons per year. If 30 million cords were deemed sufficient for 125 years, it suggests that he was using an average intake of wood of 240,000 cords. A commonly used rule-of-thumb in the early 1950s was that a ton of groundwood pulp would take one cord of pulpwood to produce and that chemical pulp would take two cords. Using the 2-cord/ton figure, that would be roughly 220,000 cords – a close match to the number used by Abel. Abel’s numbers suggest that he used a 2.18 cord per ton conversion – or 4.8 metres/tonne - a figure not too far removed from today’s rough conversion of 5.2 metres of solid wood/tonne of chemical pulp produced.

1954 – REVISED FOREST MANAGEMENT AGREEMENT

Once the North Western Pulp & Power Ltd. partnership had been formed, more focussed negotiations with the Alberta government led to the third revised Forest Management Agreement (O.C. 1250/54), the one on which the construction commitment was based, which was signed on 14 September 1954 by Frank E. Ruben on behalf of the partners. The map area was the same as shown in the 1952 agreement (Map 1), designed for the mill to be built at Edson. This Agreement referred in the preamble to the mill having a minimum capacity of 300 tons of pulp a day that would require an annual minimum of 100,000 cords of pulpwood.

It is interesting to compare numbers between these two 1954 statements. The figures in the Agreement seem to considerably underestimate wood needs. A more likely figure for wood to supply a 300-tpd mill would be about 220,000 to 240,000 cords per year. An official move in that direction took place over the next two years.



Map 10-1. Proposed NWPP pulpwood lease area centred on Edson – 1952-1954

1955 – REVISED FOREST MANAGEMENT AGREEMENT

Detailed planning for the project got underway in June 1954. Soil tests at the Edson site in the fall of 1954 showed that the ground was too unstable for the footings to support a mill of that size. Further, water supply in the McLeod River was judged to be inadequate for the mill -- the McLeod River at Edson would not yield 30 million gallons of water a day. In order to guarantee a year-round average, the newly-formed Company would have to build a dam, at an estimated cost of \$4 million, and buy all the land ten miles back from the water line. This complication immediately stalled all plans since such an investment was financially inconceivable.³³⁴

Frank Ruben remembered travelling west on a previous visit and noting a small settlement where the road, Athabasca river and railway came together. He, his son Robert, H.V. (Pete) Hart, General Manager of St. Regis Northern Woodlands Division, and Justin McCarthy St. Regis Vice-President and Chief Engineer drove west in a jeep on 25 January 1955. They wondered if Obed might be a possibility, but it was not. They then found that 80 km west of Edson the next location that combined water availability, suitable soil and rail access was at Hinton. They quickly launched studies to confirm its suitability -- and decided to build the mill there instead³³⁵.

Once the mill location was changed, it was essential to redesign the lease area. Again, Reg Loomis' expertise was enlisted to develop a conceptual lease area outline based on a mill located at Hinton that was by then expected to produce 400 tpd (360 tonnes). Earlier he had been contracted to prepare a preliminary inventory for the mill and forest centred around Edson. As Loomis³³⁶ explained, after the decision was made to move the mill to the Athabasca River at Hinton, Frank Ruben asked him if he would prepare another preliminary inventory for the new lease area to ensure volumes were sufficient for the new site:

So I said the same thing to him about getting the Minister to agree, and they did, and [this time] I got \$500! I got \$500, and then Des Crossley told me that one of the St. Regis people there, Stan Hart's father, Pete Hart said that the Company decided that they'd better have my inventory checked. They went to C.D. Schultz in BC and gave him \$25,000 to check the job I did for \$500! And they couldn't find anything wrong with it -- not because I was that accurate, it's just because it would be almost impossible to check that thing without a tremendous amount of fieldwork. So they actually gave him \$25,000 for nothing.

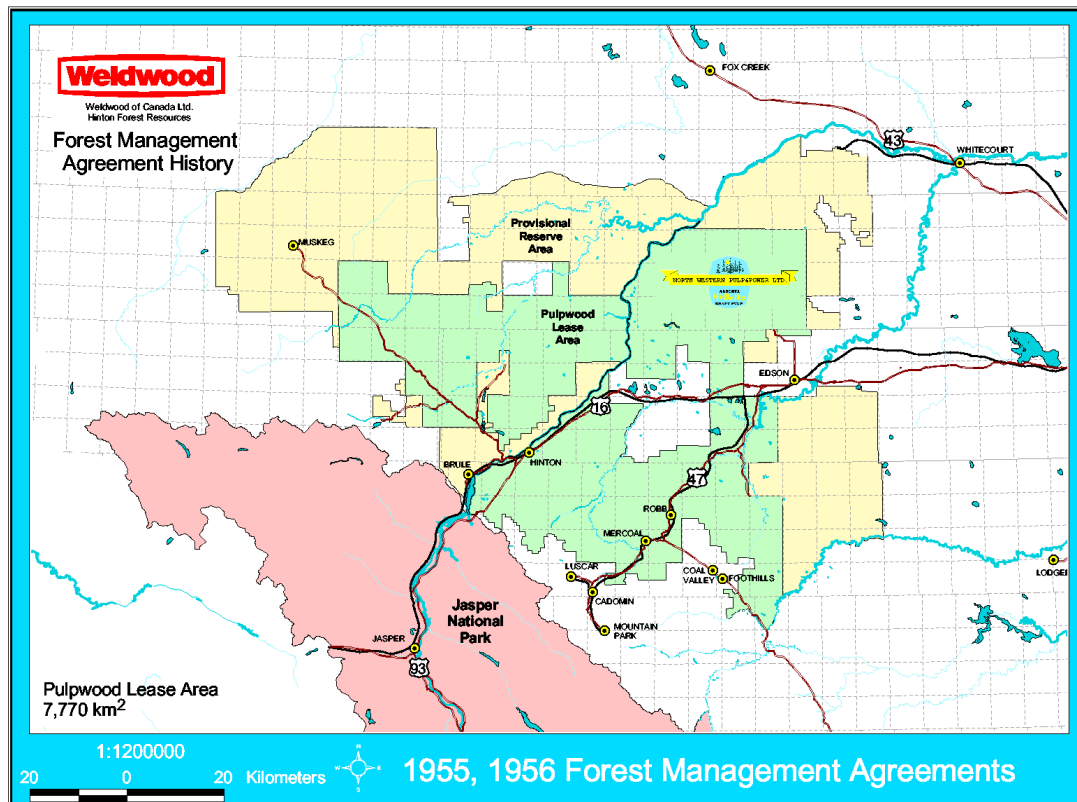
In his reconfigured lease (Map 2.) Loomis dropped some southern areas and included major areas to the north so the mill at Hinton would be more centrally located within the forest lease area. The lease area was also increased to ensure a wood supply for the planned minimum 400-tpd (360-tonnes) mill.

A St. Regis team of foresters, Dyer Phillips, Frank LaDuc, Bill Hamilton and Stan Hart visited Alberta again from 8 March to 6 April 1955 to check on the new location suggested by Loomis. The work this time focussed on the new areas north of the Athabasca, on volumes and quality of timber, availability of existing roads, and possible sites for camps. Stan Hart recalled that: "on April 5, 1955, Dyer Phillips and I, then both in the Woodlands Division of the St. Regis paper Company, presented to Reg Loomis in Edmonton the maps and description of the area which we had, on behalf of the Company, selected to be Alberta's first Forest Management Lease. This was the culmination of several months of cruising which had started in May of 1954."³³⁷

These maps formed the basis of the next revised Agreement (O.C. 882/55, dated 13 July 1955). The major change was that the area had been moved west and extended to the north, this time clearly centred on Hinton. It showed both a Pulpwood Lease Area (PLA)^{lxiii} and a Provisional Reserve Area (PRA) for future expansion, approximately 3000 square miles (7800 km²) each, totalling some 6000 square miles (15,600 km²). This new area was approved with the understanding that the Company could refine the new boundary in response to a more structured reconnaissance of the boundary areas.

The 1955 amendment also included a change in mill size to one of a minimum rated capacity of 150,000 tons per year, roughly equivalent to 410 tpd. The minimum wood supply was also increased to 150,000 cords per year, again suggesting a conversion of 1 cord per ton of pulp.

^{lxiii} Common usage today refers to current and former such agreement areas as "forest management areas" or "FMAs".



Map 10-2 NWPP -- Forest Management Area redesigned for a mill at Hinton.

1955-56 – INTERIM AAC – A VERBAL ARRANGEMENT

Jim Clark, then assistant chief forester, described in his memoirs³³⁸ how a first AAC was agreed upon:

We met with Forest Service staff in Edmonton ... to discuss the problem of Annual Allowable Cut to be assigned to the Forest Management Area^{lxiv} on an interim basis. The Company could then prepare their first Forest Management Plan for the first ten-year period of management. This was a requirement of our Agreement with the government. Reg Loomis and Charlie Jackson^{lxv} accompanied the Director of Forestry Eric Huestis; Des Crossley and I represented the Company. The meeting was a short one as nobody doubted the need for a preliminary figure but all of us were sure any figure agreed upon was speculative.

^{lxiv} Although the term “Forest Management Area” did not appear officially until the 1968 Agreement, many authors, and the Province itself, often refer to the earlier Pulpwood Lease Area as a Forest Management Area.

^{lxv} Reg Loomis was Senior Superintendent of Forest Management, Charlie Jackson his assistant. PJM

As Clark described it, Eric Huestis proposed an initial AAC of 350,000 cords per year as a basis for discussion. He continued the description of the meeting:

Reg sat with a pencil and did some figuring; he knew the Director would ask his opinion as head of forest management. Finally he looked at the Director. "That work's out to zero point one eight cords per acre per year, for an average figure for their FMA of 3,000 square miles or 1.92 million acres. That's a pretty damn good growth figure average, in my opinion. I would support your suggested figure until the Company develops their own inventory of the area, and their calculation of a future Allowable Cut figure."

Des Crossley looked at me for input but I just kept quiet; he knew my opinion by my silence. "We would accept the 350,000 cord figure as an interim cut per year. It allows us to produce 585 tons of pulp per day for 342 days per year at a wood-use conversion of say, 1.75 cords per ton of pulp. Our mill is designed for 442 tons per day. Your suggested use figure gives us a 33 percent cushion to play with." He stopped and looked at me; I nodded agreement. "We'll accept your suggested figure and expect your letter at your convenience."

Although this sounds cavalier, this meeting had undoubtedly been preceded by calculations, consultations and agreement among the participants. The agreed figure was confirmed in the next revision to the Agreement.

1956 – REVISION TO FOREST MANAGEMENT AGREEMENT

The Woodlands Division was organized in May 1955 and initial staffing of Woodlands and Forestry staff was substantially completed during the summer. The initial focus was to locate logging camps and roads. At the same time, the boundary for the new PLA centred on Hinton was checked and refined; and extended cruising and – in 1956- layout of permanent sample plots got underway to provide the volume, growth and yield data required for the first FMP.

The Agreement was amended again on April 26, 1956. It included a revised map of the PLA that was based on the intervening field examinations. By this time there had also been sufficient data collected to make a more reasoned estimate of wood needs and sustainable harvest levels. The state of the knowledge was reflected in the wording of the new Section 18 (4) of O.C. 543-56:

For all purposes of this agreement, until such time as reliable data regarding growth and yield are available and the parties agree upon a figure based on such data, it is agreed that the indicated annual growth and yield of the pulpwood lease, as now selected and defined, after making due allowances for fire losses, loss from disease, blow-down and other losses beyond the control of the parties, is not less than three hundred fifty thousand (350,000) cords annually. When such data aforesaid is available, the parties may hereafter agree upon a new figure as the indicated annual growth and yield in cords of pulpwood on the pulpwood lease as now selected and defined, after making the allowances aforesaid, and for the purposes of this agreement, the new figure shall be deemed to be substituted for the figure of three hundred fifty thousand (350,000) cords aforesaid.

This progression towards determination of a mutually acceptable AAC illustrates the iterative approach taken in the initial absence of detailed forest inventories. The size of the first FMA represented an

attempt to match wood needs for the proposed 300-tpd pulpmill with the productive capacity of the forest area. Then, as the location was changed, the planned mill capacity was increased, data for volume, growth and yield became available, and more reasoned determinations could be made. Meanwhile, up to and following the 1956 revision, a growing body of knowledge about the forest was being obtained through measurements from the network of permanent sample plots, forest cover type mapping and processing of the data through early application of computer technology. A preliminary management plan was submitted in 1958 and sufficient data were available by 1961 to begin the detailed plan.

10.4 EVENTS LEADING TO THE 1958 & 1961 FOREST MANAGEMENT PLANS

To facilitate management, the 3,000 square mile lease was initially divided into four^{lxvi} “working circles”, each regarded as a separate forest management unit to be managed on a sustained yield basis. These were then divided into “operating compartments” on the basis of topography, age class of the forest, and volume. These were uniform in size and contained approximately 500,000 cords of wood, sufficient to supply a 50-man^{lxvii} permanent camp for 20 years at a cutting rate of 25,000 cords per year. Blocks of operating compartments were assigned to one of five^{lxviii} 20-year harvest periods or “cutting cycles” – each representing 20-year blocks of time during which the areas would be harvested within the initially agreed 100-year rotation.

Using a two-pass alternate cut system, the initial cuts would be completed in the first 10 years in blocks of 60 to 80 acres sculpted to fit the contours of the hills. When these were completed and reforested, the remaining blocks would be removed in the ensuing 10 years. Reforestation was the key to sustaining the yield.

By 1958 a preliminary forest management plan had been submitted and annual operating plans were developing into comprehensive documents that included forest renewal, protection as well as logging plans. The company was also beginning to play a role in provincial policy development. In 1959, Adrien Provencher, Woodlands Manager, and Jim Clark, Assistant Chief Forester, became members of the AFS Forest Advisory Committee – Provencher representing the pulp and paper industry and Clark the Canadian Institute of Forestry.³³⁹

NWPP continued to break new ground in the development of forest management planning in Alberta. At the start in 1955, basic data for forest management was derived from aerial photos, stand volume tables and forest type maps. These alone could not provide the growth and yield information needed to develop realistic and sustainable allowable annual cuts. For this, stand growth information was critical. John Miller, a St. Regis forester was seconded to the operation in 1956 to develop and implement systems for inventory, growth and yield determination. He designed and began the installation of the company’s permanent sample plot system, the Continuous Forest Inventory (CFI) that is still maintained, since renamed Permanent Growth Samples (PGS). This provided data on age, size, vigour

^{lxvi} In the 1977 forest management plan revision, the number of Working Circles was increased to five

^{lxvii} In practice, large company camps ended up with closer to 100 men (Stan Hart pers. comm.)

^{lxviii} Before all the working circle plans in the 1961 forest management plan were completed, improved information led to a reduction in “rotation age” from 100 to 80 years, and the cutting cycles were reduced to four in the 1966 plan revision.

and quality by species, aggregated to the stand level and used to develop stand volume tables by forest type. Jack Wright, recently recruited (Jan. 1957) from Ottawa, prepared these “aerial stand volume tables” for the common forest types of the PLA, whereby photo-interpreted features such as species composition, crown closure and height could be linked to volume tables for inventory preparation. Wright had cut his mensurational teeth with Cy Seely at the Forest Research Division of the Federal Forestry Branch (later to become the CFS) in Ottawa. On the CFI plots, repeated measurements of the same trees provided real-life and real-time growth information for stand development forecasting. Re-establishment of plots on regenerated stands following the harvest of the original plots provided critical information on the comparative development of fire origin and regenerated stands.

Tree and plot data were compiled using the latest ‘timber accounting’ technology available at the time – data were recorded on “mark sensed cards” using electrographic pencils, then converted to punched cards at the IBM service bureau in Edmonton for processing. As with today’s modern computers, this was much faster than doing it all by hand, and was an early signal of a continuing company imperative to use the best available technology to advance the science and practice of forest management.³⁴⁰

When Miller left in 1958 to return to the St. Regis operations in the United States, Jack Wright replaced him, maintaining and improving the program, completing the 1958 preliminary forest management plan, and writing the first two of the detailed forest management plans for the company.

Another significant innovation was the concept of “ground rules” to enable professional judgment in field operations rather than having to adhere to potentially arbitrary rules.

10.5 TIMBER HARVEST PLANNING AND OPERATING GROUND RULES

“Rules and regulations are for guidance of the wise, but for strict adherence only by fools.”

Sign on the office wall of Reginald D. Loomis

In the early years of operations, the company and forest service collaborated to explore and define new and better ways of implementing sustained yield forestry on the industrial forest. They agreed that a mutually developed set of “ground rules” would be the most appropriate way to guide field operations. These were designed to ensure that development and harvest proceeded in a manner consistent with the intent of the forest management agreement as well as policy and regulation in the province, to achieve sustained yield management and environmental protection. The most notable feature was the use of descriptive guidelines rather than arbitrary rules. These made it possible to apply professional judgment to each unique site condition. Eventually, the “ground rules” became a requirement in the Forest Management Agreement itself (par 12(4), 1968 Agreement).

The “Ground Rules” concept arose through philosophical differences between Crossley and Loomis on the manner in which harvest and reforestation were to proceed. Crossley was a research scientist with considerable expertise in the silviculture of lodgepole pine and white spruce. He was convinced that the only effective forest management system for these species was clear-cutting followed by site preparation for natural seeding.

Loomis came from a different school of thought. He was raised on a farm in Eastern Canada during the early part of the century, and the farm woodlot was often the only cushion between the family and severe hardship. For this reason, it had to be maintained as a continuous crop of valuable spruce trees

for those occasions when extra cash was needed or when, in his example, when a barn had to be replaced. Subsequently, he worked at Beardmore, Ontario where huge clearcuts in jack pine and black spruce were left to grow blueberries and fireweed, leading him to the conclusion that clearcuts were not acceptable practice. To the end of his career in forestry, he continued to hold the view that multiple-aged management was the ideal system for white spruce and even for lodgepole pine in Alberta.

EARLY DEFINITION OF ADAPTIVE FOREST MANAGEMENT – A GUIDANCE DOCUMENT

To his credit, Loomis was prepared to accept Crossley's thesis on a conditional basis but he had strong misgivings about this departure from current forest practice in Alberta, i.e. the diameter limit system. To provide insurance against this reasonable doubt, Crossley and Loomis wrote into the first set of ground rules in 1958 a remarkable early definition of adaptive forest management that presaged current thinking by 40 years.

The initial cutting systems and variations thereof shall be on a trial basis. As many modifications of such cutting systems shall be adopted as possible in order, by experiment, to arrive at a system or systems best adapted to the silvicultural requirements of the species in question, the topography and the operational requirements inherent in economical timber extraction.³⁴¹

The first set of ground rules contained only seven paragraphs, setting out:

- a. The cutting system: alternate clear cutting to promote natural regeneration.
- b. Fringe timber to be left along roads, streams, lakes, etc.
- c. Roadside cleanup to reduce fire hazards
- d. 45 per cent maximum slope, above which logging would not be permitted
- e. 5 per cent limit for field modification of plans without prior notice
- f. Scarification within one year to control fire hazard and to prepare sites for regeneration
- g. Annual operating plan approval by the department within four months of submission

As time passed, these ground rules became more complex and encompassing. Although the stated intent to regard them as guidelines remained, there was a tendency on both sides at times to interpret them more as "rules" with penalties attendant for their infraction. However, "professional judgment" has remained a fundamental requirement. A brief history of the Ground Rules over their 40-year span is presented in Table 1.

TABLE 10-1 EVOLUTION OF GROUND RULES AND GUIDING PRINCIPLES FROM 1958.

Date	Features
1958	Short (three page) document, setting out basic guidelines in seven clauses. Items covered included cutting system, fringe timber, roadside cleanup, slope accessibility, field modifications, hazard control and approval of the AOP.
1967	New paragraphs were added covering erosion control in road construction and stream crossings, including streambed protection. Document expanded to six pages.
1973	Major change in ground rule development that established the pattern through to and including the 1988 document. Additional stream protection guidelines included. Standards for road construction and road classification were added. Management of allowable cut by working circle and five year periodic cut control introduced. The FMA was divided into "foothills" and "lowland" zones with maximum block sizes for each. Maximum block size 500 acres in "lowland" zone. Minimum standards of merchantability, and reforestation stocking standards introduced. Planning for "contingency wood" identified. Document grew to 21 pages including appendices.
1980	Additional refinements for stream and environmental protection. Contingency wood and carryover wood defined. Reforestation stocking standards no longer defined, now linked to timber management regulations. 28 pages
1986	The intent to embed wildlife guidelines expressed, with featured species to be elk and caribou. Contact with trappers affected by operations a requirement. 32 pages
1988	The forest service presented the company with a new set of ground rules, but the company rejected them pointing out this was a contravention of par. 10(5) of its Forest Management Agreement O/C 290/88 that required discussion and mutual agreement.
1988	New negotiated ground rules. The East Slopes Policy identified as a guiding document. The wildlife management process is introduced and defined, including the zoning of the FMA, and the role of the joint company/ government Integrated Resource Management Steering Committee. 44 pages
1996	Remarkable step forward in ground rule development. Developed through close consultation with FRAG. A complete set of community, economic and environmental goals were developed. A new format was introduced, comprised of Goals/ Intent/ Standards/ Operating Practices. Established a strong linkage between the forest management plan and operating practices. The new goals were included in the new management plan. The Linked Planning Process set forward a new system of plans and approvals. New rules for public consultation were also provided. A ground rules standing committee was established, with revisions to be made as necessary, not according to some prescribed schedule. Included an 18-page glossary of terms used. 104 Pages

10.6 MANAGEMENT PLAN HIGHLIGHTS

THE 1958 PRELIMINARY FOREST MANAGEMENT PLAN (JOHN MILLER AND JOHN C. WRIGHT)

In 1958 the Company prepared and submitted its preliminary forest management plan, in which it set forward the preliminary allowable annual cut agreed to earlier (350,000 cords) and described the steps that would be taken to prepare a final forest management plan to bring the forest under regulation.

The plan proposed dividing the area into four sustained yield management units, known as the Athabasca, Marlboro, McLeod and Embarras Working Circles with a total area of 1,920,983 acres (777,420 ha), and a provisional reserve area of 1,949,886 acres ((789,120 ha).

The preliminary plan identified the management objectives which would be carried forward to the 1961 plan, and the selection of the Judeich stand projection method as the management system which would be adapted for implementation on the forest.

The company proposed to build all its own roads and camps for an operation that was to be 100% contractor harvesting, with operations to commence each year in the spring and carrying on, as much as feasible throughout the year. The contractors would cut the wood and deliver it to the mill. This would continue year-round as much as feasible, but there was clear expectation that most of the wood would be delivered during the winter under frozen condition. Semi-permanent camps were proposed, each with an expected duration of about five years in a location (note that this was later changed to 20 years in the detailed forest management plan).

Early recognition of aesthetic values led to a proposed five chain (90 metre) buffer along major water courses and “resort lakes” and highways. The “Green Timbers” area, or Camp 1, was recognized as presenting unique challenges to harvest and reforestation due to the heavy winds and soil erosion potential.

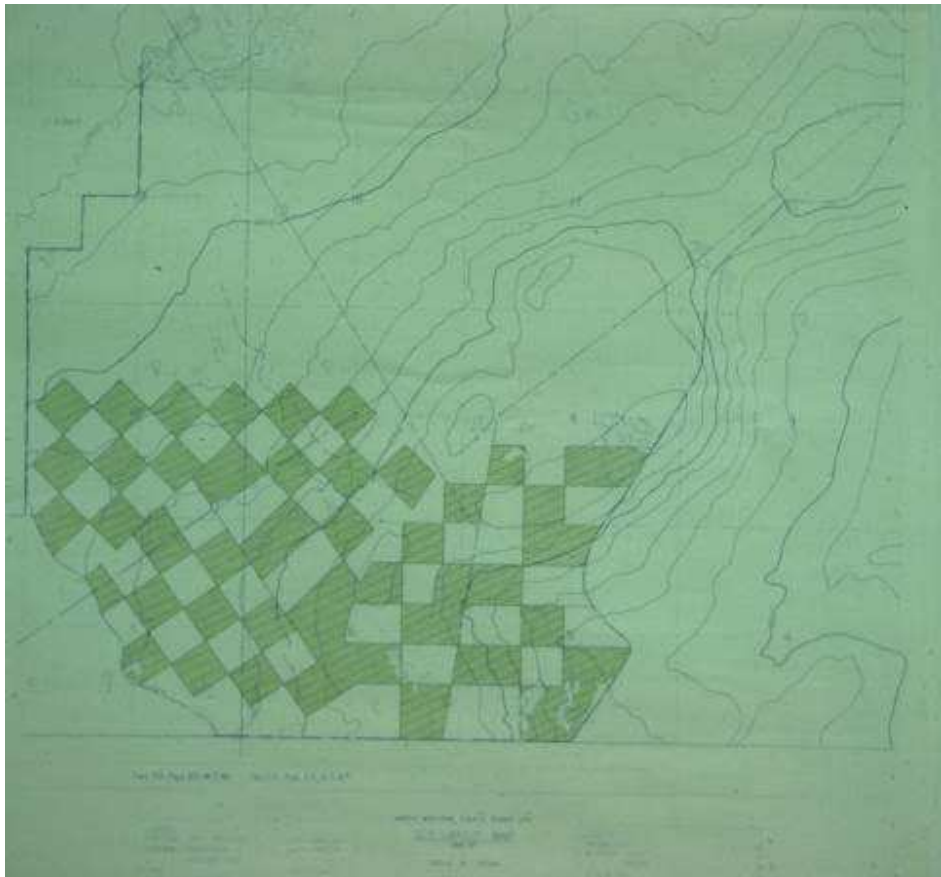
Initial inventory information was derived from the Alberta Forest Service cover type maps for the area, but the company was preparing new forest type maps using 1:15,840 photography flown July to September 1955. Furthermore, the Company proposed that its management inventory would be taken from its “continuous inventory system” based on permanent sample plots. These plots, in addition to providing inventory information, would eventually provide data to assess increment, mortality, harvest volumes and ingrowth.

Tentative rotation ages were identified for lodgepole pine (98 years), black spruce (93 years) and white spruce (122 years).

Reforestation was proposed from natural seeding following logging and site preparation. The Company planned to use skidding methods to prepare the ground for natural seeding, combined with the investigation of various types of mechanical scarification and slash piling to promote regeneration and reduce fire hazard. Follow-up surveys would identify “fail” areas which would again be treated for natural regeneration or planted.

The Company noted the need for research to support management and proposed a number of areas where it would conduct such research, including:

- Growth and yield, largely based on the permanent sample plot system
- Regeneration, including the development of appropriate stocking standards with the AFS
- Cutting and regeneration studies to match harvest systems with most effective reforestation
- Site studies including the development of a site class map important for regeneration establishment and growth prediction and assessment



MAP OF YARDING EXPERIMENTAL AREA, CAMP 7, 1957

WELDWOOD PHOTO COLLECTION

The Company also proposed to set up small demonstration projects around the Pulpwood Lease Area. On these 40 acre (16 ha) blocks, various types of thinning and regeneration would be tested for future application to management practice.

THE 1961 FOREST MANAGEMENT PLAN (JOHN C. WRIGHT)

Approved (Part I 1961) by: D.I. Crossley, Chief Forester and A. Provencher, Woodlands Manager.
Effective date: May 1, 1959

Summary of other related events leading to the 1961 FMP

Silviculture was a major focus in order to meet the basic requirement for reforestation of cutovers. Scarification trials began as early as 1956, showing initial success, improved upon through research and equipment modifications. The first full-time silviculturist was hired in 1960. Jack Wright worked with Miller in the development of the 1958 preliminary forest management plan and, when Miller left in 1958, took over Inventory and Management, setting the stage for his authorship of the first FMP.

Logging was conducted virtually entirely by hand falling and bucking, and skidding with horses. The Camps were central to the system, very little commuting was done.

Meanwhile, the pulp mill had begun production in 1957 and was officially 'opened' at a ceremony on July 28, 1957 with a rated capacity of 430 air dry tons per day. There were many 'bugs' to work out in this new system, annual production in 1958 was 93,984 tonnes and by 1962 it was up to 146,364.

Highlights of the 1961 Forest Management Plan

The Agreement, signed in 1954 between North Western Pulp & Power Ltd. and the Province of Alberta, called for preparation of a detailed forest management plan with updates to be prepared every ten years. A preliminary plan was submitted in 1958. Although the first plan was due May 1, 1959, it was not submitted until October 31st, 1961, but made effective from 1959. The major reason for the 'delay' was the need to complete and compile the forest inventory for the forest. It was a major undertaking and the Company wanted to do it right. Further, since this was the first-ever detailed forest management plan in Alberta, many details had to be determined through analysis and discussion.

The 1961 plan encapsulated the thoughts and philosophies of Reg Loomis and Des Crossley, Chief Forester and Adrien Provencher, Woodlands Manager. The plan was prepared in five volumes, one presenting an overview of the full lease area, and one each for the four working circles covering the four years remaining in the initial planning period (Map 3). The plans were prepared and submitted as the inventory data were compiled.

Management Objectives

In its introduction to the 1961 FMP³⁴², four prominent objectives clearly stated the intended manner of managing the timber resources so that the pulpmill would realize a constant supply of pulpwood in perpetuity.

This plan, developed in compliance with Section 23 of the agreement between North Western Pulp & Power Ltd. and the Province of Alberta organizes and attempts to maintain the Pulpwood Lease Area under sustained yield management, whereby the forests of the area will provide a continuous supply of quality raw materials to the Company pulp mill at Hinton.

The major objectives of the forest management system set forth in this plan are outlined below:

(1) To sustain, in perpetuity, an annual yield of coniferous pulpwood from the Pulpwood Lease Area.

(2) To provide a long-range, over-all cutting plan whereby pulpwood harvesting operations may proceed logically and systematically over the entire Lease Area during a single rotation.

(3) To remove the over-mature timber as rapidly as possible.

(4) To mould the present distorted age class pattern into a more regular distribution of classes by 20-year age groups.

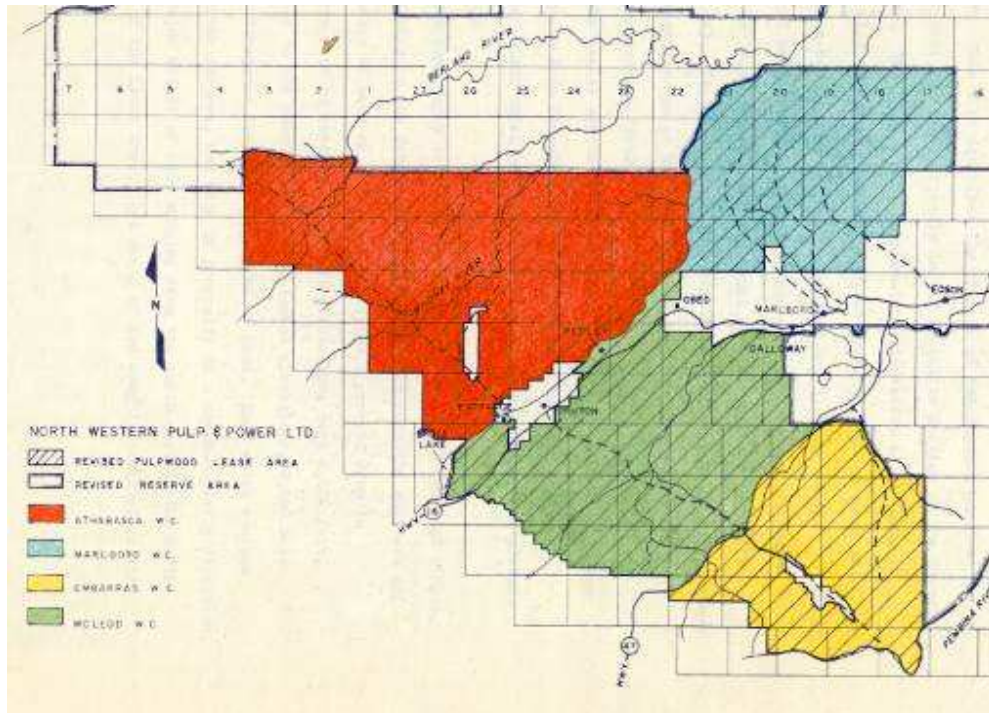
A definite attempt has been made, in designing this plan, to attain these objectives and yet to maintain as high a degree of flexibility as possible so that unexpected changes and adjustments can be made without disrupting the basic long-range management plan.

As described earlier, the Continuous Forest Inventory was to play a major role in the achievement of the first objective through the development of inventory, growth and yield and allowable annual cut calculations for this plan. Because the permanent sample plots were established on a grid basis, with clusters of four plots every two miles, the aggregated inventory information derived was representative of average volumes only as applied to large areas, 25,000 to 30,000 acres, which was eminently suitable for calculations on a working circle basis.

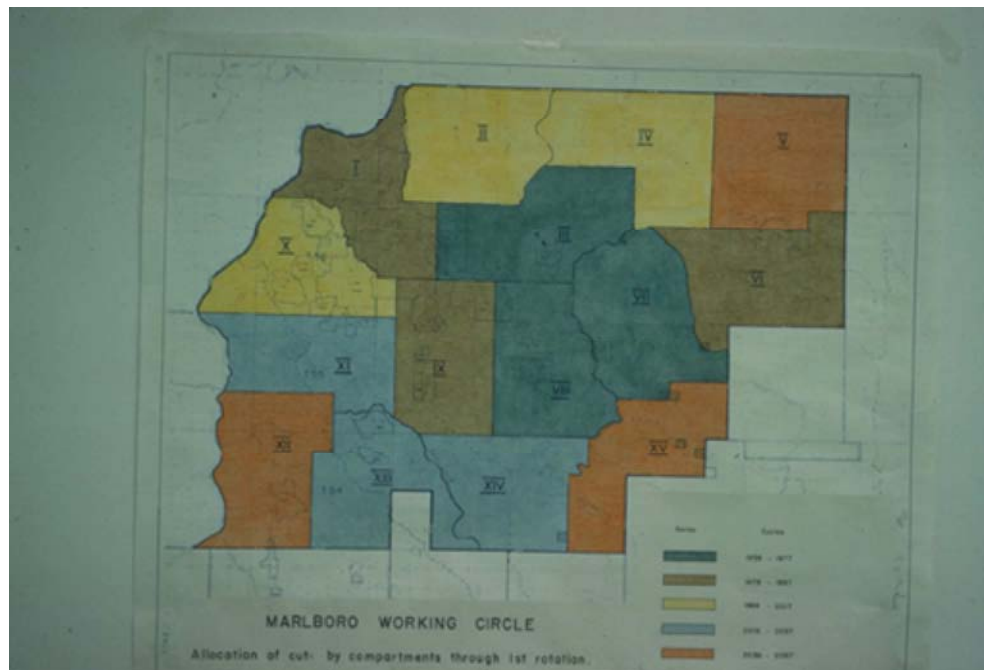
The rotation age chosen was based on 90 years for pine and alpine fir, 100 years for white and black spruce, however an extra five years was added on for the 'regeneration period'. As explained in the FMP: "In order to be practical, a rotation weighted by the proportion of pine and spruce has been selected. ... 98.3 years, or for all practical purposes, a 100 year rotation."

The second objective, that of developing a logical cutting plan for the entire lease area, was supported by the CFI inventory program and the recent completion of a fire origin inventory of the entire landbase based on determination of stand ages and years of fires. This age class information was used as the foundation of the allocation of compartments to cutting cycles, and the subsequent road and development plans (Map 4). The "logically and systematically" reference to harvesting operations proceeding over the entire lease area had profound implications for the Company. This resulted in an essentially balanced and consistent haul distance over the rotation. It was a major contribution to the economic and social leg of what would become known as sustainable forest management.

The intent of the third objective was to try to reduce areas of 'stagnant' growth including decadent stands that could become fire hazards or create situations that could support attack by insects and disease. Young faster-growing trees, the growth of which would increase future yields, would replace the older stands. This too was supported by the age class information developed on the lease area and as elaborated on in later plans.



Map 10-3 Pulpwood Lease Area divided into four Working Circles – 1961



Map 10-4 The Marlboro Working Circle set up for a 100-year Rotation, 1961 forest management plan. Each colour represents 20 years of cutting from permanent camps established within the operating compartments

The fourth objective was aimed at creating a 'regulated' forest. This reflected the classical forestry view of a managed forest with an even distribution of age classes from zero to rotation age. This condition was described in textbooks as a "normal forest." Its conditions were ideal for supporting annual harvests of timber on a sustained yield basis.

This approach gave no recognition to the need to manage the forest for any values other than timber production. Although there had been an inherent assumption that other values would automatically be assured in well-managed forests, the Company had already recognized other values such as recreation and agreed to land reservations for those purposes around Jarvis Lake when Pulpwood Lease Area was finalized in 1955. As described in the plans, this system was an adaptation of the "Judeich Stand Method"³⁴³ As Bott et al. explained³⁴⁴:

The St. Regis team and Crossley, soon joined by other Canadian Foresters such as Jim Clark and Jack Wright, recognized the "nearest first" methods would not meet their sustained-yield management objectives, nor would it support sustained cost competitiveness. Instead they adopted the approach originated in Europe by Johann Judeich (1828-1894) based on the age and composition of stands within the forest. Judeich's "stand projection" method, the first to apply biological principles to forest management, was well suited to the predominantly even-aged, fire-origin forest stands around Hinton.

Management planning forester Jack Wright cited Mayer *et al.* in his 1966 FMP, but the reference provides an appropriate perspective here as well. The authors seem almost to have anticipated the analogous conditions at Hinton.

The Stand Method is applicable to even-aged forests only, that is to forests that have been sub-divided into and inventoried by age class. By means of frequent management plan revisions, the amount cut over never endangers the continuity of the productiveness of the forest. While it allows full play to the skill of the forester in charge of operations, the forest moves steadily toward a normal distribution of age classes but this goal is attained without undue sacrifice. It must also be remembered that the application of the stand method presupposes a silvicultural system approaching some form of clear-cutting.

Allowable Annual Cut

The Judeich Stand Method, originally conceived to be applied on a non-segregated forest, was adapted to fit to the NWPP system of working circles, cutting cycles and operating compartments, as follows.

- a. Net compartment acreages by productive landbase were calculated
- b. Area and volume of living softwood by 10-year age class in the compartments were compiled
- c. The expected period of harvest was determined for each compartment based on its allocation to "cutting cycle"
- d. Compartment volumes, by 10 year age class were projected to the mid-point of that cutting cycle using growth percentages and "factors" by age class, as derived from the permanent sample plot program

- e. Volumes by compartment and cutting cycle were summed to produce the gross allowable cut for the working circle over the periods projected.
- f. These volumes were reduced by the fire allowance, equivalent to the average annual burn times the number of years to the mid-point of the cutting cycle.
- g. The sum of the net allowable cuts by cutting cycle, divided by the period remaining in the rotation was the Allowable Annual Cut (AAC).

This system of AAC calculation was to remain in effect for the 1966 and 1977 forest management plan revisions.

Local volume tables were constructed based on several hundred stem measurements to determine taper. As well, volumes were adjusted for hidden advanced decay. A cull factor was derived from 48 decay study plots measured co-operatively with the Forest Biology Division of the Science Service of Canada. This agency, charged with surveys of and research on forest insects and diseases later became part of the Canadian Forest Service.

The four individual working circle plans described the methods and assumptions contained in the allowable annual cuts developed. The average annual burn at the time was 0.32% per year, equivalent to an annual loss of 2500 hectares. The nominal allowable cut was reduced accordingly. For example, in Part II for the Marlboro Working Circle, the nominal calculated AAC was reduced by 16 per cent, the reduction based on the average annual burn of 0.32% at the time that was expected to affect half of the stands.

By the time the third (McLeod) working circle plan had been prepared, updated curves of mean annual increment and periodic annual increment suggested a rotation age of 80 years (75 years plus 5 year regeneration period). The Department was reluctant to accept this change, dependent on the Company's ability to prove it could establish regeneration within the five years indicated. It was not until a pivotal meeting of Dec. 9, 1964 that the Department agreed to the change, which was then incorporated into the last (Embarras) working circle plan, thus precipitating the 1966 forest management plan revision which would bring all working circles to an 80 year rotation.

As a check against the area/volume method used to determine allowable cuts, Hanzlik's Formula was used. $AAC = V_m/R + I$ where:

V_m = actual volume of mature and overmature wood

R = rotation age

I = mean annual increment at rotation age

This calculation was again reduced as an allowance against possible losses from fire. For the Part II calculations, The Judeich and Hanzlik approaches indicated AACs of 53,294 and 51,503 cords respectively.

The sum total AAC for the managed forest was determined at 304,804 cords^{lxix} or 733,646 cubic metres (2.41 m³/cord basis) after a reduction of 58,302 cords over the course of the rotation for allowable burn.

It was distributed by working circle as outlined in Table 2.

TABLE 10-2 DISTRIBUTION OF ALLOWABLE ANNUAL CUTS AMONG THE FOUR WORKING CIRCLES (1961 FOREST MANAGEMENT PLAN)

W.C./Plan Date	Gross AAC Cords	Net AAC after Burn Allowance	Hanzlik AAC	Comments
Marlboro Nov. 8, 1961	90,414	75,000	79,840	5, 20 year cutting cycles, 100 yr "r"
McLeod Aug. 15, 1962	85,514	71,262	71,611	5, 20 year cutting cycles, 100 yr "r"
Athabasca/Berland Oct. 1, 1964	120,945	100,787	100,671	5, 20 year cutting cycles, 100 yr "r"
Embarras July 1, 1965	66,233	57,755	51,503	4, 20 year cutting cycles, 80 yr "r"
Total AAC Cords @ 85 cu ft/ cord	363,106	304,804	303,625	Burn allowance based on 0.32%/ yr average annual burn

* includes volumes to be cut on Licensed Timber Berths

** assuming balanced age classes in future

Not reflected in these calculations is the considerable thought that went into selection of the actual operating compartments to support 25,000-cord per year camps over the first 20-years. They were selected in consideration of a balance among maturity class, hauling distance, age-classes and the objective of moulding ages towards a "normal distribution", very much as described by Mayer *et al.*

Other Land Uses

The plan described "one of the problems facing long range management of the Lease Area..." arising from the many active Timber Berths and Special Timber Permits on the area. There were 40 LTBs with a combined area of 26753 ha (3 ½% of the Lease Area) and eight STPs totalling 740 ha. They were generally located in the Athabasca and Marlboro working circles, and presented "an unknown factor to

^{lxix} One cord = 85 cubic feet of solid wood

management calculations.” The company surmised these would be operating for the next 20 years, but subsequent events showed the last LTB terminating in the late 1960’s.

Passing reference was made to other land uses including oil and gas, but there was no great concern over these. This would come later as such activities exploded on the area. The plans noted a reservation around Jarvis Lake for potential development into a provincial park, and a pending landbase reduction of 1914 ha for “training school purposes” – an area that was to become part of the Cache Percotte Forest of the present Hinton Training Centre that opened in 1960.

Company Operations and Fire Control

Independent contractors under the supervision of company superintendents conducted all company operations logging. A company cut inspector was assigned to each district, each district containing two or more camps. The company built all-weather roads to the camps, built the camps themselves and located the water supplies. The contractor equipped the camp, hired his own crew and conducted the logging operation. A company clerk had an office in the camp to keep the records, compute payrolls and run a commissary.

Concern over wildfire was evident in this plan. Large areas had burned in 1956 as the company began operations, (Gregg Burn 8,793 ha; Pine Creek 6,134 ha, Berland 3,466 ha) and another large burn in 1961 gave further cause for alarm. The plan noted that in the McLeod Working Circle alone, approximately one quarter of the area had burned within the past 45 years, including the 1956 Gregg Burn. Statistics showed the average annual burn rate for the 1941-58 period as 0.32%, based on age classes. This rate was considerably higher than the aim of the AFS following the 1956 discussions to set a target rate of not more than 0.001%^{lxx}. The plan described the government fire protection capacity and noted the status of the air arm in Edmonton as “one helicopter and two small fixed-wing aircraft.” Although small, this represented the start of a major advance in fire control capability, prompted in part by Company representations after the 1956 fires. The plan failed to note that the government had also begun to contract water bombers for fire control, the first such use probably occurring on a fire at “Camp 2” in 1959.

Transportation routes were also limited, with only 551 km of all-weather roads serving the lease area of which about half was numbered highways - (215 km).

However, considerable detail was presented in the plan to show the levels of planning, preparedness and actions expected of staff in anticipation of and response to fires.

Silviculture and Research

The plan described silviculture methods to be used, largely based on the two-pass clearcut system and natural seeding. The use of seed tree blocks for natural regeneration was referenced as one reforestation strategy, although subsequent windthrow events combined with lack of reforestation success led to the abandonment of this technique. The plan described an experimental scarification program underway (1956, 1957, 1958 cuts, approximately 1,200 ha) to encourage natural regeneration.

^{lxx} The date when this figure was identified by Eric Huestis and Bob Steele is uncertain, possibly as late as 1958 – Jack Wright pers. comm..

The Chief Forester's strong research background was evident as scientists from the Federal Forestry Branch, Research Division were conducting assessments of company reforestation effectiveness. Company plans were underway to develop an effective regeneration survey system, tentatively proposed to follow treatment after three years or, in the case of spruce, three years after a year of major seedfall.

The company was not proposing any intensive management program at the time, but was active in research, as was the Federal Forestry Branch. Several research programs were underway, including:

- Basic regeneration
- Thinning of lowland black spruce
- Fertilization of upland and lowland black spruce, white spruce to induce seed crops, to release young, dense, stagnating pine, to release black spruce understory after overstory pine harvest and to increase the growth of young white spruce

THE 1966 FOREST MANAGEMENT PLAN REVISION (JOHN C. WRIGHT)

Approved by: D.I. Crossley, Chief Forester and Stanton G.V. Hart, Woodlands Manager



THE 1966 FOREST MANAGEMENT PLAN UPDATED THE MORE DETAILED 1961 PLAN – PRIMARILY A REDUCTION IN ROTATION AGE FROM 100 TO 80 YEARS AND A REVISED AAC

WELDWOOD PHOTO COLLECTION

Summary of related events leading from 1961 to the 1966 FMP

The first measurements of the CFI had been completed in 1961 and remeasurements began in the Marlboro Working Circle shortly after. Using the initial data, Jack Wright developed the first Aerial Stand Volume Tables as early as 1962. Computer technology was in its infancy but the Forestry Department kept pace with the changes, first converting compilation from unit record computing to high speed data (batch) processing of data at the IBM Service Centre in Edmonton, shifting again from the “mark sense” to key-punched cards in 1965. The point of this was to speed compilation and enhance data analysis.

Experiments in mechanical skidding began during this time and, along with road system planning laid the foundation for a major switch to mechanization and a phase-out of horse logging. This happened during the tenure of Stanton G.V. Hart, who became woodlands manager in 1962 when Adrien Provencher left for a new St. Regis position in Montreal. The Alberta Resource Railway had begun construction towards

Grande Cache and Grande Prairie in 1965, presaging increased coal mining in and around the FMA with attendant land withdrawals.

In the meantime, problems in the pulpmill were being resolved and processes improved. Annual production increased from 146,564 tonnes in 1961 to 177,313 in 1966.

Highlights of the 1966 Forest Management Plan revision

In June 1966 a revised management plan was presented to more closely follow the prescribed outline requested by the AFS – essentially a reorganization of the format designed and used in the 1961 plan - in 1963. More importantly, the recent agreement to reduce the rotation age to 80 years pointed to the need to recalculate the sustainable allowable annual cut.

Management objectives

The four basic objectives changed very little from 1961, however somewhat more explanation was provided for the third and fourth objectives. All four are listed here.³⁴⁵

1. To sustain, in perpetuity, an annual yield of coniferous pulpwood from the Pulpwood Lease Area.
2. To provide a long-range, over-all cutting plan, whereby pulpwood harvesting operations may proceed logically and systematically over the entire Lease Area during a single rotation.
3. To remove the over-mature timber as rapidly as possible in order that those slow-growing and often decadent stands can be replaced by more rapid growing timber which will, in turn, increase the allowable annual cut on the Pulpwood Lease.
4. To mould the present distorted age class pattern into a more regular distribution of classes by 20-year age groups between zero and rotation age.

Inventory and Allowable Annual Cut

The 1955 1:15,840 photography had been supplemented with new photography at 1:31,680, taken by the Alberta Government in 1963, and used by the company to update its map information. Again in 1965 the company took a new set of 1:25,000 photography with a company-owned aerial camera.

As in the earlier plans, the permanent sample plot system of 3,000 CFI plots was the foundation of the management inventory for the lease area. The company by then had completed the development of cover type maps by township for the entire lease area, but the aggregation of this information by individual stand type to a management unit basis would have been a formidable task. Statistical analysis of the use of CFI plots for the inventory showed, again, that they were adequate for management planning purposes. Analysis showed these data were accurate at a working circle level, again the basis for AAC calculation, to +/-5%.

The rotation age had been revised after analysis of the aggregate CFI data for the four working circles. Empirical yield curves showed that the rotation age for both spruce and pine should be approximately 75 years, based on intersection of the current annual and mean annual increments. Adding a 5-year regeneration period led to recommendation of an overall rotation age of 80 years. This was agreed upon with the AFS during a December 9, 1964 Management Meeting between the Company and Department of Lands and Forests.

The empirical yield curves derived from the CFI data were used to project current stand volumes to the time of harvest to generate estimates of volume at rotation. The previous AAC of 315,650 cords showed an increase to 373,723 cords (899,530 cubic metres) when recalculated using the new parameters.

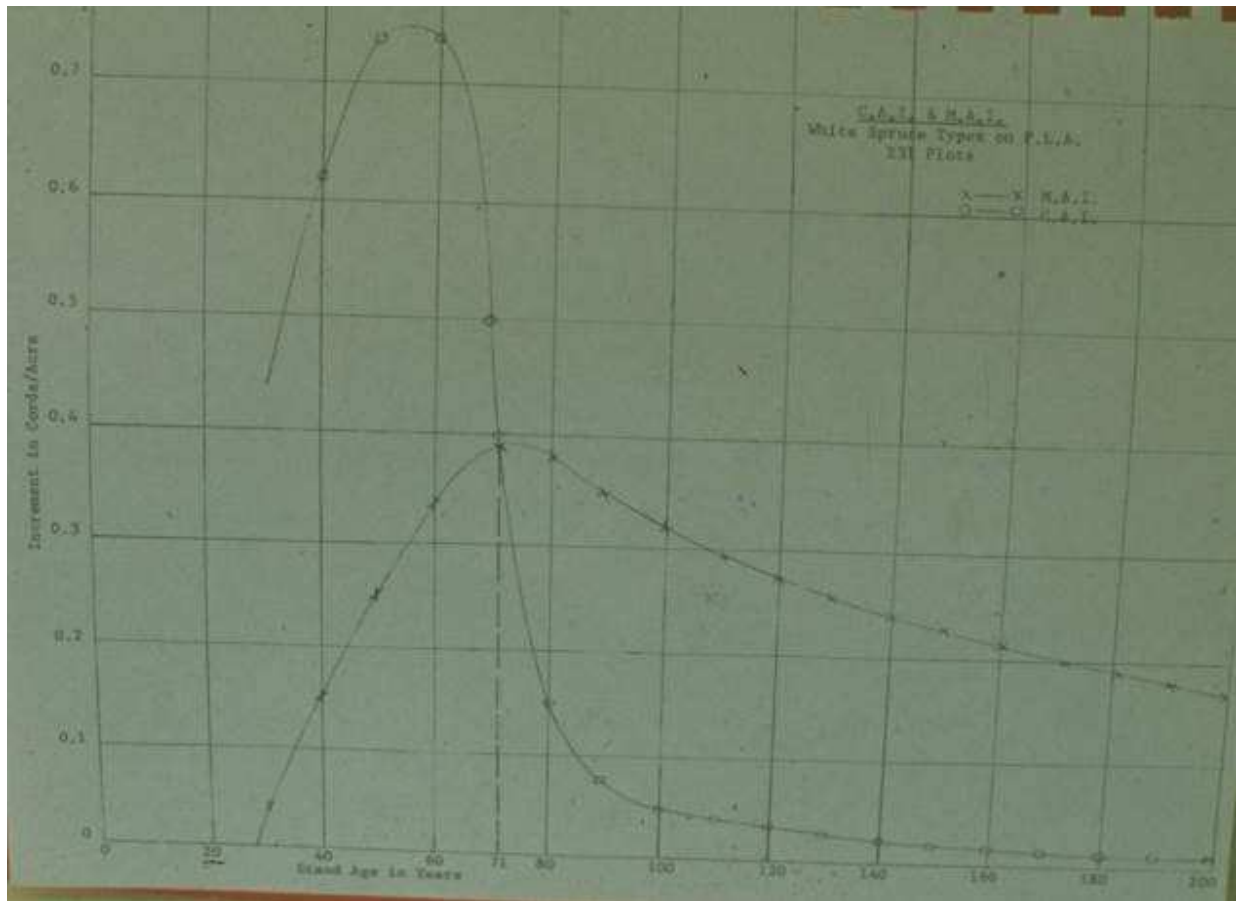


FIGURE 10-1 CAI/MAI CURVES FOR WHITE SPRUCE, 1966 FOREST MANAGEMENT PLAN. THE INTERSECTION OF CAI AND MAI IS THE NATURAL ROTATION AGE, INDICATED AS 71 YEARS

Again, the 0.32% average annual burn was accommodated by a reduction in AAC from a potential 428,860 cords to 373,723, representing a 12.9% reduction.

The allocation of the cut to compartments continued and refined the process of regulating the cut. Harvest was concentrated in the overmature compartments in the first 20-year cycle, and the second cycle was planned in compartments with timber near or at the mature stage. Sixty-four compartments were distributed among the four working circles. The allocation also considered maintenance of average hauling distance to the mill at Hinton, and a restriction agreed to that the number of compartments active in any one cutting cycle would be limited to sixteen.

The distribution of AACs among the Working Circle was as follows (Table 3):

TABLE 10-3 DISTRIBUTION OF AACs AMONG THE FOUR WORKING CIRCLES – 1966 FMP

Working Circle	AAC (net) (cords)	AAC (net) (m ³)	% of harvest on lease Area	Hanzlik formula comparison (cords/ m ³)
Athabasca-Berland	130,300	313,625	35	n/a
Marlboro	95,294	229,367	25	n/a
Embarras	57,755	139,013	16	n/a
McLeod	90,374	217,525	24	n/a
Total	373,723	899,530	100	377,961 / 910,900

Other Land Uses

Active timber licenses had declined from 40 in 1961 to 13 in 1966, the area from 66,080 acres to 31,310. The company pointed to problems in the reserved expansion area from 21 active licenses therein. Comfort was taken from an 11 July 1961 Agreement amendment that prohibited the issuance of new licenses in the reserve area once the company selected lands for expansion. This amendment also would cancel as of July 31 1968 any licenses issued prior to the date of land take-up.

The company began to express concern over the impacts of horse grazing on regeneration in cutblocks.

The plan noted potential of the new Alberta Resources Railway, being constructed at the time, for hauling wood from the reserve area, while pointing out it was also taking land out of forest production.

Switzer Provincial Park had not yet been established although plans were obviously advancing. The plan noted “approximately 10 square miles set aside in Range 26 for a Provincial Park which contains a chain of lakes in the Jarvis Creek system, with an additional two square miles to the north of and adjacent to this park which is set aside for recreational development such as cottage sites.”

Company Operations and Fire Control

Maps included in the 1966 plan showed the gradual expansion of the company road network within the FMA, and the new Alberta Resources Railroad to the north.

Administration of the company operations remained in four districts, each with a superintendent responsible for all harvesting and wood delivery in his district. The transition from camp to commuter-

based operations was noted, and by this time all but two of the remaining camps were company operations.



CAMP 23, BERLAND WORKING CIRCLE COMPARTMENT 3, 1968. THIS WAS ONE OF THE LAST COMPANY CAMPS IN OPERATION, AND WAS MANAGED BY ROSAIRE LACROIX. IT CLOSED SHORTLY AFTER THIS PICTURE WAS TAKEN

WELDWOOD PHOTO COLLECTION

While horse logging continued, the plan noted a “steady movement in the replacement of the horse by the articulated frame wheeled skidder” and that this trend would “accelerate in the near future.” Also, the company was investigating the possibility of switching from 8-foot (100-inch) deliveries to a tree length system with bucking to the 8-foot lengths for chipping at the millsite. Most of the wood continued to be delivered in the winter, and investigations into rail transport (using the Alberta Resources Railway) continued.

25-year statistics were now available for fire, and the average annual burn rate was shown as 0.279% or 10,840 acres. The 20-year average was 0.32% and the 10-year average (which included the 1956 and 1961 burns) was 0.641%. An age class inventory of the lease area had been completed in 1964 and it showed the average annual loss over the previous 105 years as 0.72% of the total area, about 28,000 acres annually. The six major fire years were cited as 1870, 1876, 1889, 1896, 1921 and 1956. The two decades of the 1880s and 1890s seem to have experienced the fires of greatest extent.

Silviculture and Research

The basic two-pass clear cutting system remained as the system of choice, noting that the stands on the lease area regenerated from fire, were even-aged and therefore most suited to this type of harvest and reforestation system. The plan noted the use of strip cutting in white spruce, with maximum strip width of 200 m (10 chains), and block or patch cutting in lodgepole pine.

The emphasis continued on natural regeneration from seed. Scarification for natural regeneration in lodgepole pine was not only expected to produce new crops at better density levels than fire, but also to produce crops where “the yield from the new stand should exceed that of wild stands, with their extremes of densities.”

Regeneration surveys had been completed on the first four years (1956-60) of cutting, and were found to have 73% of the 30,380 ha (75,070 acres) cut during that period satisfactorily restocked. It noted plans to address the unsatisfactorily restocked areas through a combination of containerized seedlings from the company’s new greenhouse, or direct seeding from ground or air – still experimental at the time. During 1965 200,000 such seedlings were planted and 400,000 were expected in 1966. If successful, planting was expected to increase to up to 2,000,000 trees per year.

The capacity of the new 6.1 x 12.2 m (20 x 40 foot) greenhouse was 700,000 seedlings.

A new silviculture section head, Bob Carman, had been recruited in 1963 to advance the program. In addition to building the greenhouse, he instituted the Management Opportunity Survey system, which was a formal post-harvest survey of cutover areas to prescribe the appropriate silviculture treatment by blocks and treatment subdivisions within those blocks.

Fourteen co-operative research projects were listed, mainly with the Federal Forestry Department but one wildlife project (Stelfox) with the Alberta Department of Lands and Forests. The Company was conducting five more on its own. The projects were distributed as follows:

- Growth and yield (6 projects)
- Seeding and Planting (2 projects)
- Seed Periodicity and Release (1 project)
- Natural Regeneration following Scarification (1 project)
- Site (2 projects)
- Effect of Small Mammals on Forest Regeneration (1 project)
- Entomology and Pathology (3 projects)
- Fire Hazard (2 projects)
- Effects of Harvesting Coniferous Forests on Big Game (1 project)

THE 1977 FOREST MANAGEMENT PLAN (ROBERT UDELL)

Approved by: J.C. Wright, Chief Forester and J.D. Clark, Woodlands Manager

Summary of related events leading from 1966 to the 1977 FMP

The events leading up to the next Forest Management plan were many. It was a time of expansion in both the forest industry and the oil and gas industry. People were becoming more aware of the impact timber harvesting and oil roads were having on the landscape.

The major policy event was the negotiation of a new Forest Management Agreement -- passed by O/C 1647/68 dated 30 August 1968. It increased the FMA from 7770 km² (3,000 mi²) to 15,540 km² (6,000 mi²). In return, the company agreed to invest a minimum of \$50 millions to construct "an addition to the mill to increase the manufacturing capacity ... to a minimum rated capacity of 9070 tonnes (1,000 tons) of pulp daily." Construction of the expanded mill was required to start no later than January 1, 1971. This condition was not met. A letter from Minister A. A. Warrack dated February 4, 1972 advised that the Company had defaulted on the August 30, 1968 agreement to expand, the period of grace having expired on June 30, 1971, so that the parts dealing with expansion of the FMA were cancelled.



DEPUTY MINISTER ROBERT STEELE AND
HINTON VP IVAN SUTHERLAND (NWP&P)
SIGNING THE 1968 REVISED FOREST
MANAGEMENT AGREEMENT

WELDWOOD PHOTO COLLECTION

In the meantime the Company proceeded with inventories of the expansion area and studies of growth and yield. The CFI plots were renamed Permanent Growth Sample plots in 1970 to reflect their new focus on that aspect. Photo-point sampling was introduced that same year to enhance the forest inventory process.

A revised *Forests Act* was passed in 1971. A notable clause for FMA holders conveyed ownership of the timber on FMAs to the holders of Forest Management Agreements. This was to have a major influence during negotiations with other industrial users on FMAs with respect to payment for damage to timber as a result of their operations. This came about, at least in part, through Company representations. New aerial photography in 1969 revealed an unexpectedly high cumulative amount of oil and gas activity on the FMA, with much loss of timber. The Company launched a successful legal initiative to establish the right of FMA holders to compensation for loss and damage to timber arising from other industrial uses. By the mid 1977, expansion of the seismic programs was phenomenal. An Environment Conservation Council³⁴⁶ report indicated that in the forested areas of Alberta the oil and gas industry was disturbing almost as much land area in the Green Zone as the forest industry was harvesting – the difference being that forest industry was reforesting while the oil and gas industry was not.

The increase in activity in the forest led to environmental concerns being expressed. Among the most prominent of the early issues was a 1971 report by an environmental organization ‘Save Tomorrow, Oppose Pollution (STOP)’ that created much stir in Alberta. One of their members, Arnim Zimmer, took a number of photographs around the Hinton area through which he purported to show that logged areas were not regenerating and that serious soil erosion was occurring. These were serious allegations and the story was given prominence by newspapers, TV and other media. Dr. Kare Hellum, head of Silviculture for the AFS was dispatched by Director of Forest Management Fred McDougall to relocate and examine all of Zimmer’s photo points. He teamed up with company forester Steve Ferdinand. They found the original photo points, staked all the regeneration and re-took pictures from the same perspective. The sea of stakes in these photographs provided a much different view of the reforestation situation. Further, the erosion was minor and largely associated with initial explorations for oil and gas, as well as the Alberta Resources Railway and Highway 40. Their report effectively discredited the STOP report. Des Crossley travelled around the province to present the results of their investigation and refute the critics who had attacked his management program. However, this episode marked the beginning of a series of criticisms launched by environmental organizations. The topics raised through these actions subsequently became more specifically addressed in detail in succeeding FMPs.

C.D. Schultz and Company was commissioned by the Province in November 1972 to conduct a review of the environmental impacts of forestry operation in the Edson-Hinton and Grande Prairie areas of Alberta, in response to increasing environmental concerns.³⁴⁷ As outlined in their September 1973 report³⁴⁸, their terms of reference were applied to the separate fields of road systems, timber harvesting and reforestation. Among their summary of conclusions were the statements:

Many elements of the total environment ... are affected in complex ways by an even larger number of identifiable activities or events associated with timber harvesting. An extremely large number of interactions thus occur. Of these, a few are considered environmentally beneficial, many are of minor importance. Some present moderate environmental threats, and relatively small number present major environmental threats.

Timber harvesting can remain as a principal and highly legitimate use of the project area.

A wide-ranging series of recommendations was made that were addressed through extensive and vigorous discussions. The results were reflected in better understandings and some mutually acceptable modifications to the operating ground rules. The report also led to the Environment Council of Alberta hearings on forestry initiated in 1977 that included the entire forested area.³⁴⁹

The reforestation program expanded to keep pace with logging. Forester Steve Ferdinand developed a new container in collaboration with businessman Hank Spencer, the Roottrainer, which greatly enhanced survival and growth of seedlings. In 1970, Crossley prepared the first intensive forest management proposal³⁵⁰. This excerpt provides a glimpse of his thinking with respect to future projections for wood supply in forest management planning. This timing of this proposal is notable since the 1968 Agreement had already enabled doubling of the size of the FMA, but Crossley's prescience is clearly reflected in the opening statement:

Because the forecasted demands for wood are enormous, because there is a parallel demand for land, no time should be lost in moving into the field of high yield forestry.

In order to take advantage of the inherent capacity of the lands under lease to produce raw material far in excess of what it produces in its wild state, and by so doing guarantee a perpetual supply of wood in spite of unpredictable drain to other users of land, and to realize the opportunity of paying a fixed rent rather than stumpage fees, the following recommendations are made.

- That we minimize the amount of outside wood purchased and by so doing reach the allowable cut at an early date so we can move to a fixed rent.
- That we continue to investigate the complete utilization of dead and down material from our harvested and our fire-killed stands.
- That we initiate investigations into suitable extraction techniques so that we can include smaller size classes into our harvesting system.
- That we establish additional seed production areas in order to encompass varying land elevations.
- That we emphasize further investigations into practical methods of cleaning dense regeneration pine stands.
- Because of the long-range nature of genetic improvement programs and the potential rewards, we immediately initiate projects to that end.
- That we await the results of the current studies initiated by the Canadian Forestry Service^{lxxi} before seriously entering the field of forest fertilization.
- Harvest thinnings await the decision to move into the use of small material.

^{lxxi} This was the name of the Canadian Forest Service at the time.

Although the proposal was visionary and would have had a major impact on the forest management plan, the Company did not accept it. Senior management did not perceive a wood shortage since AAC still exceeded needs, and planning for the pulpmill expansion had not even begun. The proposal was simply ahead of its time in their perception. However, his recommendations helped to form the basis of future work on intensive forest management.

There was a lot going on in the FMA. Wildlife management and recreation were being highlighted. Crossley presented a paper to the Canadian Society of Wildlife Biologists at Prairie Habitat Conference 18 February 1972, describing relationships between forest management for fibre productivity and the preservation of a healthy forest environment. He referred to it as “environmental forest management.”

In 1970, the company and the Forest Technology School began discussions on developing a campsite at Emerson Lakes, which was opened in 1972. This same year an application for a Recreation Reservation on the Wild Sculpture Trail was made, and construction began in 1973 using tree planters. In 1970 a new degree program in forestry was approved at the University of Alberta, the first in Canada since the University of British Columbia’s in 1921.

Great changes were made in logging – in 1967 55 Timberjack skidders were purchased and use of horses was phased out within three years. The last of the contractor Camps was closed in 1968 as mechanization and better roads systems enabled commuter operations, although company operations continued from Camp 20 north of Edson until the camp was closed in the spring of 1975. Mechanization continued with feller bunchers introduced in 1973 and self-loading trucks in 1976.

The pulpmill maintained a steady production, increasing annual production from 166,447 tonnes in 1967 to 169,679 in 1977.

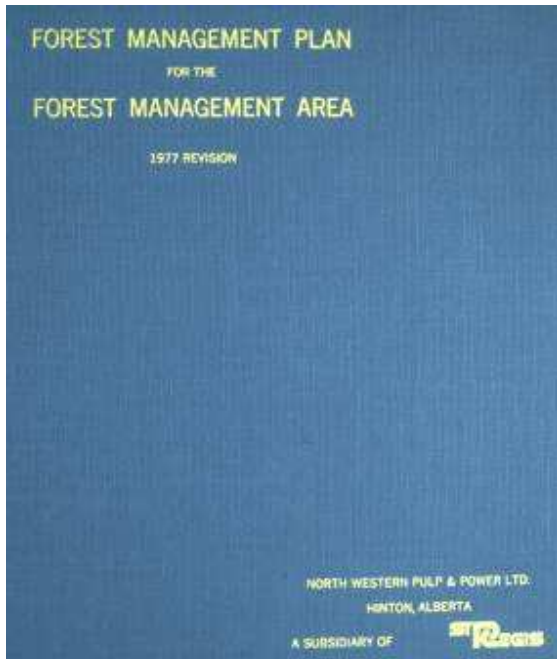
Perhaps the most significant aspect of these times was the constant definition and redefinition of the components used to calculate the AAC. The company built a new 50 million board foot stud mill that began production in 1972. The timber supply was to be integrated with the pulpmill, and was to come primarily from the existing FMA. The company had excluded parts of the 1956 burns from the AAC calculation because of their slow growth, and the Province did not agree to the proportion excluded, asserting that the AAC was too low because of this exclusion.

The discussions got even more complex when issues of rotation age for black spruce; grazing reserves for horses in Brule flats; wildlife corridors; backlog reforestation; utilization of deciduous; unique areas; compartment and management unit restructuring; role of thinning -- to name just a few -- were added. They all in one way or another affected the landbase or the assumptions that go into the AAC, and thus needed to be resolved prior to preparing the Forest Management Plan.

Des Crossley retired October 31, 1975 and Jack Wright was named his replacement as Chief Forester. Bob Udell, who left the Company in 1970 to work for the Ontario Ministry of Natural Resources, returned to take over Wright’s duties as head of forest management.

Highlights of the 1977 Forest Management Plan revision

It was obvious that the 1966 management plan was insufficient for the demands of the 70s, evidenced by the many forest management agreement revisions, both Gazetted and non-Gazetted. Surprisingly though, the main objectives still held constant -- with some changes to reflect the realities of the day:



1977 FOREST MANAGEMENT PLAN
WELDWOOD PHOTO COLLECTION

Management Objectives

The management objectives of the 1977 plan continued the focus of earlier plans, as stated:

This plan was prepared pursuant to the terms listed under Sections 11, 12, 13 and 19 of the Forest Management Agreement between North Western Pulp & Power Ltd., and the Province of Alberta (see Appendix 1). It explains the methods, which will be used to maintain the Forest Management Area under sustained or increasing, yield management.

The major objectives of the forest management system as detailed in this plan are as follows:

- (1) To sustain into perpetuity, and through better management, to increase the annual yield of coniferous wood from the Forest Management Area.
- (2) To provide a long-range, over-all cutting plan, whereby wood harvesting operations may proceed logically over the entire Forest Management Area during a single rotation.
- (3) To remove the overmature timber as rapidly as possible in order that these slow-growing and often decadent stands may be replaced with a more rapid-growing, regulated forest with an even distribution of ages between zero and rotation age, which will, in turn, increase the allowable annual cut on the Forest Management Area.
- (4) To maintain a uniform haul distance within each Working Circle, and the Forest Management Area as a whole, between cutting cycles.

This plan was designed to obtain these objectives while at the same time maintaining as high a degree of flexibility as possible to accommodate interim changes and adjustments without disrupting the long range plan itself.

The sustained yield objective now included the expectation that through more intensive management the annual yield from the FMA could be increased above the natural yield level. The 'pulpwood' emphasis in previous plans had now changed to a more generic 'coniferous' wood supply, reflecting the need to also provide the stud mill with spruce and pine sawlogs.

In the 1977 FMP the objective of removing the overmature timber first was tied in with the objective of balancing the age class distribution. Company examination of the permanent sample plots as well as field examination of regenerated stand growth performance was already showing the new forest stands growing at rates well in excess of the fire origin stands they replaced. The hard numbers to quantify this observation were not yet available, but the trend was clear and evident.

The main addition in this plan was adding the objective of maintaining a uniform haul distance. Considerable attention had been given this imperative in all previous plans, but this was the first plan in which it was included as a specific objective.

The contents of the plan also remained very similar to the 1966 plan, except for an expanded section 5. "Areas removed from management" which reflects the changes occurring from the expanding number of users of the FMA.

Inventory Systems and Allowable Annual Cuts

In the early 70s, the company abandoned the use of its permanent sample plot system (CFI) for forest inventory purposes and switched its emphasis to developing information on growth and yield for management purposes. Because of the systematic distribution of these plots, some age classes and forest types were over-sampled from a growth and yield point of view, while others – particularly the new regenerating forests – were found to be wanting. The new Permanent Growth Sample (PGS) program refocused the effort on the 3,000 – plot system to areas where improved information was needed.

New aerial photography in 1969 at 1:31,680 scale set the stage for the 1977 forest management plan revision. Studies beginning in the late 60s had demonstrated the utility of using interpreted "photo-points" as the basis for both operational and management inventories. Comparison with inventory methods used prior to that were found to be very positive. This new "photo-point sample" system was adopted for both purposes, using a 40 chain grid for the management inventory, 20 chain grid for operational inventories. A 40 chain grid was overlain the lease area, and transferred to the 1969 photography. Interpreted features included cover type; density; broad height class, and stand age (from the fire origin map). Interpretation and field checks of the photo-points were compiled, using aerial stand volume tables, to produce the new management inventory for the new plan revision. The new inventory showed 65.5 million m³ of softwoods and 8.4 million m³ of hardwoods, reflecting apparent increases of 3.8% and 27.3% respectively.

All operations were now commuter based, and – because each operating compartment no longer had to support a camp for 20 years - the compartments had been re-structured to more closely conform to age

class and topography with no upper or lower limit on the volumes to be contained therein. Thus the number increased from 64 compartments in the 1966 plan to 120 in this one.

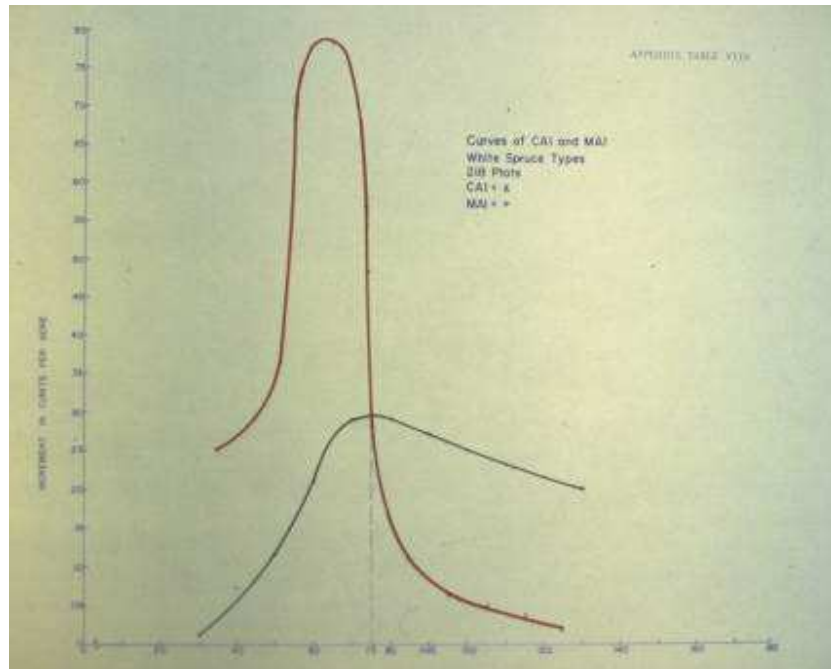


FIGURE 10-2 MAI/CAI CURVES, WHITE SPRUCE 1977 FMP. A SLIGHT INCREASE IN ROTATION AGE FROM THE 1966 PLAN, BUT STILL AROUND 80 YEARS

The FMA had been redistributed to five working circles (Map 5). With the planned 1968 Agreement expansion, essentially the Athabasca-Berland was subdivided. Although the area reverted to its original boundaries in 1972 the five working circle basis was retained. These, in turn had been divided into 120 compartments.

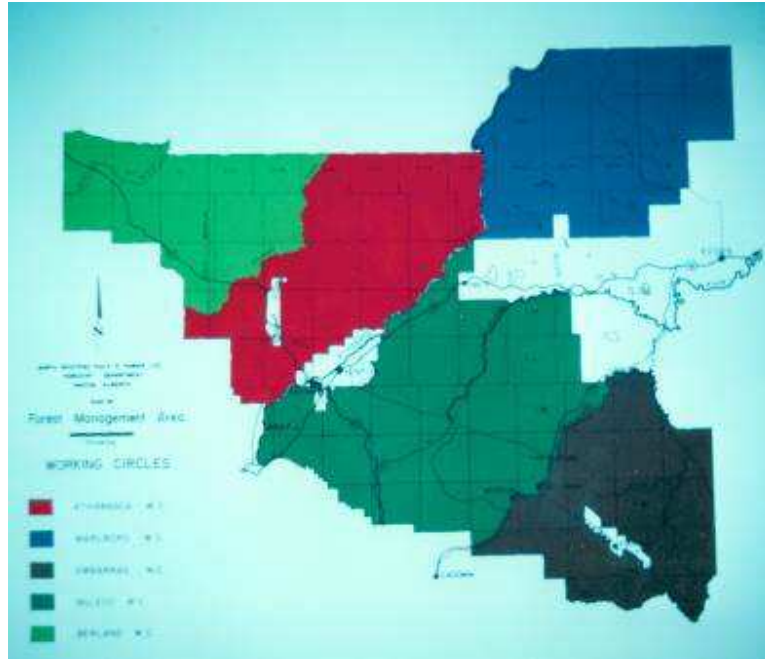
For the first time, explicit landbase reductions, beyond operating ground rules guidelines, were included in the plan for other values including sensitive sites (Wildhay Valley 1543 acres), grazing (Brule horse pasture 3655 acres), recreation (Sundance Valley 4673 acres), sand dune stabilization (Brule Lake 3213 acres) and wildlife (Pinto Goats 971 acres).

Investigations of the 1956 burns showed areas where merchantable stands were not likely to develop prior to the end of the first rotation and these areas were removed from the allowable cut calculation. After considerable discussion with the forest service, some of these were moved back into the calculations, resulting in an increase in AAC from 357,165 to 371,650 cunits^{lxxii} (1,052,040 cubic metres), including a reduction for average annual burn. This was a substantial (17% increase in allowable annual cut from the previous plan's 373,723 cords (899,530 cubic metres) AAC. See Table 4.

^{lxxii} A cunit is 100 cubic feet, and was the standard unit of measure for logs in British Columbia at this time, just prior to metric conversion. A cunit is the equivalent of about 1.18 cords.

The increase was due to two factors: 1) compartments were reformatted to more closely represent age class and topographic boundaries, and 2) an undercut was accumulated with a fixed termination date for the first rotation.

Map 10-5 Pulpwood Lease Area divided into five Working Circles – 1977



Other Land Uses

Licensed Timber Berths had disappeared from the FMA landbase by the 1977 plan. Two small operators remained, operating as “Sale Units” as requested by the AFS and established by an agreement dated June 20, 1972. These were Bighorn Forest Products, producing fence posts from over-dense mature pine stands in the Warden Valley, and Terris Lumber near the park gate, operating sawlog material in very steep terrain.

The “tremendous upsurge of usage of the Forest Management Area for purposes other than forest production” was noted as the basis for the 1968 appointment of Bill Hanington as Land Use Officer in the Forest Management Section. Later (1970) new multiplying land use issues led to the establishment of a new Land Use Section in the Forestry Department under Ray Ranger. Of particular concern was the burgeoning oil and gas industry. The plan noted recent gas discoveries near the Yellowhead Tower, Beaverdam Creek and Hinton areas in addition to earlier developments further east and north. Some concern was noted over pending losses to developing coalmines.

TABLE 10-4 DISTRIBUTION OF AAC BY WORKING CIRCLE, 1977 PLAN

Working Circle	AAC (net) (cunits)	AAC (net) (m ³)	% of harvest on lease Area	Notes
				80 Year Rotation, fixed end to 1 st Rotation
Marlboro	68,350	193,547	18.4	Period 1976-2045: 70 yrs
McLeod	96,710	273,854	26.0	Period 1976-2040: 65 yrs
Athabasca	76,860	217,644	20.6	Period 1976-2040: 65 yrs
Berland	66,730	188,959	18.0	Period 1976-2045: 70 yrs
Embarras	63,000	178,397	17.0	Period 1976-2050: 75 yrs
Total	371,650	1,052,401	100	Hanzlik Formula Check: 351,118 cords

The plan observed an increasing use of the FMA by recreationists including overflow from Jasper National Park. The company set forward a strategy by which it planned to address some of this increasing use including campgrounds, ski and hiking trails and the protection of unique areas of high recreational value for future development.

Grazing was of increasing concern, and the recent allocation of 3236 acres from the FMA near Brule for disposition to the Brule Stockmen's Association was particularly noted. Fencing and the subsequent heavy occupancy of the area by horses argued against successful reforestation, and the company announced it would suspend attempts at regenerating the area until the disposition was cancelled.

Since the 1966 plan, a new highway 40, north and south of Hinton had been constructed. Combined with the new Alberta Resources Railway, the company had mixed emotions on the developments. On the one hand, the highway vastly improved speedy access to operating areas. But load restrictions were a concern, and the combination of highway and railway to the north had destroyed the availability of the company's winter road route to the Berland.

In total the productive forest area was reduced by 4.6 per cent as a result of roads, transportation corridors, seismic lines and environmental set-asides.

Company Operations and Fire

Company camps had long since disappeared by 1977, and all operations were commuter-based. Operations were still organized on a working circle basis with a mechanized cutting crew assigned to each working circle under a crew foreman. Two production superintendents were responsible for the entire FMA.

Operations were year-round and there were two basic logging systems reported:

- Conventional hand felling, limbing and topping at the stump, and rubber tired skidders to the landing
- Felling of trees with feller-buncher machines, limbing and topping at the stump with powersaws, and rubber tired skidders to the landings.

Trials were underway with flail delimiters at roadside to replace the powersaw limbing process.

The plan described a progressive clearcut experiment underway in Berland Compartment 5 following extensive discussions with both the Forest Service and Fish and Wildlife Division. The conditions were described in an agreement (letter July 10, 1974) that set out restrictions for stream reserves, game corridors, wildlife habitat islands, scarification restrictions, and restrictions on the deployment of mechanical equipment. The Fish and Wildlife Division subsequently (April 3, 1975) removed many of these restrictions.



PROGRESSIVE CLEARCUT, BERLAND 5, 1977

WELDWOOD PHOTO COLLECTION

The improved fire protection program in Alberta was beginning to show its benefits as the 20-year average annual burn had declined to 0.068% from 0.32%, as the large 1956 fires were dropped from the 20-year average.

A new age class inventory had been completed on the FMA in 1974. Table 5 shows the impacts of logging and fire on the FMA for the period 1891 to 1975.

Silviculture and Research

In the early 70's the company collaborated with J. Dumanski³⁵¹ to develop a site classification system for lodgepole pine, based on soil characteristics. This study contained a recommendation for further

developments in site classification to include information on vegetation that would not be addressed for another decade when Ian Corns began his work on ecological classification systems³⁵² for Alberta.

There were few changes in the approach to reforestation from the previous plan, although the container seedling system had been changed (1974) from the “Ontario Tube” to the Spencer-Lemaire “Ferdinand” books. During the period 1973-76 the company reported planting an average 5,000 acres (2025 ha) per year, at an 80% success rate.

Drag scarification with D-9 cats with special blades and drags continued to be the treatment of choice. The recent acquisition of a Bracke Scarifier was noted along with its excellent performance in planting site preparation. Aerial seeding was still being done but forecasted to decline because of the gradual reduction of overmature spruce types, concerns over uncontrolled spacing and the recent implementation of a tree improvement program.

TABLE 10-5 HISTORY OF LOGGING AND FIRE ON THE FOREST MANAGEMENT AREA (1975 BASIS)

Period	10-year Age Class	Area Affected (Acres)		
		Fire	Logging	Total
1971-75	0	111	52506	52617
1961-70	10	23837	92465	116302
1951-60	20	48279	29361	77640
1941-50	30	5860		5860
1931-40	40	12286		12286
1921-30	50	78623		78623
1911-20	60	22330		22330
1901-10	70	21403		21403
1881-1900	80	478594		478594
Total		691323	174332	865655
Fire Loss Prior to Management (1891-1956 incl.)			10,077 acres/yr	0.519%/ yr
20-Year Cut & Burn Loss (1957-76 incl.)			10,030 acres/yr	0.516%
20-Year Average Annual Burn (1957-76 incl.)			1,313 acres/yr	0.068%

Peter Sziklai was hired by the company in 1976 as tree improvement forester and was busy designing a tree improvement plan. This would include improving nursery stock quality, better linking of seed source to sites being planted, improvement of seed production areas, juvenile spacing of both fire origin and regenerated stands.

The management plan listed 28 research projects underway. As before, many of these were company alone (13), or collaborative with the Canadian Forestry Service (12), University of Calgary (1), University of Alberta (1) or the Alberta Forest Service (1). The focus was:

- Growth and Yield (11 projects)
- Silviculture (9 projects)
- Effects of Harvesting (5 projects)
- Pathology (1 project)
- Wood processing (2 projects)

The F.L.C. Reed Report on Forestry in Canada -- 1978

Consultant F.L.C. Reed & Associates was assessing strategies for forestry development across Canada in the late 1970s. Their report³⁵³ *Forest Management in Canada* -- includes the NWPP operation as an example of a successful approach and suggested that other jurisdictions in Canada could incorporate similar ideas into their Forest Management plans and agreements. The following excerpt from the Reed report refers to the NWPP 1977 FMP. It provides a succinct summary of the highlights, and is revealing of the problems perceived in 1977:

Management Problems

1. Utilization of small timber: Present utilization standards require harvesting all trees over 13 cm at stump height but substantial numbers of trees below this size are found in most merchantable stands. These small trees offer a potential for increased harvests as harvesting and utilization technologies develop.
2. Stagnating juvenile stands: Dense stands of fire-regenerated lodgepole pine must be thinned at an early age if stand stagnation is to be prevented.
3. Hardwood and mixedwood stands: Hardwoods (mainly poplar) usually occur in mixed stands and not only reduce coniferous productivity but also, if left unharvested, result in a serious obstacle to site preparation after the conifers have been harvested. Pulp produced from hardwoods is less profitable than that from readily available conifers.
4. Economically inaccessible timber: About 15,000 ha with 2.4 million m³ of merchantable timber is considered inaccessible due to excessive slopes.
5. Environmentally sensitive areas: Fringe areas and other areas worthy of protection have been withheld from cutting. Under Alberta regulations a partial cut could be undertaken but these areas have not yet been exploited.

6. Cutting pattern constraints: Clear-cutting in strips and patches increases harvesting costs and causes damage to adjacent regeneration during the second cut as well as erosion along roads. Experiments on progressive clearcutting are being undertaken to determine the effect on forest management.

Intensification of Management^{lxxiii}

The Forest Management Agreement provides that when mutual agreement is reached on the natural productivity of the forest land, Crown charges will not be payable on volumes harvested above the AAC level due to improved utilization or to increased growth induced by company efforts in excess of the mandatory obligation. This provision offers a substantial inducement for more intensive forest management as well as improved utilization.

Analysis of the inventory data, and of the available information on the improvements in yield which can be gained from specific treatments, has indicated possibilities for increases in annual cut as shown in ---(Table 6).

The combined total represents an increase of 75% over the presently calculated annual cut of 914 665 m³^{lxxiv}. However, these increases are not all cumulative. Thinning in fire-origin lodgepole pine and spacing in second-growth regeneration would concentrate growth on fewer larger trees and would reduce the gains from improved utilization in future harvests. Further increases are also possible from tree improvement and from fertilization but more research is required before programs can be initiated.

Summary

1. The agreement between industry and government for management of the FMA by industry has resulted in good forest management over a 20-year period, with every indication that good management will continue in the future.
2. Planning of harvesting operations to facilitate early removal of mature and over-mature timber has resulted in relatively constant haul distances and, consequently, constant transportation costs, as well as improved growth on the FMA.
3. The government and the company have jointly improved protection from fire and have reduced fire losses to below 0.1% of the productive area annually.
4. Through site preparation for natural regeneration as well as for direct seeding and planting, harvested areas have been reforested promptly.
5. Silvicultural and other management costs now experienced by the company are regarded as part of the cost of harvesting present stands. Silvicultural costs are currently \$1.22/m³ or about 10% of the total harvesting cost.

^{lxxiii} Note that this part of Reed's report was based on Crossley's 1970 proposal for intensive silviculture.

^{lxxiv} Final AAC determination of 1,052,040 metres was not completed until 1979.

6. As harvesting the present unmanaged stands progresses substantial increases in annual cut can be realized through:
 - a) Increased growth resulting from replacement of overmature and mature timber with thrifty young stands;
 - b) Better growth rates in terms of merchantable timber through replacement of the dense fire-origin stands by less dense stands following logging and scarification;
 - c) Thinning young fire-origin stands and spacing regeneration on logged lands to further improve growth rates in terms of merchantable timber.
7. The preponderance of older age-classes on the FMA will permit prompt increases in harvests, under the allowable cut effect, subject to marketing and other constraints.
8. Current harvest could also be increased by use of dead trees, hardwoods and smaller trees in the stands now harvested as well as by harvesting fire-killed timber and stands now considered inoperable due to low volumes and/or very small trees.
9. Due to management, cuts on the FMA cannot only be sustained but can be increased to support an expanded forest-based industry in the region.

The Reed report also included a table of expected AAC increases from adopting various measures including better utilization and enhanced forest management (Table 6). It is interesting that these projections are based on Crossley's 1970 proposal for intensive forest management that was rejected by senior Company management. Reed was sufficiently impressed that he included it in his 1978 report. As will be seen, many of these suggestions were adopted and refined following the 1988 Agreement that provided an FMA of a size nominally capable of providing only 70 per cent of projected wood needs for the expansion.

TABLE 10-6 INDICATED INCREASES IN ALLOWABLE CUT -- FROM REED & ASSOCIATES 1978, BASED ON CROSSLEY'S 1970 PROPOSAL.

Opportunity	AAC (m³)
From Improved Utilization	
- Use of dead trees in stands harvested	66,550
- Use of fire-killed timber	25,640
- Use of hardwoods	32,850
- Use of smaller trees in currently merchantable stands (7.6 cm dbh and 5.1 cm top)	272,600
- Use of low diameter dense stands now considered inoperable (7.6 cm dbh and 5.1 cm top)	226,560
Sub-total	624,200
From Improvement of Future Yields	
- Reforestation of potentially productive land	143,200
- Harvesting at or near culmination age	334,180
- Reduction of rotation age to 70 years	113,280
- Thinning fire-origin lodgepole pine	14,050
- Spacing second-growth regeneration	368,160
Sub-total	972,870
Combined total	1,597,070

THE 1986 FOREST MANAGEMENT PLAN (ROBERT UDELL)

Approved by: D.W. Laishley, Manager, Forest Resource Department^{lxxv}

Summary of related events leading from 1977 to the 1986 FMP

This was an eventful period, presaging significant changes in policy that would affect forest management planning, practices and proposals for mill expansion, influences still in effect to the present.

Increasing land use conflicts had led to a government study of the entire Rocky Mountain foothills and mountain areas under provincial management. The report³⁵⁴ *A Policy for Resource Management of the Eastern Slopes* was released in 1977. It introduced a policy of zoning of lands designed for both protection of ecologically or socially important areas and integrated resource management on others. Eight zones were identified ranging from 'prime protection' to 'industrial' and 'facility'. The Hinton FMA lay wholly within the scope of the policy. Most of the FMA was zoned 'multiple use'. Most of the major riparian valley bottoms were zoned 'critical wildlife' and several 'general recreation' zones were identified such as the Wildhorse-Kinky Lakes in Camp 1, Sundance, Fickle and Obed Lakes. The management constraints in these zones largely reflected Company policies and were made specific in the 1986 FMP. A 'prime protection' zone was delineated to protect the sand dune area on the east side of Brule Lake, but heavy use by motorized recreation continued. This area had been previously been left as an undisturbed buffer when the Camp 1 cut layout plan was developed in 1956.

The Environment Council of Alberta set up its expanded study of environmental effects of forestry operations in Alberta in 1977. Dr. Bruce Dancik, forestry professor at the University of Alberta, chaired the panel that included Des Crossley, recently retired Chief Forester. Studies were commissioned, briefs accepted and hearings were conducted throughout Alberta. Their 1979 report³⁵⁵ contained 140 wide-ranging recommendations that were to have a strong influence on policies and practices, many reflecting successful contributions of the Company. One of the results was a revision of the East Slopes policy in 1984 that elaborated on the forest land-use zoning policy. Another recommendation that was to have a major impact on the Company expansion negotiations that started in 1986 was that FMAs should no longer be of sufficient size to provide the full fibre needs of proposed mills – a guideline of 85-90% was suggested.

Ken Hall was appointed Resident Manager in 1977 when the previous Vice President and General Manager Jim Bowersock was promoted to the St. Regis corporate office. He first initiated a review of the pulpmill operations, effecting a number of efficiencies. However, his major concern became one of expansion and diversification of the mills to ensure the Company's competitiveness. He developed a proposal in 1978 that included expansion of the pulpmill, a new light-weight coated paper mill and a modernized sawmill. This led to a Company proposal in 1979 for the government's advertised Berland-Fox Creek Timber Development Area. When the bid was rejected he developed a new proposal and initiated discussions with the government in 1986. In the meantime, Udell and his team wrote the 1986 FMP revision based on the existing FMA.

The AFPA sponsored an interface forestry and wildlife symposium at Jasper Park Lodge for three days in 1982 to encourage an integration of management in the province. Dr. Jack Ward Thomas was the

^{lxxv} This plan was prepared during the time when J.C. Wright was Chief Forester, D.W. Laishley joined the Company in 1986, approving the plan subsequent to the merging of the Forestry and Woodlands Departments.

facilitator who led the attendees through an appreciation of the "how" to do it. Jim Clark, St. Regis Woodlands Manager, gave the summary address to the conference and offered its FMA as the testing grounds for the future. An industry-government committee spent three years determining the means to bring this integrated management of resources to fruition. This Task Force on a Forestry/Wildlife program for FMA was struck by assistant deputy ministers Dennis Surrendi, Fish & Wildlife, and Al Brennan, AFS. The group was chaired by Don Fregren and included from the government AFS representatives Ed Gillespie and Norm Rodseth, Fish & Wildlife staff Dave Neave, Bruce Stubbs and Gerry Thompson. The Company representatives were Jim Clark, Jack Wright and Jim Bocking.³⁵⁶ Their positive 1986 report (authors Wright, Rodseth, Quinlan and Smith) set the stage for inauguration of Alberta's first Company-based wildlife program in 1988

The Wildlife Task Force Report was followed by a subsequent 1997 report and recommendations by Rainer Ebel and Beth McCallum. The task force proposed an integrated plan with guidelines that would enhance wildlife habitat through better design and timing of timber operations. The plan featured elk throughout most of the FMA, and woodland caribou north and west of the Berland River. The onus was placed on the company to provide the necessary browse, hiding and thermal cover within operating compartments. The regulatory agencies were to be responsible for the management of other controllable elements that impact the safety and survival of the game. These included such aspects as road closures, amendments to hunting regulations and predator control.

Ground-breaking studies were conducted in both fire origin and regenerated stand growth performance. Management forester Bob Udell and consultant Dick Dempster collaborated on a study using both permanent sample plots and paired-plot stem analysis to examine growth performance and yield forecasting for both regenerated and fire-origin lodgepole pine stands. This set the stage for new growth-based yield projection in the plan revision, resulting in a major increase in AAC. A new forestry greenhouse was completed in 1981, increasing annual seedling production to three million. Two new coalmines were opened in 1983 and 1984 resulting in further land withdrawals.

North Western Pulp & Power Ltd. was renamed St. Regis Alberta Ltd. in 1978. It then became Champion Forest Products Alberta Ltd. in 1984 when the parent company St. Regis Paper was purchased by Champion International under a friendly merger. The Woodlands Manager, Jim Clark, became heavily involved with the Alberta Forest Products Association when he was elected President in 1984. The tasks and issues at hand were many: Workers compensation standards; countervail action by the US forest industry; product marketing; membership expansion with the addition of pulp/paper producers; and environmental problems associated with the mountain pine beetle infestation and salvage programs to utilize dead timber and eradicate the infestation were but a few.³⁵⁷

In 1985, Vice President and Resident Manager Ken Hall accepted a proposal to restructure forest-related units into a single Forest Resources Department, as suggested by Bryon Muhly. Woodlands began an evaluation of a reorganization that proposed a 3-year phase-in to merge Woodlands and Forestry.³⁵⁸ Before retiring at the end of November 1986, Jim Clark and Jack Wright, who retired in July 1987, collaborated to work out details to speed up the merger and have it controlled by one Manager. This proposal was accepted and Don Laishley was hired to head up this new Department in 1986.³⁵⁹

The stud mill was expanded in 1981 to a 75-million fbm capacity, in 1986 producing 73.7 million fbm. Pulpmill annual production increased from 167, 476 tonnes in 1978 to 187, 132 tonnes, in large measure as a result of Hall's refinements.

Highlights of the 1986 Forest Management Plan revision

The federal government introduced a White Paper on Metric Conversion in January 1970, and established a Metric Commission in 1971 to advise on and assist with development of metric conversion plans. It was a complex process. Although conversion factors for Canadian forestry were published in 1974³⁶⁰, it was not until the early 1980s that full implementation became effective. However, the leaders in metric conversion included the major sectors such as the automotive industry, petroleum, forestry, wood, and pulp and paper among others.³⁶¹ The result was that the forestry sector adopted hectares (ha) for area calculations, metres (m) or kilometres (km) for distance, and cubic metres (m³) for solid wood measurement. While this simplified many of the calculations that forest planners make, the conversion back and forth between imperial and metric was problematic, especially when forestry units of measure were based on the amount of final product a log was expected to produce, given such variables as size, defects, taper and sweep. The cubic metre is a measure of the solid wood content of a log, after deducting for decayed wood. The plan delivered in 1986 contained both acres and hectares, but wood volumes were presented in cunits, primarily because the data used in the compilation were originally recorded in Imperial measure.

The 1986 plan was structured similarly to the original 1961 plan, with the one significant addition of Point 5 to the objectives³⁶²:

This plan was prepared as required under Sections 12, and 15 of the Forest Management Agreement between Champion Forest Products (Alberta) Ltd. (Champion), and the province of Alberta. It is the third revision of the Company's Management Plan, originally submitted in October 1961 and revised in 1966 and 1976.

In it are described the techniques which will be used by the Company to maintain and enhance the yield and value of the forest resource contained within the Forest Management Area. The Plan was developed by the Central Planning Division of the Forest Resource Department, and administration of the plan rests with the Forest Resource Department.

Management Objectives

The objectives, which drive the management system of Champion Forest Products (Alberta) Ltd., have remained essentially unchanged since they were originally developed in concert with the Alberta Forest Service (AFS). A new objective is stated in this Plan which, while it has always been recognized, has not before been formally identified. The objectives are as follow:

1. To sustain into perpetuity, and through better management to increase, the annual yield of coniferous wood from the Forest Management Area.

To provide a long-range, over-all cutting plan whereby wood harvesting operations may proceed logically over the entire Forest Management Area during a single rotation

To harvest the overmature timber as rapidly as possible in order that these slow-growing and often decadent stands may be replaced with a more rapid-growing, regulated forest with an even distribution of ages between zero and rotation age. This will, in turn, increase the allowable annual cut on the Forest Management Area.

4) To maintain a uniform haul distance within each working circle, and within the Forest Management Area itself, between cycles.

5) To manage the Forest Management Area in such a manner that a variety of other uses may be accommodated. These uses may occur simultaneously or sequentially within the context of prime use for timber production, as defined in Section 10 of the Forest Management Agreement.

As is expected with any plan, interim changes and adjustments may be required. This flexibility does not change the objectives identified.

The final objective brings out the fact that multiple use of the FMA had become a fact of life for many years. The integration of other uses was viewed as a process of accommodating them. The objective also reinforces that the prime use of the FMA is to produce timber.

Also included in the 1986 FMP was a Mission Statement. The Executive Group at Hinton had developed it through discussions about the principles on which the operations of their industrial complex should be based. It forthrightly outlined the scope of the Hinton operation's responsibilities. The following is a summary.³⁶³

Champion Forest Products (Alberta) Ltd.'s Mission is to assure continuing responsible stewardship of resources entrusted to us so that

- We can produce an attractive and competitive return on our shareholder's investment;
- We provide a dependable source of employment and revenue for our community;
- We provide quality products to our customers throughout the world;
- We obtain maximum possible utilization of our harvested wood fibre;
- We value, protect and share the natural environment in which we work and live;
- We ensure sustained yields from the renewable forest resource we manage.

Inventory Systems and Allowable Annual Cuts

A Table of wood requirements showed wood needs for the mills and their sources of wood supply³⁶⁴ (Table 7).

The average volumes supplied to the mills for 1975-85 and proposed for 1986 were less than the AACs. This was a reflection of the intent to use the 'opportunity' wood such as small tops and chips from other timber operators, salvage such as from mineral exploration and development, and wood from local settlers or landowners. The advantage of using this 'outside' wood was that it enabled fuller utilization of the regional wood supply and extended economic benefits throughout the region. The disadvantage, as Crossley³⁶⁵ pointed out was that it delayed the process of reaching his objective of a more balanced

age class distribution. The situation may also have contributed to a perception that the FMA was larger than necessary for the existing mills.

TABLE 10-7 AVERAGE ANNUAL WOOD REQUIREMENTS AND SUPPLY -- 1986

<u>Source of Fibre</u>	<u>Average Delivery</u> <u>1975 – 1985</u> <u>m³ *</u>	<u>1986 Supply Plan</u> <u>m³ *</u>
<u>Forest Management Area**</u>	<u>764,972</u>	<u>623,230</u>
<u>Sales Units***</u>	<u>27,060</u>	<u>51,000</u>
<u>Purchased Chips</u>	<u>192,193</u>	<u>433,430</u>
<u>Salvage</u>	<u>18,700</u>	<u>14,160</u>
<u>Purchased Roundwood</u>	<u>69,884</u>	<u>99,150</u>
<u>Total</u>	<u>1,072,809</u>	<u>1,220,970</u>
<u>Sub-total from FMA m³</u>	<u>792,032</u>	<u>674,230</u>
<u>Per cent from FMA %</u>	<u>74%</u>	<u>55%</u>
<u>Volumes were reported in cunits – converted in this table to cubic metres at 100 ft.³ or conversion of 0.353.</u>		
<u>** Volume delivered from FMA and charged to AAC</u>		
<u>*** Volumes from other timber operations on FMA, charged to AAC</u>		

New aerial photography in 1981 at 1:31,680 scale was the basis for the inventory for the 1986 forest management plan revision. The FMA remained divided into five Working Circles. Inventory was again based on photo-point sampling, growth and yield as derived from analysis of PGS plots.

Several new landbase reductions further removed land from timber production. Significant among these was the loss of 3240 hectares, largely comprised of reforested stands, to the Obed-Marsh coal mine, and another 1200 hectares to the Luscar-Sterco mine.

Despite these and other losses, and a gradual reduction in the contributing landbase, the AAC increased by 23.7% from 371,650 cunits (1,052,040 m³) to 459,900 cunits (1,302,300 m³) in this plan revision. "This increase arises in part from an accumulation of overmature growing stock due to low levels of harvest. Of more significance is the application of better growth information to the management inventory." See Table 8.

Beginning in 1985, forest consultant Dr. W.R. Dempster was engaged to examine the growth performance of regenerated forests compared to the fire origin stands, based on an analysis of PGS plots. His reports showed a substantive and statistically defensible uplift in the growth and yield of regenerated forests, which was included in the timber supply analysis. This was further advanced when Dempster and Udell embarked on paired plot stem analysis project (Figure 3) to examine the potential of the “growth intercept”^{lxxvi} method of site index determination originally pioneered by D.H. Alban on Red Pine at the U.S Forest Service Great Lakes Forest Experimental Station.³⁶⁶ This research led to the eventual use of the growth intercept in yield forecasting not only on the company FMA but also in many other jurisdictions such as interior British Columbia.



Technologist Dave Wallace measuring growth rings, 1985 paired-plot analysis project

Weldwood Photo Collection

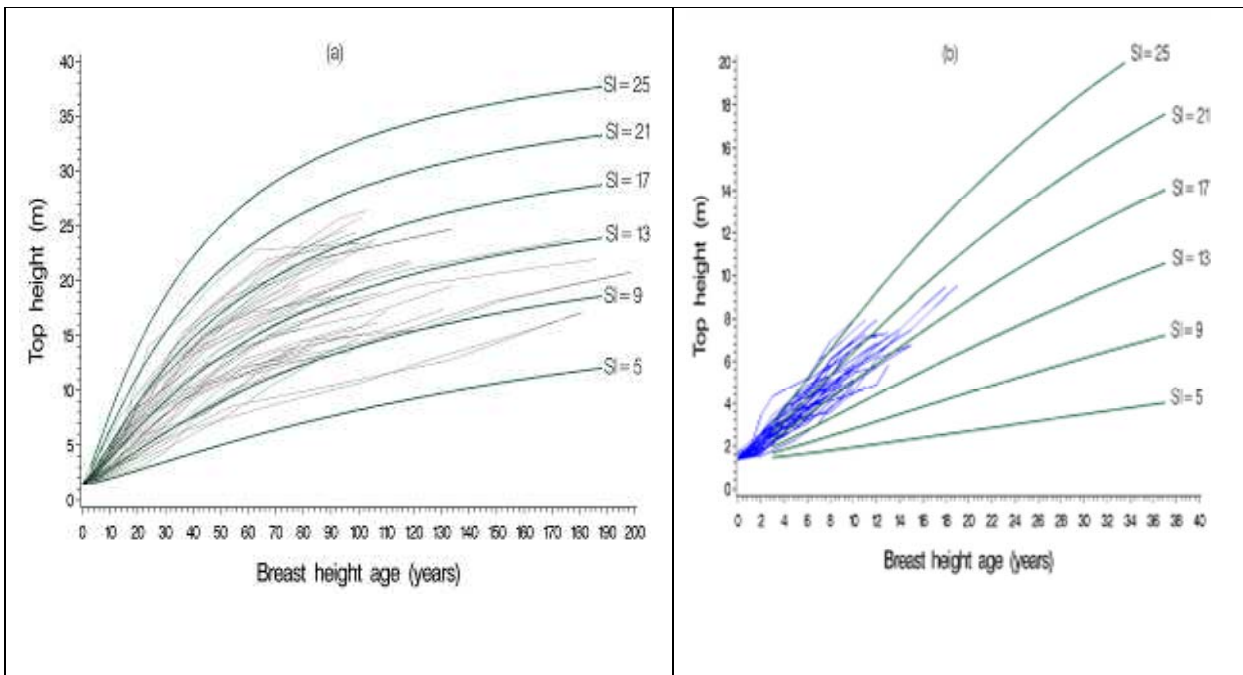
The PGS plot analysis also showed surprising and sustained growth well beyond the period considered as normal “rotation age” – i.e. the culmination of mean annual increment. This led to a proposal to change the rotation to 90 years and allocate it to three cutting cycles rather than the four used previously. The change from four 20-year to three 30-year cutting cycles was based largely on a change to the Operating Ground rules that required greater regeneration height requirements. The new rule stipulated that, in essence^{lxxvii}, regeneration must be 2 metres in height before residual stands could be removed. PGS data indicated that this condition was not likely to be achieved in a 10-year retention period.

Technical timber supply analysis was through WR Dempster’s Forest Yield Projection System (FYPS), a computerized model that incorporated growing-stock estimation, inventory updating and forecasting of future yields into one system. It depended on yield equations and site curves to produce estimates of volume at various points of time into the future taking into account harvesting, reforestation and growth. A major step forward, this was the first time a computer-based model had been developed and applied to technical timber supply analysis on the Hinton FMA. The analyses showed both that regenerating stands were growing faster than the original harvested stands and that there was “unprecedented growth” occurring beyond the empirically indicated rotation ages.

^{lxxvi} Five year or ten year height growth above “breast height” of top height trees in a stand

^{lxxvii} Height of 320 regeneration dominants and advanced growth per acre (790 per ha) must average 2 metres throughout the cut block.

The AAC calculation was refined from the 1976 plan in which growth factors used to project volume development over time were derived from the empirical volume-age curve. The system used in 1986 was described as “considerably more precise.” In determining growth and yield from the PGS only then-merchantable volumes were included (6 inch stump diameter, 4 inch top diameter, 9 inch stump height (15.2, 10.2 and 22.9 cm respectively). Gross volumes were reduced for advanced decay using cull factors from 48 study plots. The updated PGS data bank was analyzed in 1984 to produce a revised Aerial Stand Volume Table.



COMPARISON OF TOP HEIGHT DEVELOPMENT BETWEEN FIRE ORIGIN AND REGENERATED PINE STANDS.

Udell and Dempster stem analysis data from (a) fire-origin stands and (b) regenerated stands. The SI (site index) curves (in green) were generated from equation [1]. The same set of site index curves appears in both graphs, but on different scales. SI values of 5, 9, 13, 17, 21, and 25 m were used to generate the site index curves.

FIGURE 10-3 PAIRED PLOT STEM ANALYSIS RESULTS

Timber yields were projected for one full rotation (90 yrs) by the Harvest projection sub-system of the FYPs. It incorporated an Area-Volume Check method as stipulated by AFS. Annual harvests were projected at a trial cut level and the time taken to cut each timber class, or sub-compartment, was calculated according to its area and forecasted volume yield. The time taken to harvest the timber was then accumulated according to a sequence defined by the forest manager. If the projected time to harvest the entire Working Circle did not coincide with the selected rotation, the trial cut was raised or lowered. Iterations were made until an annual harvest was reached that would provide an even flow for a period of at least one rotation. An advantage of this approach was that each projection was specific to individual stands, so performance and related attributes, such as haul distance, could be tracked.

At the same time, the company signalled its intent to review the issue of including a fire risk reduction in its timber supply analysis. The burn allowance (0.0057%) had little impact on the new AAC reducing it only 1100 cunits from 461,000 to 459,900. For the first time, an estimate of aspen AAC was produced as “opportunity” or non-even/flow volumes averaging 17,500 cunits (49,550 m³) and the plan made note of a new oriented strand board plant in Edson which might find a use for this volume.

The Hanzlik formula check was abandoned for this and all subsequent plans.

TABLE 10- 8 AAC DISTRIBUTION BY WORKING CIRCLE, 1986 FOREST MANAGEMENT PLAN

Working Circle	AAC (net) (cunits)	AAC (net) (m ³)	% of harvest on lease Area	Notes
Marlboro	89,100	252,300	19.4	
McLeod	117,100	331,600	25.5	
Athabasca	94,100	266,500	20.5	
Berland	68,600	194,300	14.9	
Embarras	91,000	257,700	19.7	
Total	459,900	1,302,300	100	90 year Rotation Full 90 year forecast

Other Land Uses

Major impacts of oil and gas, along with coal development were reported and reflected in the gradual reduction of the landbase contributing to the allowable annual cut. For instance, the Obed Marsh Mine north of Hinton had removed 3513 ha of primarily young reforested stands in 1982, with another 3951 ha held in reserve for mine expansion in future. Compensation for timber damaged was now well established, based on timber damage assessment tables developed by the Province and used by the forest industry and other industrial users.

With the completion of the study into wildlife and forestry integration, a preliminary approach to management was appended to the ground rules. Species of emphasis were elk and caribou, along with various sport fish. The company commitment was to produce the habitat requirements of the species through management and stream protection, the regulatory agencies remained responsible to control the other elements that might impact their survival and well being.

Further facilities had been added to the company trail and recreational system and reported in the plan. These included several hiking and cross-country ski trails including the 1981 Spruce management interpretive trail that became most used by skiers.

A new Integrated Resource Plan process being developed by the Resource Evaluation and Planning Branch (REAP) of Forestry, Lands and Wildlife was discussed briefly. The Coal Branch sub-regional plan had just completed its terms of reference.

Company Operations and Fire Management

At the time of plan submission, the company had combined woodlands and forestry organizations into one Department reporting to a new Forest Resource Manager, Don Laishley. The woodlands operations were managed through three Operating Districts under three new District Managers. In the spirit of change, both logging and reforestation staff were integrated within the Operating Districts. The intent was to try to better link logging and reforestation, but the result was not as effective as anticipated. There was soon to be a conversion from a strictly company crew-based logging operation to one that included both company crews and contractor operations. Harvest systems were being closely scrutinized to obtain optimum efficiency and effectiveness.

Single stem delimiters had been introduced in 1986 and a rapid transition from hand or flail delimiting and topping was underway.

Three major systems were noted as active.

- Conventional piece work with trees felled, delimbed and topped at the stump by loggers with chain saws, skidded to roadside with smaller line skidders;
- Feller-buncher falling using larger grapple skidders with single stem delimiting at roadside, followed by burning of the tops and branches in piles at the landing.
- Manual hot logging with trees felled and skidded full tree to roadside for single stem delimiting and debris burning.

A steady decline in average annual burn was reported, the 20-year rolling average having declined to 0.0057%, the 10-year average to 0.0071%. Company operations conformed to requirements of the fire control agreement.

Silviculture and Research

The plan reported on the outcome of the progressive clearcutting experiment in Berland 5 during 1974-80 that had originally been suggested in the C.D. Schultz and Company (Schulco) Report³⁶⁷ of 1973. Unfortunately for the silviculture group, roads had been "put to bed" immediately following the haul and this imposed an extra logistical and financial burden on the silviculturists. A number of the roads had to be re-opened. About 50% of the area harvested had to be site prepared and planted. This was considered excessive, but given the slow germination of pine in the Berland working circle it might have been expected.

The standard treatment for natural regeneration continued to be the D-9 or Komatsu 355A crawler tractor equipped with the company-owned scarification blade, the "Crossley Scarifier." However, in some situations an overabundant seed supply would result in serious overstocking with the conventional treatment. Some optimism was evident in the results of a trial wherein a Bracke cultivator was used in place of the Crossley Scarifier in an area with an overabundant seed supply. The comparison trial resulted in 4,290 stems per ha with the Bracke in contrast to 20,730 stems per ha with conventional.

The shark-fin barrel pulled by a smaller tractor was now being used in imperfectly drained sites, to achieve better coverage and less environmental impact.

Normal site treatment by forest type was described:

Lodgepole Pine Scarify for natural regeneration with Crossley scarifiers and anchor chain drags, or shark-fin barrels on imperfectly drained sites.

White Spruce Scarify with the Crossley scarifier, no drags and wait for natural seeding. Use shark-fin barrels on imperfectly drained sites.

 Scarify "deep duff" and wetter areas in winter with D-9s and ripper-mounted C-S ploughs

Aerial seeding was described as an operational practice, although it was soon to be abandoned based on unpredictable results and the need for large amounts of spruce seed that proved to be difficult to collect in sufficient quantities. The average annual seeding in the previous 10 years was 302 acres, with 80% reforestation success.

Reforestation still depended on about 35% of the area being planted – generally "fill in" planting of partially regenerated areas - using student crews hired by the company. During the previous ten years, average annual planting was 4638 acres (1880 hectares), at an average rate of 530-trees/ acre (1300/ha) and average man-day production of 1150 trees.

Company operations were moving into younger age classes and, particularly in the lower elevation parts of the FMA, this led to problems with hardwood and grass competition. The company was deeply concerned about the reduction of its coniferous landbase, the classification of changes from this hardwood invasion.

A major effort was underway to reduce backlog reforestation liabilities on the FMA. Considerable success was reported, reducing overall liability from 10.4% of total cutover surveyed to date in 1980 to 2.4% in 1985 summarized in Table 9.

An annual juvenile spacing program, conducted "when economic conditions permit", averaged 1000 acres (400 ha) per year. Stands were not treated below a threshold of 3000 stems/ac (7400 stems/ha). The program ran during the fall and winter months, with the objective to reduce mutual competition among individual trees and select for the faster growing trees in the stands treated.

Twenty two research projects were reported on the FMA in the areas of Growth and Yield (5), Silviculture (11), Effects of Harvesting (2), Pathology (2) and Other (2).

TABLE 10-9. GROSS REFORESTATION LIABILITY -- STATUS 1980 TO 1985

	Reforestation Liability – Area and % of surveyed Cutovers by Year 1980-85					
	1980	1981	1982	1983	1984	1985
Area -- ha	6,528	5,448	3,657	2,604	1,497	2,002
% of Cutovers surveyed to date	10.4	8.1	5.1	3.6	2.0	2.7

THE 1991 FOREST MANAGEMENT PLAN (H. DOUGLAS WALKER R.P.F.)

Approved by: R.W. Udell, R.P.F., Manager, Forest Planning and D.W. Laishley, Manager, Forest Resource Department

Summary of related events leading from 1986 to the 1991 FMP

Several significant events took place with respect to staff and staffing. Ken Hall retired as vice-president and resident manager in 1987 to become project leader for a major expansion of Hinton facilities, for which he had received support from Champion International. He had also agreed with the Minister and Cabinet on the main commitments and benefits associated with the proposed expansion.

With Hall’s attention focussed on the expansion, Forest Resource Manager Don Laishley assumed a broader leadership role in forestry-related developments. At the end of July 1987, Jack Wright retired and Bob Udell became the new Strategic Planning Superintendent. Dennis Hawksworth, General Manager of Weldwood’s 100-Mile House operations, was transferred in 1988 to design – and subsequently construct - the new state-of-the-art Hi-Atha sawmill, staying on as manager.

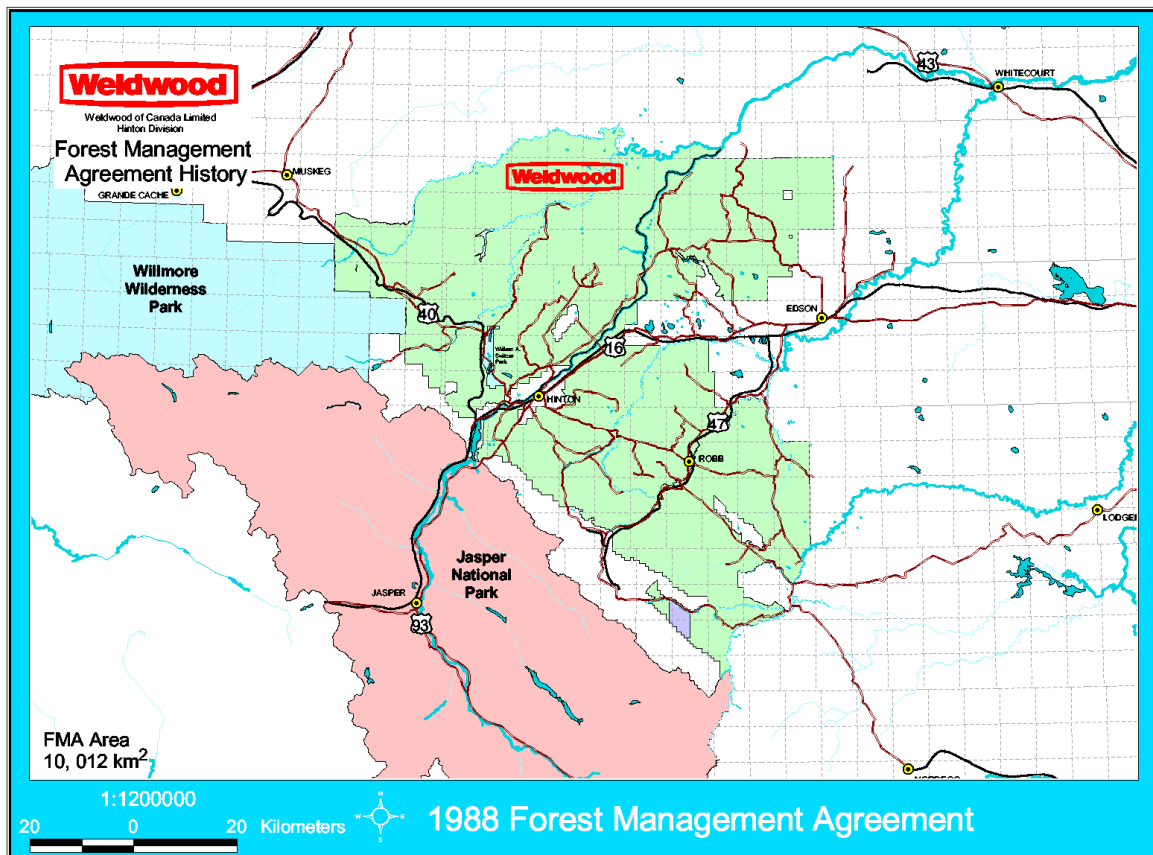
Don Laishley, Bob Udell and Ray Ranger were the negotiating team charged with negotiating the new Forest Management Agreement that would provide the resource and forest-regulatory basis for the expansion.³⁶⁸ Fred McDougall, Deputy Minister of Forestry, Lands and Wildlife represented the government. The single most significant event was the successful culmination of over two years of these negotiations with the approval of a new Forest Management Agreement on 15 June 1988 (O/C 290/88 May 26, 1988)

This enabled the Company to invest in an expansion of the pulpmill to 385,000 tonnes per year capacity and a new 220-million fbm sawmill. To support this increase the Forest Management Area was expanded to 1,012,119 ha (Map 6). However, under the influence of the ECA report of 1979³⁶⁹, the AAC of the new FMA would provide only about 70 per cent of the mill requirements following construction, adding a new dimension to forest management planning. In fact that was to become only one of many related challenges as events of the 1990s unfolded. However, although the 1986 FMP had only been in force for five years, a new FMP was mandated for 1991 for the new Agreement and the expanded FMA.

Doug Walker, was hired from the staff at Lakehead University in 1988 to replace Udell and lead the new FMP development and implementation. Sean Curry was also brought in that year to lead the forest inventory, and Rick Bonar was hired as the Company’s first biologist. The Company began what was to become a 4-year focus on the next Forest Management Plan.³⁷⁰

In 1988 Champion Forest Products was purchased by Weldwood of Canada Limited and became the Hinton Division, Weldwood of Canada Limited.

A Growth & Yield Co-op was set up with Procter and Gamble from Grande Prairie and the BC Forest Service Research Branch. The focus of the co-op was on developing and utilizing two new computer growth models: Stand Projection System (SPS) and Tree and Stand Simulator (TASS). Additional PSPs were established in new areas at 1/8th intensity to provide full FMA representation.



Map 10-6 Forest Management Area expanded in 1988

The hire of Rick Bonar in 1988 to head a new wildlife program signaled its importance as an essential component of integrated resource management. It also marked the start of a commitment to managing for the broader objective of sustaining biodiversity. To further effect these objectives, senior officials from the Company, the AFS and Fish & Wildlife Division met in 1988 to discuss a collaborative approach to integrated resource management on the Weldwood FMA. From these discussions arose the Integrated Resource Management Steering Committee -- IRMSC. This committee was charged with developing and implementing an integrated resource management program on the FMA. Members included Weldwood's management forester (Doug Walker) and biologist (Rick Bonar), along with their counterparts from the LFS (Tony Sikora) and Fish and Wildlife (Richard Quinlin). When plans are agreed to, each agency committed to playing its regulatory or delegated role in implementation -- recognizing that everyone has a part to play if IRM is to be achieved. In concept, the Company responsibility was to

manage for habitat, the government to look after the regulatory and enforcement aspects – similar to the recommendations in the 1986 task force report. Any unresolved issues were to be referred to senior regional government and Company management.³⁷¹ Bonar and his associates developed a draft wildlife strategy for the FMA in 1991, too late for inclusion in the 1991 FMP, but strongly influential in the next one.

Public involvement and public input into forest planning were expanded substantially for this plan. The Company had previously encouraged citizen comments through informal means. In the late 1980s, public interest in forest management and sustainability was growing. FMA holder representatives were called to a meeting in 1988 with ADM Ken Higginbotham who requested that they develop and implement formal public consultation processes. Weldwood immediately set to work to develop a formal approach. This presented the challenge and opportunity of obtaining meaningful input from non-foresters on technical issues.

The result was the new Forest Management Liaison Committee (FMLC) for the Hinton Division, first convening in January 1989 “to provide input to the Company’s forest management plan.” This was the first Public Advisory Committee in forest management in Alberta,³⁷² although others followed shortly thereafter. It consisted of representatives of various local interests, including government, professional, industry, labour, commercial, and special-interest groups such as conservation and environmental organizations. Attempts were made to select members on the basis of their perspectives on forest management issues, so that as wide a range as possible of interests were included, while maintaining a moderate group size.³⁷³ One of the first tasks, agreed to by the group, was to provide organized and reasoned advice to the Company in the development of its new forest management plan. As well, ‘open houses’ for communicating with the general public were continued

On the policy side, the Province was actively promoting forest industry development as a means of diversifying the provincial economy. A new Division of Forest Industry Development had been established in the Department of Forestry, Lands and Wildlife and was actively advertising and promoting opportunities with outstanding results. This in turn was ringing alarm bells in the environmental community that perceived this expansion as a negative impact on the forests and wilderness dear to their hearts. It was against this backdrop and in this context the new management plan was to be prepared.

The mounting public concern over the proliferation of industry development and the impacts of the forest harvesting in the late 1980s led the Minister of Forestry, Lands and Wildlife, Leroy Fiordbotten, to establish another Expert Panel in Forest Management in early 1989. This four-member panel was chaired by Bruce Dancik (chair of the earlier panel also) and included biologist John Stelfox, forest scientist Lorne Brace, and Bob Udell from the Company, representing the Alberta Forest Products Association. Its 1990 report was based on briefs, questionnaires, meetings and public hearings. The Brundtland report (Our Common Future)³⁷⁴ was cited, and clearly the report reflected concepts of sustainable forest management -- ecosystem-based and reflecting a wide range of values and products.

This was an auspicious introduction for the 1990s. Among major points of emphasis were an integrated resource management approach to planning and operations, public participation, expanded inventories for a broader range of values, and improved growth and yield calculations. Of particular interest was the comment that environmental impacts in forest landscapes could be addressed most effectively by expanding and refining the ground rules process and by periodic audits of forest management by the ECA -- and that environmental impact assessments (EIAs) were neither designed for nor appropriate for forestry programs. These points have all been reflected in Weldwood’s forest management planning,

operations and in government policies. Also important was a recommendation for a forest conservation strategy for Alberta that later led to provincial consultations and eventually publication of Alberta's Forest Conservation Strategy in 1997.

The AFS introduced 'Free-to-Grow regulations, primarily to guide Quota holders in their reforestation efforts. However, the new rules were developed with industry-wide consultation and were made applicable to all forest harvesting operations. These necessitated revisions to Company planning and record-keeping. The Company celebrated planting of its 50-millionth seedling in 1990.

Announcement by the Canadian Forest Service in 1991 of a competition to select 10 Model Forests across Canada held out exciting prospects for the Company, which it pursued vigorously and successfully, in partnership with the Forest Technology School and Alberta Forestry, Lands and Wildlife. Foothills Model Forest was one of ten model forests selected in a nation-wide competition and announced in 1992.

Annual pulpmill production increased from 192,230 to 346,683 tonnes, the increase following the opening of the expanded mill in 1990. Lumber production increased from 77,032,000 to 83,534,000 fbm before the new sawmill was constructed.

Highlights of the 1991 Forest Management Plan revision

This was both an advanced and transitional forest management plan. The Company had made its commitment to Sustainable Forest management to encompass a broader range of values, had initiated an Alberta-first wildlife program in 1988 and another Alberta-first public participation process in 1989. Changes in approaches to forest management were evolving rapidly, but the new Forest Management Agreement of 1988 made it clear: a detailed forest management plan covering the full expanded area had to be submitted within three years of the date on which the Agreement came into force -- a deadline of 15 June 1991. So, the FMP had to be written before all the new emerging philosophies and ideas could be articulated.

This plan illustrated the very new approach the Company had adopted for integrated forest management. Sustained yield and scheduling of timber operations were still of prime importance to meet the needs of the mill both present and in the future. However, in 1991 the planners also built in a focus on public input and integration of higher level Integrated Resource Plans (IRPs) and Eastern Slopes Policy.

Management Objectives

For the first time, there was a major departure from the abbreviated list of objectives that preceded and guided previous plans. In part, this was a reflection of the new, more embracing philosophy, reflecting the environment in which forest management was to be conducted. Yet upon closer examination, the fundamentals of the previous plan commitments remained as basic underpinnings. As stated in the Introduction to the 1991 FMP:³⁷⁵

Objectives are met through sets of goals and strategies. Goals are more-detailed re-statements of objectives, in terms suited to developing strategies. Each management objective has several goals, and some goals relate to several objectives. Strategies are action plans to meet objectives and goals, within constraints.

Forest management objectives were discussed under six headings. The point was made that:

Although conflicts among multiple objectives are inevitable, Company staff are committed to achieving compromises, which minimize adverse impacts arising from these conflicts, both to the Company and to other interested parties. Balancing the objectives requires that they be viewed as a set. Taken separately, the objectives have much less significance.

Also recognized was that objectives represented opportunities for discretionary Company actions, beyond those required by public policy, law or the FMA. Within each objective was listed a series of more specific goals or considerations. The following excerpts highlight the intent of the objectives themselves.

1. Sustain Coniferous Yield

Annual yields of coniferous wood from the Forest will be sustained or increased into perpetuity. Cutovers will be promptly reforested, and the Company will continue to examine the benefits and costs of practicing more intensive silviculture. Where the benefits of improved volumes, increased annual allowable cuts, or better quality wood outweigh the costs of getting them, the Company will invest that extra money. As a minimum, basic reforestation and stand maintenance will be practiced on all areas harvested.

2. Schedule Balanced Operations

A coniferous harvest of up to 1.9 million m³/year is required from the Forest during the next ten years. This will be supplemented by chip and roundwood purchases to meet mill requirements. Road construction and timber management activities will be scheduled to meet mill requirements in a cost-effective and environmentally sound manner. Construction of the new sawmill necessitates increased attention to scheduling both pulpwood and sawlog volumes. As much as is practicable, uniform average haul distances within each Working Circle, and within the Forest itself, will be maintained annually and between cut control periods.

3. Improve Stand Vigour

Harvesting and reforestation methods affect regenerated stand performance, and Company staff will continue to ensure that site productivity is maintained. Company experience has been that regenerated stands perform better on average than the harvested stands that they replace. This is based on expertise and experience from the gathering and analysis of much data over the decades, including projects completed in cooperation with staff of the AFS, Forestry Canada, and Universities.

Harvest priorities will be directed toward areas of over-mature, high-risk, and/or slow-growing stands, to replace many of these with more vigorous and fast-growing young stands. This will improve average growth rates and long-term sustainable harvest levels achievable across the Forest. Tree and stand improvement activities will be directed to improve average growth rates and multiple forest values.

4. Integrate Renewable Resources Management

The Company is committed to multiple-use principles, as reflected by the various components of its Management Philosophy ... and its performance record. Participation in the Integrated Resources Management Steering Committee (IRMSC) is an important part of this commitment. ... The work of IRMSC will continue, leading eventually to direct linkage of Company actions to manage habitat with Government actions to manage populations and access. Analogous activities may be implemented for fisheries, recreation, and tourism opportunities.

A variety of forest uses will be accommodated within the forest management program. Ecosystems, including mature and older stands, will be managed through space and time to conserve wildlife species in the Forest.

5. Liaison with Government Agencies

Most resource matters are dealt with using an inter-agency referral system channelled through the AFS. Direct contacts are also used where appropriate. Alberta Environment is contacted directly to obtain water-crossing permits. Water crossings are also referred to Transport Canada, which is the Company contact for the Navigable Waters Protection Act, federal Fisheries Act, and the federal Environmental Assessment and Review Process. Major roads require permits from the Public Lands Division of Alberta Forestry, lands and Wildlife. Public Lands also issues landfill permits and sand and gravel licenses.

6. Public Involvement and Input

Public involvement and public input into forest planning were expanded substantially for this plan. The Company has always encouraged citizen comments through informal means. With the growing public interest in forest management, Company staff realized that better processes were needed for public involvement into planning decisions. This presented the challenge and opportunity of obtaining meaningful input from non-foresters on technical issues.

Inventory Systems and Allowable Annual Cuts

In preparation for the 1991 plan, new aerial photography was taken for the expanded FMA, from which was produced orthophotos (planimetrically corrected aerial photos and new base maps for planning and control purposes. All this information was contained in the new Geographic Information System.

Operating compartments were increased from 120 to 136 with the inclusion of the expansion areas.

The 1991 plan continued the steady progress towards comprehensive and increasingly explicit inventories as the basis for forest management planning. Whereas the 1986 plan had employed the photo-point sample approach exclusively, the 1991 plan used a combination of photo-point samples, fine type inventories and, for the first time, an inventory of regenerated stands on the FMA.

- Photo-point Sample: The “low intensity” photo-point sample used in the 1977 and 1986 plans was maintained for operating compartments scheduled for harvest 30 or more years in the future. This represented 55 per cent of the FMA. Inventory coverage was expanded to include the new landbase

from management units E4, E5, E6, E7 and E11. The 40-chain (805 m) grid sampled timber type, density, height class, age, slope and understory.

- Fine Type Inventory: A more comprehensive inventory of compartments scheduled for some harvest in the first 30 years of operations provided more detailed information for both forest management and operational planning. This area was 35 per cent of the FMA. Photos were interpreted to a minimum 2 ha polygon size to produce information on species, density, height, age, slope and understory. These were then transferred to the orthophotos. Within those compartments, about 12,000 ha of non-forested land were interpreted to the new Collective Vegetation Inventory standard (precursor of the Alberta Vegetation Inventory system) to provide improved information for habitat assessment.
- Regenerated Stand Inventory (RSI): All blocks harvested prior to 1981, approximately 80,000 ha (10 per cent of the FMA), were interpreted and field sampled to provide information on structure, composition and productivity (site index) in order to place them on the appropriate growth trajectory for management plan forecasting. Blocks cut between 1981 and 1991 were assigned to forest-wide median cover types for regenerated stands. Almost 28,000 temporary plots were established in the conduct of this inventory, a major effort.

The 1986 plan, as described earlier, used the Forest Yield Projection System developed by W.R. Dempster and Associates. This model used a modified area-volume check to analyze the capacity of the forest to produce fibre over a chosen “rotation” period, but was not designed to consider allowable cut effects resulting from future investments in intensive forest management.

For the 1991 plan, a new timber supply model ATAMO was adapted from the FORMAN timber supply model developed by Wang and colleagues³⁷⁶ in 1987. This new model, to accommodate compartment sequencing and two pass harvesting systems. ATAMO was used to examine alternative management strategies and compartment sequencing over a 200 year planning horizon. It represented a significant departure from earlier models and set the stage for the first truly integrated planning model that was to follow in 1999. Among the significant changes:

- The concept of “cutting cycle” was abandoned. Compartments were assigned to a priority harvest, on a two pass system, and the model worked through them according to rules developed from the growth & yield and inventory programs.
- With the “green-up” requirement of 2 metres average dominant height before second pass removal could be contemplated, compartments were in the management queue for longer than before, allowing up to 15 years before second pass removal (similar in result to the 30-year cutting cycle proposed in the 1986 fmp).
- The concept of “rotation” was abandoned. The model produced estimates of rotations, and showed whether various harvest levels could be sustained over multiple periods (Table 10).
- Sustainable harvest was evaluated over 200 years.
- The plan could examine alternative management strategies, including intensive management, on sustainable harvest levels. This opportunity, however, was not taken in the 1991 plan.
- For the first time, a check against the calculated allowable annual cut was conducted through the calculation of Long-Run Sustained Yield Average, an estimate of timber yields attainable under the

probable future management system. In this case, it included all present and future merchantable stands (min. 47.5 m³/ha @ 150 yrs), growing at expected regenerated-stand growth rates and scheduled for harvest at MAI culmination.

- The fire allowance reduction to AAC was no longer used. A 1987 study³⁷⁷ by Dempster and Stevens had provided compelling evidence that such allowances were counter-productive in that, by extending the period of harvest through application of this allowance, the likelihood of such catastrophic loss was increased.
- Although wildlife models were not included in this plan, an extended period was assigned between first and second passes in Berland 1 to enhance habitat for caribou.
- An allowable annual cut for hardwood was calculated as an “opportunity” or “uneven flow” volume to be produced in conjunction with softwood harvest.

TABLE 10-10 ALLOWABLE ANNUAL CUTS AND DE FACTO “ROTATION” -- 1991 FOREST MANAGEMENT PLAN

Measure	Value
Softwood Allowable Annual Cut - 1991 FMP	1,900,000 m ³
Hardwood Allowable Annual Cut – 1991 FMP	126,000 m ³
Total 1991 FMP	2,026,000 m³
Softwood Long-Run Sustained Yield Avg. - Weld	2,140,935 m ³
Hardwood Long-Run Sustained Yield Avg. - Weld	301,246m ³
Softwood Long-Run Sustained Yield Avg. - AFS	2,000,821m ³
Softwood Long-Run Sustained Yield Avg. – AFS	297,892 m ³
Average Haul Distance	68.7 km
Forest Rotation (de facto)	85 years

Other Land Uses and Values

Concern over the impact of oil and gas development continued. Seven major gas fields were already established in the Forest, and an eighth was proposed, along with the entire infrastructure and impacts those represented. Although salvage of timber destroyed by seismic exploration was required within reasonable distance of all-weather roads, 95% of it was inaccessible and left to decay.

Coal development continued and expanded, with 6500 ha of major deletions listed, along with another 5300 ha in proposed expansion areas. Proven reserves in various stages of approval could result in a further loss of 164,000 hectares, or 16% of the total FMA landbase. On a positive note, the plan noted remarkable success in coalmine reclamation for a variety of uses, and that areas reclaimed to timber productions “appear to match or exceed previously timbered areas.” In that sense, coal activities could

be viewed – would be viewed – as a temporary removal and interruption of productivity which could be factored into AAC calculations if and when they occurred.

The company noted its intent to continue developing recreational resources on the FMA, primarily in the area of backcountry or wildland recreation. It also reported that, with the development of the Nordic Centre, use of company ski trails had fallen off and the company would no longer maintain them.

Damage to regeneration from grazing continued to cause concern. The Brule horse pasture, 1310 ha, had been withdrawn from the FMA by the Forest Service in 1986 but controlled and uncontrolled grazing in other parts of the area continued.

Work on wildlife was advancing, the company having hired Alberta's first industry-employed Wildlife Biologist - Rick Bonar – in 1988. The 1986 and 1987 reports of the joint government – company task force had been reflected in new wildlife management guidelines in the Operating Ground Rules, another Alberta first. The plan reported 284 wildlife species on the FMA, about 64% of all species found in Alberta. A joint government – company task force, the Integrated Resource Management Steering Committee (IRMSC) was established in 1990 to develop and oversee the integration of wildlife and forest management on the FMA. Both parties recognized they could not achieve this integration on their own, and each accepted the role set out for them. Weldwood would manage the habitat through timber harvesting, regeneration and stand tending activities. The Province would manage populations through direct and regulatory action, and habitat with programs such as Buck for Wildlife.

Unfortunately, the development of wildlife models with which to manage and integrate these resources was only in its early stages, with much work remaining by both Weldwood and the soon-to-be-announced Foothills Model Forest. Company and government contented themselves with continuing research and explicit habitat examination and planning on an operational compartment level. The habitat supply model was under development, a co-operative venture with the Company and Drs. Jim and Barb Beck.

Similarly, fisheries information was sparse with Alberta Fish and Wildlife Division having examined populations on only 30% of the pre-expansion area streams.

Company Operations and Forest Protection

In recent time, the company operations had seen major change. Both company and contractor crews were deployed on the FMA to harvest the increasing volume of wood as the expanded pulp mill ramped up to full production. The rapid transition from a largely hand labour force to a primarily mechanized harvest operation was paying big dividends in worker safety and productivity.

The rapid change to a fully mechanized system was driven in part by unrelenting attention to minimizing the cost of delivered wood. Events would soon show that this single-minded attention to harvest costs would deliver unexpected costs in silviculture, in increasing costs of and reduced effectiveness in establishing regeneration, as reported elsewhere in this study. Little if any stumpside delimiting was being practised, which would soon produce problems in the natural regeneration of some pine types by removing seed sources. However several other logging systems were used (Table 11).

TABLE 10-11 LOGGING SYSTEMS AND MAN-DAY PRODUCTIVITY 1990

Harvest System	Average Productivity m ³ / m.d.	Harvest %
Feller/buncher Logging, grapple skidder, roadside delimiting, limbs and tops burned at roadside	94 ^{lxxviii}	90
Manual Hot Logging, one faller, two line skidders. Roadside delimiting, burning.	48	5-10
Single grip harvester, tree length skidding, roadside delimiting, burning	52	Trials only
Single grip harvester, buck & delimb in woods, shortwood forwarder to roadside	Unknown	Trials only
Horse logging: hand falling, delimiting, topping and bucking at stump, horse logging max 50 m to landing	8	Trials in Riparian Areas
Remote Chipping	Unknown	Trials to commence 1991

Fire had become inconsequential on the FMA, with less than 1% average annual burn since operations began, and a 20-year (1971-1990) average annual burn of 0.006% or 60 ha/ yr. Company operations continued to incorporate conditions of the fire control agreement.

Silviculture and Research

The reorganization of the Forest Resource Department in 1987 placed all operational responsibility for silviculture in Operating Districts, established to take autonomous responsibility for all operational activities. This experiment evolved quickly into a more co-ordinated organization, but operational silviculture remained under operations coordinators.

At the time of management plan preparation, new approaches to silviculture systems were being tested, e.g. shelterwood trials and selective harvest, but the emphasis remained on the tried and proven systems of the past. The major change to roadside delimiting and burning was being reflected in a major increase in site preparation and planting as a reforestation technique.

Tending of regenerated stands to reduce hardwood competition was a growing concern, with an estimated 15,000 ha of such cutovers needing treatment. It is interesting to note that 1991, the year

^{lxxviii} Productivity figures have been adjusted to reflect the equivalent phases included in horse logging, i.e. the activities of felling, delimiting, skidding and piling the shortwood bolts at the landing.

the plan was submitted, was also the date that new “free to grow” reforestation guidelines were implemented in the province, wherein such stands were mandated for release. Treatment would soon begin using Fox Creek Development, an aboriginal co-operative, as prime contractor for manual stand release.



TIMBCO FELLER-BUNCHER IN COMPANY OPERATIONS, 1993

WELDWOOD PHOTO COLLECTION

The plan reported that the company’s juvenile spacing program was suspended “pending economic analysis of growth and mortality dynamics in spaced stands.”

A detailed summary of research projects underway was not provided. However, eight silviculture projects were listed: in mixedwood management (3), ingress and mortality (1), pest management (2), site impact mitigation (1) and site classification for upcoming free to grow standards (1).

10.7 SUMMARY OF FOREST MANAGEMENT PLANS TO 1991

As mentioned, the 1991 FMP represented both an advance and a transition. In this case, advances were noted in the scope of the objectives and in the technology of forestry computations and practices. This is reflected in this extract from the companion Volume 3 in this series *Evolution of the Forest Management Agreements*³⁷⁸:

The FMP process provides an opportunity to reflect on performance, to adjust the course of management practices and to set new objectives. The 1991 FMP was the first for the 1988 agreement and included an expanded set of objectives including sustaining coniferous yield, scheduling balanced operations, improving stand vigour, and integrating renewable resources management. This was clearly a forward-looking transitional document that provided a focus on managing for specific ecosystems through space and time to conserve wildlife species and to integrate other uses. In its concluding statement, reference was made to the data collection and analysis that would occur and several special studies that would be completed before the next FMP and suggested that the 1999 plan would be still more comprehensive in the spirit of sustainable forest management.

In fact, most FMPs also incorporate advances and epitomize their transitional nature as ideas and practices evolve in the spirit of adaptive management or the application of science with 'learning from experience'.

This concept is well illustrated in the following four summary tables (12-15) prepared by Company staff for various presentations during the 1990s.

TABLE 10-12 EVOLUTION OF FOREST MANAGEMENT PLAN OBJECTIVES 1966 TO 1991: REFLECTING GAIN IN KNOWLEDGE OF THE FOREST AND SOCIETY'S NEEDS.

Objective	1961	1966	1977	1986	1991	Comments
1. Sustain in Perpetuity annual coniferous yield from FMA	X	X	X	X	X	1986, 1991 plans added intent to increase AAC through better management.
2. Prepare plan to harvest FMA during a single rotation, logically and systematically.	X	X	X	X		1991 plan moved away from traditional use of "Rotation"
3. Remove overmature timber ASAP.	X	X	X	X	X	1986 plan added "replace with vigorous regeneration to increase AAC." 1991 plan reworded as "improve stand vigour."
4. Normalize forest in even distribution by 20-year age group.	X	X				Little difference from Objective 2, dropped in 1977
5. Maintain uniform haul distance within each W.C. and FMA between cutting cycles.			X	X	X	Relates to Objective 2. 1991 plan: Schedule balanced operations, uniform haul still an objective.
6. Manage forest so a variety of other uses may be accommodated, simultaneously or sequentially.				X	X	First introduction of integrated resource management as an objective in 1986.

TABLE 10-13 INVENTORY SYSTEMS 1956 TO 1991: INCREASING LEVELS OF CERTAINLY, INCREASING EFFICIENCY

Plan Year	Inventory System
1961	3,000 1/5 acre permanent sample plots (Continuous Forest Inventory). Measured every 10 years.
1966	Permanent sample plots (CFI) used again for fmp inventory. Broad forest type maps prepared for the entire FMA 1960-63.
1977	Photo-point samples (PPS), interpreted points – 4-x increase in samples. CFI abandoned for inventory, changed to Permanent Growth Sample (PGS) – targeted measures for growth and yield.
1986	Photo-point sample inventory used again in 1986. Major advance in growth and yield due to a) growth-based yield projection instead of empirical yield curves, b) paired-plot studies.
1991	Inventory used a combination of fine-types for pending operations (35% of FMA), PPS for remaining original forest. Plot-based Regenerated Stand inventory pre-1981 cuts; 80,000 ha.

TABLE 10-14 SUBDIVISION OF THE FMA 1956 TO 1991

Plan Year	Management Subdivisions	Comments
1961	FMA divided into 4 Working Circles ^{lxxix} . 65 equal-sized Operating Compartments	All operations from 10 permanent camps, 50 men each. Compartments (65) each contained 500,000 cords (1,205,000 m ³). 20 years cut at 25,000 cords/year (60,250 m ³). Man-day productivity 8 m ³ . 100% horse logging. 5, 20-year Cutting Cycles, 100-year rotation. Priority of compartment entry by age class
1966	4 Working Circles. Compartments reduced to 64 to fit 80 year rotation	Some commuter operations underway. 3 Company, 2 Contractor camps still operated. Little change in man-day productivity, 100% horse logging 4, 20-year Cutting cycles, 80-year rotation.
1977	Increase to 5 Working Circles. Compartments (120) restructured on age lines, operations efficiency.	100% commuter operations Combination of hand-falling/cable skidding; feller-buncher, cable skidding. Productivity gain to 35 m ³ /man-day.
1986	135 compartments Minor boundary adjustments.	Logging systems continue to evolve. Major change to feller-buncher, grapple skidder system with roadside delimiting underway. Man-day productivity rising Computer-based model (Forest Yield Projection System FYPS) used for timber supply analysis. Change to 90 year rotation; 3, 30-year cutting cycles (green-up requirements)
1991	Minor fine-tuning of boundaries	Use of FORMAN model for timber supply analysis, no 'Rotation'. Compartments prioritized for entry, no cutting cycles. Almost 100% mechanical operations, up to 120 m ³ /man-day productivity.

^{lxxix} The term "working circle" means the same as "sustained yield management unit" (SYMU).

TABLE 10-15 TIMBER SUPPLY ANALYSIS, CONTRIBUTING LANDBASE AND PRODUCTIVITY: 1956 TO 1999

Plan Year	Timber Supply Analysis	Gross Area (ha)	Net Prod'Ve Area (ha)	% Landbase in AAC	AAC (m3)	AAC per prod'Ve ha (m3/ha)	Rotation (years)
1958	Preliminary Plan. No inventory, no G&Y information AAC estimated	777,422	682,340	87.8%	842,430		100
1961	Adaptation of Judeich Stand Method. Current volumes projected to time of harvest using growth factors from empirical volume/ age curve. 100 year "R" 0.32% average annual burn reduced AAC by 140,330 m3	777,422	682,340	87.8%	730,810		80
1966	As above. 80 year "R" increased AAC. 0.32% average annual burn reduced AAC by 132,040 m3	774,672	657,710	84.9%	899,530	1.37	80
1977	As above. Undercuts in first 20 years, combined with a fixed end to the first rotation increased AAC. 1956 burns no longer in 20-yr average annual burn, reduced AAC by 23, 455 m3/ yr.	786,006	612,970	78.0%	1,052,400	1.72	80
1986	First computer-based simulation for AAC projection. 2-stage ht/age; vol/ht curves used to project stand volumes. Regenerated stand growth performance included.	782,912	564,840	72.15	1,302,300	2.31	90
1991	Adaptation of FORMAN model to compartment-based scheduling. Regenerated stand inventory included in plan.	1,012,119	801,570	79.19	1,900,000	2.37	"de facto" 85
1999	"Woodstock" model used for simulation of alternative management strategies. PSP growth performance basis of yield forecasting. Full AVI inventory of FMA used for first time. Spatial landbase net-down, quantitative analysis of non-timber values impacted AAC	1,005,744	715,341	71.12	1,936,000	2.71	200 yr projection

As can be seen, the 1991 FMP set the stage for major changes in the 1999 FMP as discussed in Chapter 11.

TABLE 10-16 MANAGEMENT FORESTERS CONTRIBUTIONS: 1955-2005

Forester	Years	Leading Accomplishments
John Miller	1955-58	<p>Led start-up of management program</p> <p>Designed management system after Judeich Stand Projection system</p> <p>Designed, installed CFI program</p> <p>CFI basis of management inventory</p>
John C. Wright	1958-1975	<p>Developed aerial stand volume tables</p> <p>Major technical advances in CFI program</p> <p>Fire Origin Map of FMA</p> <p>Conversion of CFI program to PGS (from inventory to growth/yield focus)</p> <p>Change from CFI to Photo-point sample for management inventories</p> <p>Change from fine type operational inventories to Photo-point sample</p> <p>First analysis of CFI pointed to remarkable growth of stands</p> <p>Preliminary FMP 1958 (With Miller)</p> <p>First detailed FMP 1961</p> <p>First revision 1966</p>
Robert W. Udell	1975-1988	<p>Second FMP revision, 1977</p> <p>Analysis of third PGS measurement verifies/improves earlier growth estimates</p> <p>1985 paired plot stem analysis project</p> <p>Development of Growth Intercept for SI forecasting</p> <p>Third FMP revision, 1986</p> <p>PGS analysis used to support major AAC increase, growth-based volume projection</p> <p>Change to computer-generated timber supply analysis using Forest Yield Projection System (1986)</p>
Douglas Walker	1988-1992	<p>Integrated Resource Management Steering Committee (IRMSC) formed</p> <p>Fourth FMP revision 1991, expanded FMA</p> <p>First regenerated stand inventory (RSI) for management plan</p> <p>Modest AAC increase based on regenerated stand performance</p> <p>Adaptation of FORMAN model to Hinton forest management system</p>

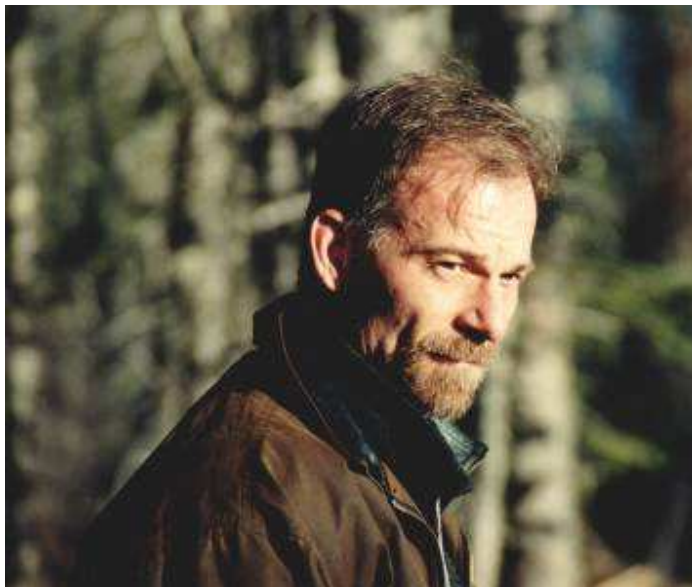
Hugh Lougheed	1992-2001	<p>Fifth FMP revision 1999.</p> <p>Major expansion of inventories and research as basis for plan – wildlife, riparian, visual, historic, etc.</p> <p>Improved growth-based yield projection</p> <p>First fully integrated wildlife/ forestry/ hydrology plan in Alberta, possibly in Canada – with quantitative examination of interactions.</p> <p>Use of Woodstock model for AAC calculation</p> <p>Fine type mapping for FMP to AVI Standard, incl. regen stands</p> <p>Ecological site classification</p> <p>Introduction of historic rates of disturbance as FMP benchmark (coarse filter)</p> <p>Fine filter check of selected wildlife species</p> <p>Hydrologic Assessment</p> <p>Growth-based yield curves</p>
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CHAPTER 11 – THE 1999 FOREST MANAGEMENT PLAN: A FOCUS ON SUSTAINABLE FOREST MANAGEMENT

ACKNOWLEDGEMENTS

This final chapter is a tribute to all those individuals who have worked for or with the Company from the inception of operations in 1955. Each of the previous Forest Management Plans (FMPs) built on the philosophies and practices developed by those who had preceded them. Each FMP reflected the best-available science and technology of the day, and established a new state-of-the-art in forest management planning systems. In this sense, although the 1999 FMP represents a culmination of past and present contributions, it will also serve as the starting point for the next FMP due in 2008 and on which work has already started.

Hugh Lougheed authored the 1999 FMP. A forestry graduate from the University of New Brunswick in 1984, his education was strongly influenced by Dean Gordon Baskerville and then-graduate student Doug Walker for whom he would work in their pioneering techniques in forest management at UNB in 1984-85. In the fall of 1985 he began studies for a Masters degree at Lakehead University under Doug Walker who had then become a staff member there. Graduating in 1988 he joined Weldwood at Hinton for about a year but left in the spring of 1989 for Northwood in British Columbia where he was responsible for strategic forest management planning for their Prince George and Houston areas. In the meantime, Doug Walker had left Lakehead in 1987 for Hinton to write their 1991 FMP, leaving in 1992 for the consulting field. Lougheed applied for his position and started in the fall of 1992 as Forest Planning Coordinator. His major responsibility was preparation of the 1999 FMP. It was to represent a major departure in philosophy and scope that there were many issues through which he had to work as they went along. As he noted, he was pretty much given a free rein with respect to the approach, but clear direction as to the end result expected. Some of the major steps in which he was involved included the Linked Planning Process, Stewardship Report the Development Plan and Aspen Study.



HUGH LOUGHEED 2002

BOB UDELL PHOTO

Lougheed described his job as part of an extended team involving both Company and government staff in which his role was one of coordinator and integrator. Among those he recognized were:

Bob Udell and **Rick Bonar** as members of the Linked Planning Process Task Force with **Tony Sikora** and **Dan Wilkinson** on the government side;

David Presslee for his silvicultural leadership and effective work with the Forest Resources Advisory Group (FRAG);

Brian Maier for developing the Geographic Information System (GIS) and use of ortho-photos;

Sean Curry who worked on growth and yield;

Paul Hostin who developed new inventory techniques;

Rick Bonar who developed the wildlife program and quantifiable habitat indices;

Bob Christian for his data analysis techniques;

David Andison for natural disturbance analysis and their application to harvest planning; and

John Griffiths who served as chairman of FRAG during the preparation of the 1999 forest management plan, and **Lyle Benson**, its facilitator.

Acknowledged with appreciation are **Don Lashley** and his successors as Managers of Forest Resources **Dennis Hawksworth** and **Jim Lelacheur**; and **Bob Udell**, Manager of forest policy and government relations for their leadership, suggestions and encouragement to broaden the vision and continue to consider the unconventional.

11.1 INTRODUCTION

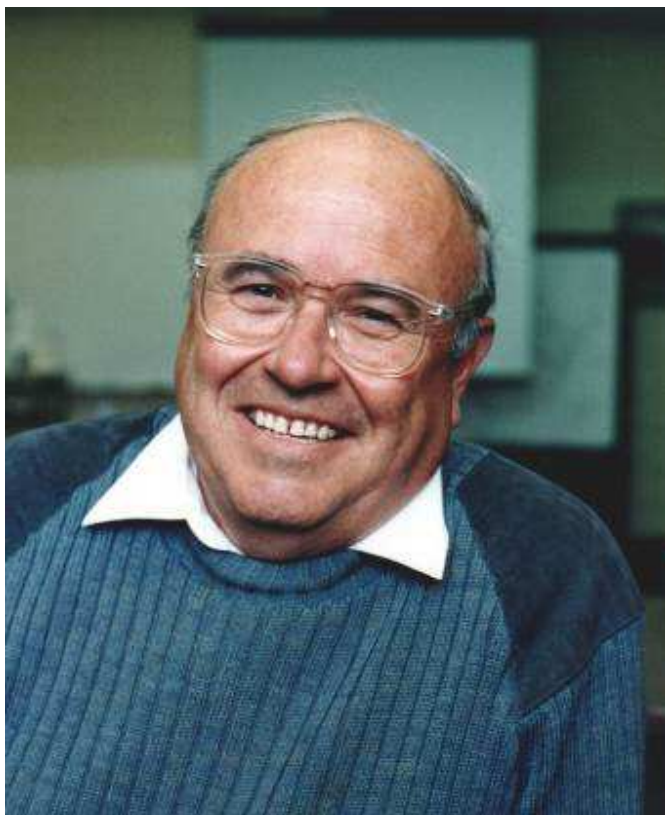
The Company has gone through several phases in its history of forest management planning. In 1955 the initial emphasis was on a quick assessment of the FMA to do the short-term planning needed to get a flow of wood started into the wood yard, and to begin the forest inventory. In order to focus on the specific tasks that had to be done, the Forestry Department concentrated on the planning, management and silviculture aspects while the Woodlands Department focussed on roads, harvesting and transportation of wood to the mill. This situation prevailed through the demanding years of the start-up phase from 1955, to the "model" forest management agreement of 1968 with plans for expansion, and through the two successive representations for expansion culminating in the 1988 Forest Management Agreement. This was followed by the 1991 Forest Management Plan with its focus on integrated resource management planning.

By this time it was becoming apparent that there were many other forces at work for which a reassessment and realignment were necessary. In fact, the decade of the 1990s was one of the most eventful periods in the history of the Company. Almost twenty issues and events influenced the 1999 FMP, with its expanded commitment to sustainable forest management and explicit analysis of forestry, wildlife and hydrologic impacts.

11.2 HISTORICAL CONTEXT TO 1999

ALBERTA

Events during this period reflected the convergence of two major forces. The first was the continuing provincial economic policy to encourage investment in the forestry sector. The second was coalescence of environmental concerns, which had begun to manifest themselves in the early 1970s in response to more visible logging and petroleum developments. Alberta passed a number of environmentally focused acts in the mid 1970s but concerns continued to grow as population and pace of development grew. The Brundtland Report of 1987 *Our Common Future* was a catalytic event. It reviewed these forces from a worldwide perspective, emphasized the need to find a balance between environment and economy, and used the concept of “sustainability” as a philosophical objective.



DON LAISHLEY, 1992

DON WAS A CHAMPION OF WILDLIFE/FORESTRY PROGRAMMING, SUSTAINABLE AND ENHANCED FOREST MANAGEMENT ON THE HINTON FOREST, AND A MAJOR PLAYER ON THE NATIONAL SCENE DEALING WITH THE SAME ISSUES.

BOB UDELL PHOTO

In Canadian forestry, the concept of sustainable forest management (SFM) was described through public forums leading to the National Forest Strategy and Canada Forest Accord of 1992 in which Don Laishley and Bob Udell participated. These were reviewed and renewed in 1998, a process in which Bob Udell was again a participant. The Forest Round Table on Sustainable Development, on which Don Laishley was a lead participant, unveiled its principles of SFM in 1994. The Canadian Council of Forest Ministers further defined SFM through their nationally developed Criteria and Indicators in 1995. This was followed by creation of third-party programs to certify forests that were being managed to achieve sustainability -- ones such as the Canadian Standards Association and Forest Stewardship Council nationally and internationally, and the Alberta Forest Products Association’s ForestCare codes of practice provincially.

This period also saw growth and strengthening of environmental organizations – international ones such as Greenpeace and World Wildlife Fund for Nature (WWF) with local chapters, along with national, provincial and local groups. Working individually and collectively, these groups became strongly influential. In forestry, their objectives have ranged variously from attempts to improve forestry practice to creation of protected areas or elimination of logging altogether.

These developments placed enormous challenges on forest managers to develop ways to sustain or increase wood supply while managing forested lands for a broader range of values, including environmental, ecological, social and economic. The planning process was also to entail participation of interested citizens.

In Alberta, the economic impact of the forest industry, as reflected by harvest levels, continued to grow rapidly -- doubling from 8.3 million m³ in 1988 to 16.6 million m³ in 2000. The success of the Forest Industry Development Division in attracting new and expanded industrial investment in Alberta was reflected in its 1987 annual report³⁷⁹ which noted that the Millar Western pulpmill proposed for Whitecourt in 1988 would be the first new pulpmill since the Procter and Gamble mill of 1973; then reported five other new or expanded pulp mills along with numerous other solid wood plants utilizing both coniferous and hardwood stock.

The most recent of the major approved pulp mill proposals was that of Alberta-Pacific Forest Industries, announced as the largest single-line pulp mill in the world. This was also a catalytic moment for environmental movements, resulting in vigorous demonstrations and sustained criticism. The government responded by forming two commissions: one to review water and air concerns, the other impacts on forests and forestry. The Expert Panel on Forestry was formed in 1989, reporting in 1990. The four-member panel comprised Bruce Dancik as Chair, Lorne Brace (Canadian Forest Service), John Stelfox (retired from Fish and Wildlife Division) and Bob Udell of Weldwood's Forest Resources. One of their recommendations led to the Alberta Forest Conservation Strategy exercise, a multi-stakeholder consultation group established in 1994 and whose 1997 report was published as the *Alberta Forest Conservation Strategy*. The government's response took the form of an action framework released in February 1998 as the *Alberta Forest Legacy: an implementation framework for sustainable forest management*. A Forest Management Science Council was established in March 1996 to advise how science could be applied to achievement of SFM. It reported in the form of a management protocol in January 1998, and its recommendations were incorporated into the *Forest Legacy* document.

In 1999 three Forest Land Use Zones (FLUZ) were established in or near the FMA on the Coal Branch, Athabasca Ranch and Brule Lake. These were to protect sensitive sites and minimize disturbance of elk. The *Special Places 2000* program affected several areas on the FMA and a number of proposed sites were submitted by the Company, most later accepted or modified by the Province.

The importance of forest research also came to the fore. In 1989 the industry-government Alberta Forest Research Advisory Council was formed, replacing the previous 1974 Forest Development Research Trust Fund. When new sawlog stumpage rates were negotiated with the industry in 1994, provision was included for a portion of that stumpage to be set aside in a dedicated fund to be used to support approved forest management activities over and above regulatory obligations. Forest research was among the approved activities. This fund, the Forest Resource Improvement Program (FRIP) was subsequently (1997) transferred to the Forest Resource Improvement Association of Alberta (FRIAA), an arms-length "designated administrative organization" (DAO) established to collect the dues levies and manage the fund. The Alberta Research Council also greatly increased its involvement in forestry and wildlife research. Then a University of Alberta-led consortium successfully applied to establish a

National Centre of Excellence in Sustainable Forest Management at the U of A through a program of the Natural Sciences and Engineering Research Council of Canada (NSERC). More recently a Centre for Enhanced Forest Management supported by Weldwood, Weyerhaeuser and NSERC was also established at the university. Research in the Hinton area was boosted by its designation as the Foothills Model Forest in 1992 under Environment Canada's national Green Plan. This program was administered by Natural Resources Canada until 1997 when CFS was assigned entire responsibility for funding and direction of the Model Forest Network.

A three-member sub-committee of the Standing Policy Committee on Natural Resources and Sustainable Development was chaired by Wayne Jacques, MLA from Grande Prairie-Wapiti to review government policy with respect to Agreements. Their June 1996 report confirmed policies that had evolved through negotiations with Weldwood and others. However, it also resulted in recommendations for profound changes in terms for renewal of Agreements with increased emphasis on investment and economic contributions.

Within the Alberta Forest Service (AFS), Free-to-Grow legislation was passed in 1991, with terms negotiated with forest Industry designed to ensure sustained yield. Silvicultural practices were enhanced through increased ecological considerations. Management planning increasingly emphasized integrated resource management, and greater attention was being paid to Aboriginal and Métis rights and entitlements. Major forest fires in 1998 and 1999 were a reminder of the persistent inherent risk from wildfire; they also highlighted the increased vulnerability of Alberta's forest industry to threats to a wood supply that had been increasingly allocated. The AFS continued under the Department of Forestry Lands and Wildlife until 1992. Ralph Klein succeeded Don Getty as Premier and reorganization later resulted in AFS becoming part of a new Department of Environmental Protection, then Department of Environment and now (2001) Sustainable Resource Development. Government fiscal policies also resulted in significant downsizing of government departments, in part based on a philosophy of increasing self-regulation by industries. As part of this process Lands Division was combined with AFS in 1992 becoming part of a new Land and Forest Service (LFS).

Fred McDougall retired in 1989; Cliff Smith became Deputy Minister, taking early retirement in 1992. Ken Higginbotham was named ADM for the AFS in 1989, but left to work with forest industry in 1995. At that time Cliff Henderson was appointed ADM. In 1999 the Premier announced and unveiled *Alberta's Commitment to Sustainable Resource and Environmental Management*. This led to some major changes in government departmental organization and structure. A new Department of Resource Development took over the Forest Industry Development Division (FIDD) of Alberta Environment. For a brief time (1999-2000), the new department had an Associate Minister of Forestry, Mike Cardinal, but this position was phased out. In early 2000, FIDD was given the lead role in forest management agreement negotiations under the *Forests Act* for the province. The LFS remained at the negotiating table, dealing with the management and administrative sections of the negotiations. A new Ecological Landscape Division was added to LFS and Dennis Quintilio was appointed the new Director to advance the development of integrated resource management in Alberta. Doug Sklar was named head of Forest Management and Craig Quintilio of Forest Protection.

HINTON

The new Weldwood Agreement signed in 1988 enabled expansion of the pulpmill and construction of a new sawmill. The 385,000 tonne pulpmill was opened in 1990, the 220 million fbm Hi-Atha sawmill opened in 1993. However, the expanded FMA could provide only about 70 per cent of required wood supply. Further, the new sawmill had demanding requirements for size, quality and volume of timber, so it became the primary determinant of wood supply to the site. The challenges for forest management therefore included those of increasing wood supplies, maintaining wood quality to the sawmill, managing the FMA for sustainability for a broader range of values including biodiversity and visual qualities, and incorporating public participation, all in a cost-competitive process. These objectives are being pursued through a number of technical forestry and resource management innovations within a sustainable forest management context.

Weldwood hired their first wildlife biologist, Alberta's first forest industry biologist, Rick Bonar in 1988. Then, a Company-government Integrated Resource Management Steering Committee (IRMSC) was formed to enhance collaboration. This launched an expanded wildlife, biodiversity and recreation program. Two more biologists were added in 1994.

Public participation in Weldwood's forestry planning was begun in 1989 through the Forest Management Liaison Committee. This was the first such industry group in Alberta. It was reorganized in 1993 as the Forest Resources Advisory Group. Among its achievements were major inputs to the 1991 and 1999 forest management plans, and review and refinement of the Harvest Planning and Operating Ground Rules published in 1996. FRAG also requested that the Company commit to visual and recreational and cultural inventories that were done for the 1999 FMP.³⁸⁰ In 1997 FRAG was called upon to coordinate citizen response to McLeod 8 a controversial harvesting area south of Hwy 16. Their work is now a vital part of the Company's planning process.

The Company took a broad coordinated approach to addressing forest management and wood supply. Activities included employing a tree improvement forester (again), joining the Huallen Seed Orchard in 1994, membership in an inter-provincial growth and yield cooperative, and introduction of improved practices based on a number of internal company initiatives (Crossroads, Intensive Management, Tree Improvement reports) as well as provincial initiatives in which company foresters played leading roles (Linked Planning Process, Enhanced Forest Management). It embarked on joint harvest/silviculture planning based on an ecological classification and mapping system for the FMA.

Milestones included selection of the areas of Weldwood and its partners as the Foothills Model Forest (1992) and celebrations of planting the 50 millionth tree in 1991, 100 millionth in 1999. By 1997 the Company forest was certified by Alberta ForestCare, and celebrations marked the 40th anniversary of first pulp production at Hinton. Part of those celebrations included renaming the two sustained yield management units of the FMA after Des Crossley and Reg Loomis. Rick Bonar played a key role in the task force developing the CSA/SFM process.

Forest planning was provided with more tools in 1993 with the start of the Forest Resource Information System (FRIS) that included wildlife/habitat aspects. David Presslee championed and played an important role in the development of an ecosite classification system for west central Alberta in the model forest, a project led by Ian Corns³⁸¹ who was a research manager with the Canadian Forest Service³⁸². This led to a ecological mapping and preharvest assessment trial on 74,000 ha in 1994, resulting in a commitment to use the system for all future planning. This was expanded to 100,000 ha in 1995, 270,000 ha in 1996 with a targeted completion of the full FMA by 2003. In 1997 the entire Caribou range was mapped.

This was truly the information age in the field of forest management. The 1999 plan would require coordinated planning of the major plan components: wildlife, growth & yield, inventory, analysis, landscape for aesthetics, recreation and culture, watershed and hydrology and riparian corridors. In order to make these components of the plan operational, the inventory data needed to be greatly expanded in scope. In 1997 a visual landscape inventory; riparian corridor inventory; and a recreation and cultural resource inventory were undertaken.

Two revised Forest Management Plans were submitted, the 1991 FMP incorporated planning for the expanded area, and the 1999 FMP was restructured to reflect the Company commitment to sustainable forest management. The 1999 FMP was the first management plan in Alberta, perhaps in Canada, to include an explicit analysis of forests, wildlife and hydrological interdependencies. The Company received registration of its FMA as a sustainably managed forest under the demanding Canadian Standards Association Standard for SFM in 2000.

Don Laishley transferred to Vancouver in 1996. In the meantime Dennis Hawksworth had moved to Hinton in 1988 as project manager to design, build and operate the new sawmill. He was appointed General Manager of Forest Resources and Hi-Atha in 1996, and Vice President of Hinton Forest and Solid Wood in 1997. In 1996, Forest Planning and Forest Operations were merged under one manager, Bryon Muhly. This freed Bob Udell to head Policy and Government Affairs, a position in which he could focus on external forest policy issues with both industry task forces and government, as well as his responsibilities as president of Foothills Model Forest. In 1999, Jim Lelacheur became General Manager of Forest Resources and Lumber. Bryon Muhly was appointed Manager, Resources Optimization -- Alberta, focussing on optimization of fibre exchanges for Weldwood's facilities throughout Alberta. Rick Kziesopolski was hired in 1999 to replace Muhly as Forest Resource Manager.

Hugh Lougheed started with Weldwood in October 1992, followed a month later by David Presslee. It was a great time for any foresters interested in advancing their field -- Enhanced Forest Management was making its debut. In 1995 a new tree improvement position was established at Weldwood Hinton with Diane Renaud appointed as Tree Improvement Coordinator.

11.3 MAJOR EVENTS AND ISSUES LEADING TO THE 1999 FOREST MANAGEMENT PLAN

The period between the 1991 and 1999 FMPs was an "event-full" one. Although the 1988 agreement was amended twice, in 1995 and 1998, policies and practices continued to evolve through means and events other than legislation. It was a time during which new philosophies such as sustainable forest management emerged and were put into practice. New policies and programs were negotiated or imposed; and new technologies made it possible to put old ideas into practice. Some of the most significant developments are described in this section, all of which influenced the 1999 FMP. There were 20 of particular note during the dynamic decade of the 1990s.

THE 1991 FOREST MANAGEMENT PLAN

The impetus for a new approach to forest management planning was provided within the 1991 FMP itself. The FMP process provides an opportunity to reflect on performance, to adjust the course of management practices and to set new objectives. The 1991 FMP was the first for the 1988 agreement and included an expanded set of objectives including sustaining coniferous yield, scheduling balanced operations, improving stand vigour, and integrating renewable resources management. This was clearly a forward-looking transitional document that provided a focus on managing for specific ecosystems through space and time to conserve wildlife species and to integrate other uses.

In its concluding statement, reference was made to the data collection and analysis that would occur, and to several special studies that would be completed before the next FMP. It suggested that the 1999 plan would be still more comprehensive in the spirit of sustainable forest management. Thus, the commitment was made; the magnitude of the changes was not fully understood at the time.

INTEGRATION OF FORESTRY AND WOODLANDS -- 1985

Starting around 1983 Bryon Muhly began to see some inefficiencies developing as a result of the compartmentalized administration comprised of Woodlands and the Forestry Department. That, along with his interest in people, prompted him to initiate an individual study about organization and management systems. Based on his studies and discussions with staff he wrote a paper with recommendations that was well received by Don Bunbury, Jim Clark and Jack Wright. Ken Hall and the Champion organization agreed with the concept of his changes. As Muhly explained³⁸³:

The Department was organized into functional groups. We had our Forestry group and our Woodlands group -- forest planning and operations in two very distinct separate groups. Within each of those two groups people were also functionally organized. On the Woodlands side were a road construction and a maintenance crew, a logging group and log haul group. On the forestry side -- forest planning, silviculture and land use -- all separate groups. It was clear that each was very effective and efficient within their groups. They were managed very well from a cost point of view and achieving their goals and objectives within their respective groups. However, there were many conflicting goals and objectives between the groups, which, in turn led to friction and also to some inefficiencies, and probably an overall higher bottom line in terms of cost. For example, harvesting was done in complete isolation of silviculture and reforestation and some initiatives which lowered overall harvest costs were more than offset by the resulting increase in silviculture costs. I suggested it would be better to have the departments combined into one complete and cross-functional team with broader goals and objectives.

This led to a series of discussions and working with consultants in 1984, and in 1985 to a trial on one of the five districts. It set the stage for integration of the forestry and woodlands units into a new department of Forest Resources that Ken Hall approved in 1985. Details were worked out by Jim Clark and Jack Wright before they retired. Don Lashley started in January 1986 and oversaw the process of integration that continues to evolve to the present. Lashley supported this integration wholeheartedly. As he reflected³⁸⁴ in 1977:

I really want to emphasize that we had all the brainpower in the world in our people, but we did not have a "learning organization." I mean an organization that plans, acts, assesses the outcome and takes action to continually improve performance, repeating the cycle. The greatest challenge that I had was to mould together a team of people that recognized and managed this incredible resource. I sure as hell didn't have the answers, but I think we set up an organization and a process that allowed us to get the answers.

We reorganized into what I considered to be one of the most dynamic forest resources departments in Canada – and maybe the world – an incredibly dynamic group of people getting an enormous amount of work done very professionally with a great understanding of what each other was doing. It was not what I did but what **we** did.

Laishley³⁸⁵ also believed that reorganization had to be an ongoing process in the spirit of adaptive management.

Our sense of purpose, our vision and where we are going were clear -- notwithstanding that we would continue to modify the organization in the future. But we had a process in place to manage change, and could adapt to the new issues as they were coming at us.

INTEGRATED RESOURCE MANAGEMENT STEERING COMMITTEE (IRMSC) -- 1988 TO 2000

Senior officials from the Company, the Alberta Forest Service (later Land and Forest Service or LFS) and Fish & Wildlife Division met in 1988 to discuss how a collaborative approach to integrated resource management on the Weldwood FMA could be developed. From these discussions arose a new government-company committee called the Integrated Resource Management Steering Committee (IRMSC). The original committee comprised Rick Bonar and Doug Walker from the Company, Richard Quinlan from Alberta Fish and Wildlife and Tony Sikora from the Alberta Forest Service. The premise of IRMSC for wildlife is that Weldwood will manage habitat through timber harvesting, regeneration and stand tending activities. The province will manage populations through direct and regulatory action. Cooperative planning and action are intended to ensure appropriate actions are used to meet habitat and population goals.³⁸⁶

IRMSC continued to perform its collaborative function, serving as one-window entry to the FMP process. For example it played an oversight role in developing strategies for management of caribou that impose conditions on harvesting practices that are, in turn, incorporated into the FMP and calculation of AACs.

EXPERT REVIEW PANEL AND REPORT 1990

This four-member panel, of which Bob Udell was a member, was formed by the Minister of Forestry Lands and Wildlife in early 1989 in response to public concerns about the impacts of forest harvesting. It was precipitated by the announcement of the controversial AI-Pac Agreement. The 1990 Expert Panel report³⁸⁷ was based on briefs, questionnaires, public hearings, meetings with regulators and others. The Brundtland report (Our Common Future)³⁸⁸ was cited, and clearly the report reflected the concepts of sustainable forest management -- ecosystem-based and reflecting a wide range of values and products. This was an auspicious introduction to events of the 1990s. Among major points of emphasis were:

- an integrated resource management approach to both planning and operations,
- incorporation of public participation processes,
- expanded inventories for a broader range of values,
- improved growth and yield calculations,
- integration of harvesting and silvicultural systems,
- incorporating ecologically-meaningful information into forest-level planning
- increased consideration of the impact of forestry operations on populations and habitats of fish and wildlife.

Of particular interest was the comment that environmental impacts in forest landscapes could be addressed most effectively by expanding and refining the ground rules process and by periodic audits of

forest management by the ECA -- and that environmental impact assessments (EIAs) were neither designed for nor appropriate for forestry programs. Also important was a recommendation for a forest conservation strategy for Alberta that led to provincial consultations and publication in 1998 of Alberta's Forest Conservation Strategy.

These points have all been reflected in Weldwood's operations, the 1999 FMP, and in government policies.

FOOTHILLS MODEL FOREST 1992



MODEL FOREST LOGO, 1995

Weldwood and the province, along with the Forest Technology School, collaborated in a proposal for one of Canada's 10 model forests in a nation-wide competition in 1991. The awarding of the Foothills Model Forest (FMF) to Hinton in 1992 set in motion an unprecedented period of co-operation and collaboration in the development of research and its application of a wide spectrum of forest management challenges. Led by a Board of Directors representing the major land and resource managers within the model forest borders, including Jasper National Park, which joined in 1995, the FMF program has gained national and international recognition for the area. Directed research on integrated resource management has resulted in many changes in forest management. Weldwood cited 11 specific applications of model forest research which were used in its 1999 FMP. The criteria and indicators program of the FMF was adapted to the 1999 forest management plan as well as to the 2000 sustainable forest management program prepared as support for Weldwood's Hinton forest certification through the Canadian Standards Association.

NATIONAL CONSULTATIONS 1992-1998

The Canadian Council of Forest Ministers (CCFM) developed a Forest Sector Strategy for Canada in 1987 through consultation with selected stakeholders. Following release of the Brundtland report that same year, it became apparent that neither the scope of consultation nor the range of values addressed in that first CCFM Strategy was adequate.

In 1990 CCFM launched a series of national consultations and questionnaires involving individuals and representatives of a wide range of interests. These culminated in 1992 with a first National Forest Strategy (NFS)³⁸⁹ and signing of Canada's National Forest Accord. Weldwood endorsed the Accord through membership in the Alberta Forest Products Association. Don Laishley and Bob Udell were both active participants in the process. The NFS essentially described the component elements of sustainable forest management listed under the headings of ten strategic directions and contained 96 commitments. Progress was evaluated after five years by a Blue-ribbon committee, then a second national review took these and new commitments a step further in 1998

with the signing of a new Accord and publication of a revised NFS³⁹⁰. Actions to achieve these commitments are inherent in the 1999 FMP.

In the meantime, the National Round Table on the Environment and Economy set up a Forest Round Table on Sustainable Development, also comprised of representatives of a wide range of interests, of whom Don Laishley, then Weldwood's forest resources manager, was a member. The 26 principles listed in their 1994 final report gave further direction to the achievement of sustainable forest management.³⁹¹

FOREST RESOURCES ADVISORY GROUP (FRAG) 1993

In 1988, ADM Ken Higginbotham met with the forest management agreement holders in Alberta. He advised them that, based on public sentiment about forest management in the province, the government believed that industry should consult the public more extensively in developing its forest management plans. He challenged the industry to develop an expanded process, promising that the province would do the same for Crown management units. He also advised that, if industry chose not to respond to the request, the province would define such a program and impose it on industry. The Agreement holders agreed to accept the challenge, and Weldwood was first off the mark. A precedent-setting public advisory group, the Forest Management Liaison Committee (FMLC), was set up, first meeting in January 1989. It provided substantive input to the 1991 forest management plan.

Based on their experience the consultation process was expanded and reorganized in 1993 as the Forest Resource Advisory Group (FRAG). This ongoing working public advisory group comprises representatives of about 20 interest groups, including governments, chaired by an elected member, with meetings run by a paid facilitator. This is the major public participation process, but not the only one. FRAG has had a major influence on forestry practices. One of its initiatives was to request that the Company address biodiversity in the FMP. Its first major task was to participate in and give its approval to a revised volume of the Harvest Planning and Operating Ground Rules. This took about a year of in-depth discussions; the new volume was published in January 1996³⁹². FRAG has since been an integral part of the planning process and of dispute resolutions involving public concerns.

ALBERTA PROVINCIAL CARIBOU CONSERVATION STRATEGY – 1993/ WELDWOOD CARIBOU CONSERVATION STRATEGY 2001

Caribou are classified as threatened under the Alberta Wildlife Act, and the province has been working on their conservation both before and since the 1993 strategy was published. Since about 8 per cent of the winter range of the A la Pêche caribou herd is on the Weldwood FMA, the Company and government developed a strategy in 2001 to conserve caribou habitat on the FMA.³⁹³ The process started in 1989 with formation of a caribou technical committee. The strategy includes immediate reduction of the harvest rate within the designated Caribou Protected Area, deferring about 1 million m³ of harvest during the first decade. At the same time, the Company collaborated with the government and Foothills Model Forest on inventories, research, monitoring of caribou movements and experimental cutting while a more detailed strategy is being developed. The IRMSC was involved in the planning process.

HI-ATHA SAWMILL AND INTEGRATION OF WOOD SUPPLY 1993

The 1988 forest management agreement was negotiated conditional on the Company doing two major construction projects: expansion of the pulp mill and construction of a new sawmill complex with minimum capacity of producing 150 million board feet (fbm) per year. Construction of the 220 million fbm Hi-Atha sawmill added a new dimension to wood supply.



TRAIN CAR LOADED WITH HI-ATHA LUMBER

WELDWOOD PHOTO COLLECTION

For the pulp mill operation, the size and shape of trees and logs was not a major consideration -- the wood fibre itself was the important factor. Wood fibre quality had been found to vary somewhat with the location in which it was growing and rates of growth. Rough sorting for general pulp-grade characteristics could be done on a truckload basis as they entered the mill yard so wood from identified areas could be stored in designated locations. However, for the high-speed and market-driven sawmill, wood qualities such as log diameter, roundness, straightness, taper and defects all became of critical importance. In fact, the HI-ATHA sawmill became the primary consideration for wood supply, the pulp mill almost a residual recipient. This meant that many changes had to be made to the objectives of the FMP and to harvest planning and scheduling.

Dennis Hawsworth had been working for Weldwood in their B.C. operations. A forestry graduate from the University of British Columbia, he had achieved considerable experience and skill in sawmilling. He had also learned the importance of customizing sawmill design to match the profile of the wood supply. In 1987 he was sent to Hinton to assess the proposal for the new sawmill that would be a part of the expansion being negotiated. As he commented: ³⁹⁴

There were two things that struck me right at the outset. First of all I couldn't believe that, considering the quality of the wood that was being harvested, we were just processing studs. I felt that this could be a random length random width mill. Secondly, I was also very impressed by the stand and stock table information as to the amount of timber that would be suitable for a random length mill. I estimated that we could easily justify building a mill in the area of 200 million board feet.

When the new Agreement was signed in 1988, Dennis moved to Hinton as project manager for the new sawmill. Given the wood supply and quality, and considering economies of scale, he designed the mill to a 220 million fbm per year capacity. He also designed it to produce random lengths and widths in either metric or imperial units. The objective was to produce the highest possible grades of lumber at a competitive price. Achieving efficiencies involved both technical and labour aspects, so the project was

delayed for about a year as those points were resolved. In the meantime, planning continued on the integration of Forest Resources inventory, planning, logging and wood supply.

There were several forest resources-operations aspects that needed to be changed. As Hawksworth explained, to run a successful sawmill of this type:

... basically starts with careful planning. We have a very close relationship developed between the Forest Resource department and the mill. The Forest Resource department understands what can happen if the profile of the logs isn't properly balanced, not only to HI-ATHA but as well to the woodyard and pulpmill. We are a big mill, but we are also a specialty mill in that we produce a unique variety of commodity products. We have a customer base that is used to certain lengths of various products at certain grades. If we start gyrating significantly in the log quality mix going into the mill we impact the performance and output of the mill which in turn impacts our ability to meet our customers' expectations. So we are very sensitive about what goes into the mill.

The major requirements for the sawmill include:

- Proper log profile to meet current market needs – the profile included such characteristics as diameter, roundness, length, straightness, taper, minimum defects and freshness.
- Flexibility to adjust log profiles in response to changes in the market, considering volume and product prices.
- Freshness or recently-felled wood because it saws better with higher quality and lower energy cost; and fresh chips result in higher quality pulp.

These mill requirements, in turn, necessitate:

- More detailed stand inventories from which log profile and product volume calculations may be made.
- Year-round harvesting and hauling capability – including a suitable road network and versatile logging systems.
- Understanding of species characteristics and their variability by season.
- Tighter scheduling of harvesting and delivery to minimize inventories – to reduce congestion in the wood yard, to enhance freshness, to enhance flexibility to respond to changes in markets, and to reduce capital investment in logs.

To make this possible, it was important to bring Forest Resources and HI-ATHA under one manager, where the management and scheduling of the wood supply and deliveries is largely driven by the sawmill needs.

To refine the forest inventory calculations of log profiles, the Company measured a 600-stem sample of trees in the yard selected from across the FMA. Each tree-length sample log was precisely measured, recording such characteristics as diameter, length, taper, sweep, crook, ovality and typical amount of

defect. These data were analyzed in the SAWSIM model, the results were used to recalibrate the stand and stock tables for log quality.

Hawksworth³⁹⁵ noted that: “Having log profile forecasts means that we can also forecast what is going to come out of that mill every month. Thus we can sell our production before we even produce it, through knowing what our length and width and grade characteristics are going to be!”

The major change to logging was to move to more mobile and flexible systems to enhance access to appropriate stands as needed. Inventories were managed to try to stay within a one- to two-month log supply. In this respect Hawksworth³⁹⁶ also noted:

I think the significant achievement that the Forest Resources group has been able to accomplish is gearing up to the present level of production. Our total consumption of fibre is 2.7 million cubic meters. It is a phenomenal amount of wood both in the form of roundwood and chips. That supply is being managed very well in terms of cost control, inventory management, safety, and with regard to our relationships with our employees and our community.

The mill was completed in August 1993. With a heavy focus on detailed planning, staff training and trouble shooting the HI-ATHA mill passed the design capacity of 212 million fbm after 17 months, in early 1995, and by 2001 was producing 230 million fbm

One of the serious challenges of the new agreement was that the AAC from the new FMA would provide only about 70 percent of the wood needed for the expanded manufacturing capacity. As Hawksworth³⁹⁷ commented:

We buy about 30 per cent of our wood that comes into the Hinton mills. One of the neat things about this operation is that I can trade off chips, pulp and round wood in that 30 per cent to meet the needs of the facilities. So, for example, if I need more saw logs for HI-ATHA then all I have to do is dip down lower into the diameter classes. I can now go to an 8-inch sort instead of an 8.5-inch sort. –While this takes volume away from the pulpmill, about half of it returns in the form of chips from HI-ATHA. I then have four options, depending on the economics, to replace the volume turned into lumber - I can increase the harvest on the FMA in the form of pulp wood, or I can go out and buy chips, or I can go out and buy pulpwood or I can trade wood.

The ability to trade has resulted in a sophisticated network of trades designed both to meet wood requirements and to optimize wood value (Figure 1). This complexity of factors is also considered in the FMP planning process.

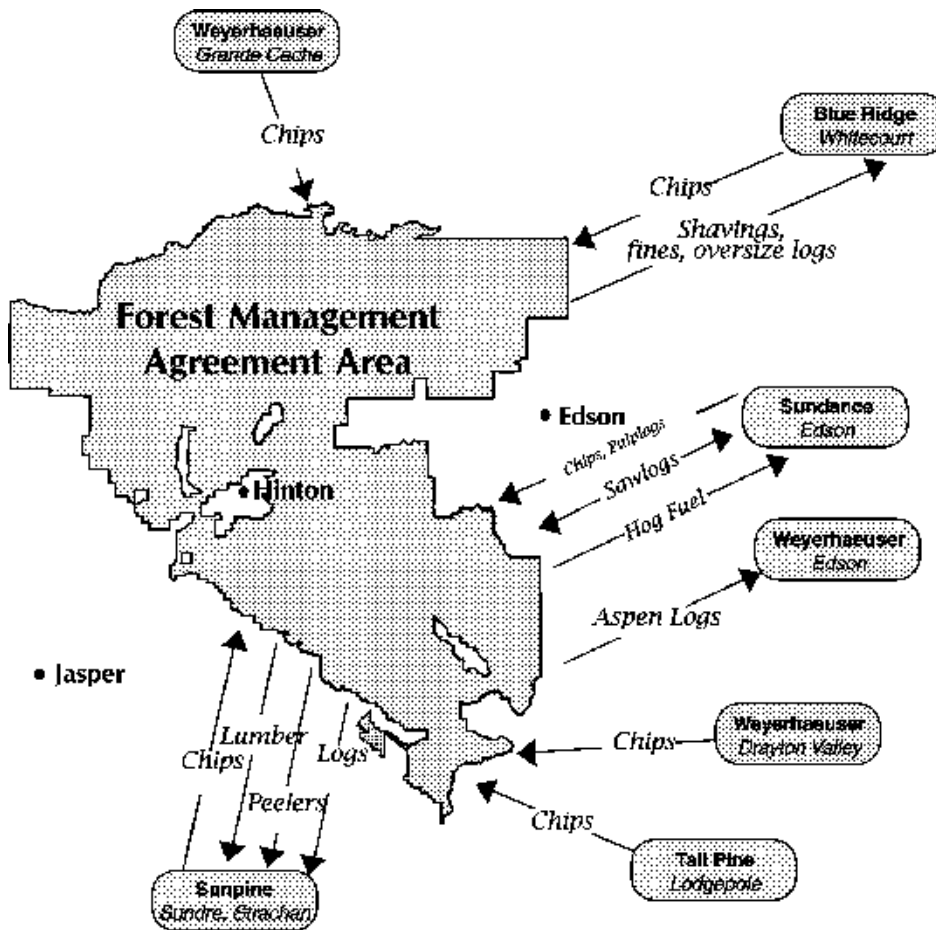


FIGURE 11-1 WELDWOOD WOOD EXCHANGE NETWORK 1999 FOR WOOD VOLUME AND OPTIMIZED VALUE

FOREST RESOURCES INFORMATION SYSTEM (FRIS) 1993

In light of these emerging complexities and the challenge of handling the huge amounts of new data being generated by specialized and extended inventories, the Company needed to improve its data handling capability. The Company had pioneered the use of computers as early as 1956 with the use of IBM 'Mark Sense' cards for compiling its Continuous Forest Inventory plots. It had advanced to its own mainframe installation but, as Don Lashley recalled when he arrived in 1986: "We had one terminal to the mainframe and we had one PC on site. I had bought my own PC in 1984 and used it in my consulting business. When I went to Hinton in 1986 I did not know how to do business without a computer." New PCs were obtained, and the 1991 FMP calculations and analyses were based on Doug Walker's computer-based ATAMO model (an adaptation of the FORMAN model). New staff all had strong computer backgrounds.

The challenge of selecting harvesting compartments to provide wood quality and balanced hauls, especially to service the Hi-Atha mill, quickly showed the need for a Geographic Information System (GIS). As Lashley³⁹⁸ recalled:

We soon realized that without a system that linked our forest resource information databases to geographic locations, we would be unable to effectively plan and manage this large forest. This led us to the purchase and installation of a GIS system, and a major initiative to convert all our systems and databases to this critical information platform.

Although the system was used effectively for large-scale planning, its products were also made available to first-line supervisors in the field through ortho photos. These are aerial photographs that have been digitally corrected through the GIS process so that details are in their true map positions, retained at a constant scale and stored on the GIS system. These images show the full detail of the photographs but can be reliably used as maps.

TURNING POINTS IN SILVICULTURE: CROSSROADS REPORT 1993

The Crossroads project was also prompted by construction of the Hi-Atha saw mill that, for the first time in the Company's almost four-decade history, resulted in harvesting of the full allowable cut on the FMA. As stated in the report:³⁹⁹ "This effectively eliminates any "comfort zone" which we enjoyed in having surplus allowable cut to make up for potential silvicultural failures. Although in the past it was safe to fail, we now must make every effort to be fail-safe."

Team members were Sean Curry, Hugh Loughheed, David Presslee, Diane Renaud, Bill Rugg, Clark Shipka and Bob Udell. Their report contained 25 recommendations addressing eight issues, the headings for which illustrate the areas of concern: program planning, monitoring and evaluation; pre-harvest planning; crop protection; quality control; seedling supply; backlog reforestation; tree improvement; forest stewardship. The report emphasized the importance of silviculture and recognized that silviculture was a responsibility of all Forest Resource department operations. It led to a closer integration of silviculture into the entire forestry process from planning through harvesting and post-harvesting treatments.

TURNING POINTS IN SILVICULTURE: ECOLOGICAL CLASSIFICATION AND MAPPING 1993

Classifying and mapping of sites based on ecological criteria had been a long-sought goal. However, the issue did not become a pressing one until after the 1988 Agreement. In the meantime Dr. Ian Corns, a research scientist with the Canadian Forest Service, was investigating possible approaches.⁴⁰⁰ Working with Rick Annas he developed a prototype classification field guide for forest ecosystems of west-central Alberta, published in 1986.

In 1993, at the urging of Dave Presslee, who committed financial support to the initiative, Corns agreed to undertake a model forest project to upgrade the ecological classification system for west central Alberta. Presslee worked tirelessly with Corns and John Beckingham, along with Harry Archibald of the Alberta Forest Service, to complete this new guide in 1996⁴⁰¹.

This refined guide was used by Weldwood to support a first trial of ecological mapping, to a scaled-up project on 74,000 ha in 1994 with more areas in ensuing years. The Company committed to a full-scale program of ecological site mapping in 1996 that would eventually cover the entire FMA, to be completed by 2003. The project reflected the imminent commitment to enhanced forest management and complete integration of silvicultural and harvest planning.

TURNING POINTS IN SILVICULTURE: TREE IMPROVEMENT PROGRAM 1995

The tree improvement program, recommended in the Crossroads report, followed in 1995. The intent of this program is to capture some of the gain in wood production and allowable annual cut increase that is possible through tree improvement. It also addressed questions of adequacy of seed supply both to ensure quantity, quality and genetic diversity. The costs of the gains in AAC were estimated to be less than the cost of purchasing wood. This report was accepted, and led to the revitalization of tree improvement at Hinton, including a new position for a tree improvement specialist, filled by Diane Renaud. It also involved joining other industries and the Alberta government in the Hualien Seen Orchard Company, a tree improvement cooperative.

LINKED PLANNING REPORT 1994

Weldwood foresters conceived the concept of the Linked Planning process in 1992 as the Company was integrating its forestry and woodlands to try to ensure that their plans could be linked and addressed in operational plans. Company management, considering the levels of harvest at full AAC, was concerned about the impacts on long term sustainability should the assumptions and strategies contained in the higher level FMP not be reflected in development and operational plans. In 1993, a joint Company/LFS committee was struck to develop a planning process for sustainable forest management. The report was co-authored by Hugh Lougheed and Dan Wilkinson with considerable input from other team members including Udell, Bonar and Tony Sikora of the Forest Service.

The Linked Planning Process was designed to institutionalize adaptive management, applying Baskerville's six steps to forest management⁴⁰² including measurable objectives, monitoring results, and a feedback mechanism to reassess practices where results were not meeting objectives (Figure 2). The process was integrated into all planning phases from annual to ten-year plans. It captured the essence of an SFM system: plan, implement, review and evaluate/modify.

This was a major contribution, not only to Alberta forest policy but also to Canadian advancement in sustainable forest management. Assistant deputy minister Ken Higginbotham described it as the mechanism he needed in order to be able to justify delegation of authority to Registered Professional Foresters (R.P.F.s) in Company operations to manage by objectives. It can also be seen reflected in the Canadian Standards Association Z809 SFM System as well as in the 1998 forest management planning guidelines for Alberta.

The Linked Planning Process introduced the Development Plan, initially a 20-year but subsequently a 10-year projection of the proposed harvest volume by compartment and the main access plans required to meet assumptions of the forest management plan. It was updated annually and provided direction for harvest and road planning. At Hinton, the development plan also showed how the constant average haul distance would be maintained.

An annual *stewardship report*, recommended in the Crossroads report, described how the objectives stated at all levels of planning were being achieved. It consolidated the annual and cumulative results of performance monitoring. This formed the basis for both changes in practices and revisions of the affected plans.



Forest Management Planning Process

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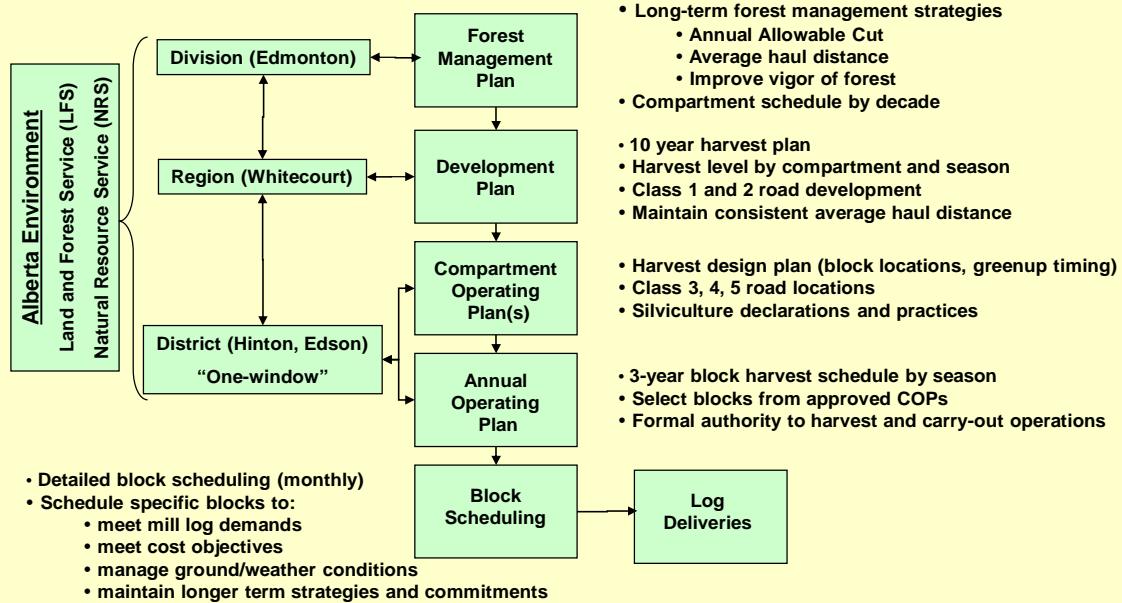


FIGURE 11-2 THE LINKED PLANNING PROCESS FOR SUSTAINABLE FOREST MANAGEMENT

The ensuing 'suite' of plans illustrated in the Linked Planning Process is illustrated and compared in Table 1.

TABLE 11-1 THE LINKED PLANNING PROCESS FOR SUSTAINABLE FOREST MANAGEMENT – TYPES AND FREQUENCY OF PLANS

Report	Updated	Description
Forest Management Plan	10 yrs	Strategic plan, sets forward goals and objectives, strategies to achieve them. Describes approach to sustainable forest management and proposes a level of harvest consistent with management for timber and other forest values. Reflects new inventories, landbase reconciliation and analysis.
Analysis Report	10 yrs	A component of the forest management plan, describes the technical analyses conducted for the plan submission. Includes the allowable annual cut (AAC) calculation.
Development Plan	Annual	Translates strategies in the forest management plan into details for operations scheduled for ensuing 10 years.
Compartment Operating Plan	3 yr review	Detailed plan for a complete operating compartment, including roads, cutblocks and reforestation. Identifies resource values and objectives.
Annual Operating Plan	Annual	Annual plan, scheduling planned operations from approved compartment operating plans. Road construction, silviculture and harvest operations are listed.
Stewardship Report	Annual	Report examines operational performance in relation to plans and objectives contained in various plans. Measures "indicators" - a feedback mechanism to ensure sustainable forest management.
Public Involvement	Annual	Public input to plans through open houses, personal contact, Forest Resources Advisory Group, and 1-800 line. A condition of operations in Alberta.

ENHANCED FOREST MANAGEMENT INITIATIVES 1995

Crossley was prophetic in his 1970 proposal to intensify management on the FMA:

Wood is our basic resource. --- Because of the nature of our location within the Province, the land available for wood production is not expected to increase. On the contrary, because of the demands for forest for products other than wood, the area presently available to us for wood production will very likely steadily decrease. In order to remain as a viable production unit it is imperative that we move steadily --- toward the optimization of wood yield from the acres available to us. This means increasing the efficiency of wood harvest and utilization, the effectiveness of protection measures and the intensification of silviculture.

Negotiations for the 1988 Agreement were influenced by the 1979 ECA report that recommended less area than required to sustain the facilities. Negotiations were also influenced by strong competition for the available forested land. The result was a FMA that could provide only about 70 per cent of wood requirements. As a result, as Crossley stated: "Intensification of yield would have to be considered by the Company as one of its options" -- and the Company put an enhanced forest management plan into effect in 1996.

The Company set up a team in August 1995 to review the potential opportunities and propose a program that would increase the growth, yield and allowable cut of the FMA through intensive silviculture. Team members comprised Sean Curry, Paul Hostin, Hugh Lougheed, Marty Martelle, David Presslee and Bob Udell. Their report, submitted in January 1996⁴⁰³, suggested ten strategies to consider: prompt regeneration, full stocking, tree improvement, backlog reforestation, backlog brushing and weeding, pre-commercial thinning, innovative silviculture regimes, commercial thinning, fertilization and exotic softwoods and hardwoods.

A program of Enhanced Forest Management was implemented in 1996 to enhance the productivity, value and AAC of the FMA. These comprised a suite of strategies to increase growth, capture mortality through thinning and a number of alternative silviculture systems designed for specific sites and stand conditions.⁴⁰⁴

Then, in 1996 the Jacques Report recommended, among other things, that forest industry be encouraged to practice intensive forest management. This was also one of the three 'legs' of the triad in the 1996 Alberta Forest Conservation Strategy.

A joint AFPA/LFS Task Force, co-chaired by Trevor Wakelin and Bob Udell, backed up by technical experts including Paul Hostin and Hugh Lougheed of Weldwood, and Daryl Price of the LFS, developed a comprehensive report recommending a direction in which the province should proceed in responding to these two reports.⁴⁰⁵ Udell and Wakelin presented the recommendations to Minister of Environment Ty Lund, and the Standing Policy Committee in early 1997 where it was warmly received.

This led to further industry/government activity in developing policies and procedures for the application of enhanced forest management on Crown lands in Alberta. This work culminated in late 1999 with necessary changes in policy, regulation and guidelines.

Weldwood dedicated considerable effort to the task force report and subsequent activities, because the need was apparent to increase its AAC through intensive management, and to document such increases. The 1999 forest management plan, while it did not incorporate such intensive management in the timber supply analysis, signalled the company's intention to explore a define such a program before the next plan.

CRITERIA FOR SUSTAINABLE FOREST MANAGEMENT – CANADIAN COUNCIL OF FOREST MINISTERS 1995

In the meantime, the concept of the environment continued to widen. In 1987, the World Commission on Environment and Development (Brundtland Commission) popularized the idea of "sustainable development" in its landmark report, *Our Common Future*. This was defined as development "that meets the needs of the present without compromising the ability of future generations to meet their own needs."

Sustainable development became the central theme of the second UNCED Earth Summit in Rio de

Janeiro in 1992. The outcome directly affecting forestry was the international treaty to protect biological diversity. New legislation passed by the federal government in 1988 and the Alberta government in 1993 also embraced this more holistic view of the environment, including impact assessment for most new developments. To put these visions into effect, the Canadian Council of Forest Ministers developed a *National Forest Strategy* (1992), a document that was presented in Rio. A positive response prompted a CCFM decision to develop criteria and indicators that could be used to report on progress towards sustainable forest management. This so-called Montreal Process resulted in formation of a national task force. Its report was adapted as an important framework: *Defining Sustainable Forest Management: A Canadian Approach to Criteria and Indicators* (1995). Six criteria were identified with 28 critical elements, illustrated in Figure 3.

These were later incorporated into the 1999 FMP and, since the Canadian Standards Association also adopted them as the basis of its SFM standard, the FMP was modified to more clearly relate to this structure.

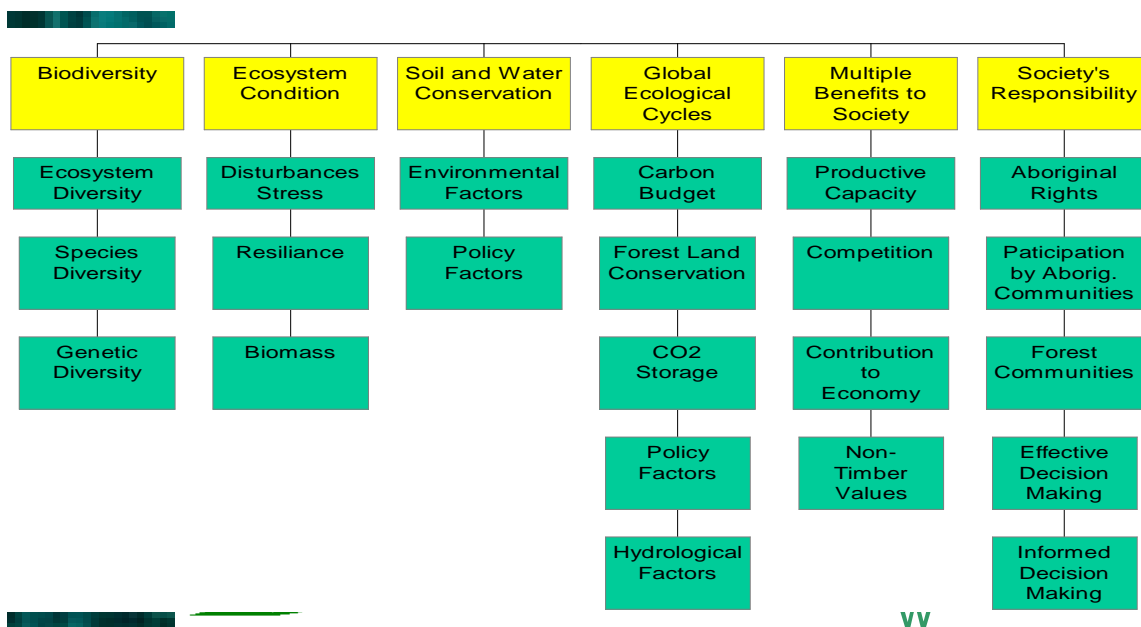


FIGURE 11-3 CCFM SUSTAINABLE FOREST MANAGEMENT CRITERIA AND CRITICAL ELEMENTS

HARVEST PLANNING AND OPERATING GROUND RULES (OGR) 1996

An early and major task selected by FRAG was to work with the Company and LFS/NRS negotiators to develop an expanded set of Ground Rules that addressed the concept of sustainable forest management. As might have been expected, the process took longer than proposed, spanning three years. However, the exercise provided an ongoing opportunity for discussion of both technical details and philosophical principles, proving to be an educational experience for both FRAG and the Company. The ground rules were developed in the spirit of trying to enable adaptation and professional judgment. The selected goals set the stage for the 1999 FMP revision.

FOREST CERTIFICATION 1996 AND 2000

While national and international strategies for sustainable forest management were being developed, thought was being given to the development of standards that could be used to certify performance that would lead a forest to a sustainable state.

The Alberta Forest Products Association embraced sustainable development in its FORESTCARE Codes of Practice in the early 1990s, incorporating some – but not all - of the elements of the CCFM system. Two more comprehensive systems emerged in 1996 that would influence forestry practices in Alberta.



The Canadian Standards Association (CSA) standard for sustainable forest management was developed through multi-interest consultation. Company biologist Rick Bonar was a significant contributor on the technical committee developing the standard. Published in 1996, the Sustainable Forest Management (SFM) Standard requires adherence to the nationally-developed criteria for SFM developed by the Canadian Council of Forest Ministers, a comprehensive and continuing process of public participation in the forest planning process, a rigorous closed-loop management system consistent with that of the International Standards Organization's environmental management system (ISO 14001), continual improvement and third-party audit. It is both a system and performance standard.

Weldwood at Hinton was the first in Alberta (June 2000), third in Canada to achieve CSA certification. Two other FMAs in Alberta, Canfor and Sunpine, were also certified by 2001. The Canadian standard is described in **CAN/CSA Z808 96 A Sustainable Forest Management System: Guidance Document** and **CAN/CSA Z809 96 A Sustainable Forest Management System: Specification Document (1996)**.

The Forest Stewardship Council, supported by the World Wildlife Fund for Nature, developed a similar system based on adherence to a set of international principles with a sub-set developed by regional committees. At least two forest management agreement holder in Alberta declared an intention to achieve FSC certification (Alberta Pacific Forest Industries, Canfor), but to 2001 there were no forests in Alberta certified under that program.

THE JACQUES REPORT 1996

This report was developed as an Alberta government initiative through its standing policy committee on natural resources and sustainable development, a sub-committee chaired by Wayne Jacques, MLA from Grande Prairie-Wapiti. Other members were MLAs Dave Coutts (Pincher Creek – McLeod) and Gary Friedel (Peace River). Bob Udell and AlPac Woodlands Manager Bob Rualt worked with the committee members in crafting a report which would be palatable to industry as well as the province.

The June 25, 1996 report contained ten recommendations developed, as indicated in the report: *"in consultation with existing FMA holders."* It re-emphasized the basic principles of sustainability, fairness, security of tenure, stability and maximizing value from the timber resource. However, the recommendations suggested a more politically-driven agenda to try to increase revenues to the

province, increase corporate investments in the forest and value-added production, and sharing the value of the forest through strategic partnerships with other forest tenure holders.

In concept the Jacques report and subsequent government endorsement stipulated that in order to renew an agreement the company had to show more than just adherence to the previous terms. Requirements for renewal included further investment in manufacturing capacity for value-added production and greater economic activity, enhanced forest management to ensure sustainability and increased social benefits, or some combination of these.

The recommendations were sent to the Alberta Forest Products Association for review and comment. One of the more significant proposals was for a form of 'evergreen' clause that required a mid-term review at 10 years, which, with agreement, would result in a 10-year extension of the agreement. It also provided for a 20-year renewal at the end of the nominal 20-year term. This was intended to ensure that a company would have an assured term of agreement of between 10-20 years at any one time.

The AFPA formed a Forest Management Agreement Renewal Task Force (FMAR Task Force) comprising senior members of six Agreement holders (including Bob Udell, and chaired by Murray Summers. In a 24 July 1998 letter to Cliff Henderson, following meetings with LFS and internal AFPA deliberations, Summers summarized five of the 26 strategic directions required for the Alberta forest products industry to reach its potential that reflected the importance of tenure. After discussing implications of the 10- and 20-year renewals, he listed examples of actions that could be taken to meet the objectives for economic, social and environmental considerations. This report was never accepted nor rejected by the Province.

The Jacques Report had an immediate influence. The new Agreement for Sundance Forest Industries, whose O.C. was dated December 1996, included the "evergreen" clause. They were also clearly reflected in the renewed Agreements with Millar Western and Vanderwell in 1997, and the Canfor, Daishowa (DMI) and Blue Ridge agreements of 1999.

As proposed by the task force and implicit in the Jacques Report, Weldwood's investments in enhanced forest management to increase or sustain AAC was acknowledged as a substantial economic investment during preliminary Agreement renewal negotiations in 2000.

ALBERTA CONSULTATIONS 1994 TO 1998

In the spirit of public consultation, Alberta established the Alberta Forest Conservation Strategy Steering Committee in 1991 as recommended by the Expert Review Panel. This multi-interest group held public hearings and met frequently, with its final report – *Alberta Forest Conservation Strategy – A New Perspective on Sustaining Alberta's Forests* – presented to the Minister in May 1997.

The Alberta government later produced the *Alberta Forest Legacy (1998)* document in response to the recommendations of the steering committee.

The government also formed a Forest Management Science Council (FMSC) in 1995 to explore how science could contribute to enabling the transition to sustainable forest management. The FMSC recommendations in 1998 incorporated philosophies of the Forest Legacy and application of a closed-loop sustainable forest management system incorporating public participation, a system that was already inherent in Weldwood's 1999 FMP.

SPECIAL PLACES IN THE FOREST 1996-1998

In the meantime, a government-appointed Special Places committee held hearings and received briefs to establish protected areas or “Special Places.” Considerable dissension developed over the extent and conditions of protected areas.

Weldwood became involved in the program in 1996, when the province advised that it was considering withdrawing 60,000 ha from the Company’s FMA for Special Places designation. The Company pointed out the difficulties this would present to the province as well as the Company, and offered to propose alternatives. This process was accepted, and Weldwood announced its own

Special Places in the Forest program in 1998.



The Weldwood program proposed that areas with unique and special value be given unique and special management consideration ranging

from official protection to intensive treatment for priority values. *Special Places in the Forest* contributes to the framework for the Company’s biodiversity and landscape management program. It includes protected areas connected by special management zones; unique areas of historical significance; recreational trails; provincial recreation areas; and Company-developed campsites. A local committee of Yellowhead County chaired by councillor Jack Williams reviewed the sites. The committee report went to the Minister in early 2000 and, following further review and adjustment, the final site selection passed the Standing Policy Committee in December 2000.

In addition, access-restricting Forest Land Use Zones (FLUZ) were designated by LFS on the Coal Branch and east of Brule Lake to protect sensitive sites, and on the Athabasca Ranch to minimize disturbance to elk. These designations, Special places and FLUZ, resulted in removal of some productive forestland base and imposed constraints on others that affected the FMP. But the official designation of protected areas under the provinces Special Places program was not done in time to be incorporated in the 1999 forest management plan.

HANDBOOK OF FOREST STEWARDSHIP 1999

Forest workers are at the front line of applying principles of sustainable forest management. Weldwood developed a program of Forest Stewardship to train field workers to understand the science behind forest practices. This is done through training in cooperation with the Hinton Training Centre at Hinton and field demonstrations. In 1999 a profusely illustrated Handbook of Forest Stewardship was printed as a reference guide to explain best management practices (BMPs) for workers. Topics include the dynamics of the forest ecosystem, soil, watersheds, silviculture and wildlife and protection. The program also includes an accreditation program for loggers that incorporates both pride and performance. This is another manifestation of the policy of integrating planning and operations from the FMP level to on-the-ground operations, all in pursuit of sustainable forest management.

The handbook and Weldwood’s program were acknowledged by Wildlife Habitat Canada, which awarded the Company its Forest Stewardship Award at the Thunder Bay sustainable forest management conference in the spring of 2000.

11.4 CYCLE OF PLANNING FOR SUSTAINABLE FOREST MANAGEMENT

Perhaps the most challenging step in “bringing it all together” is managing for sustainable forest management. Wood supply must be sustained to provide its now-more-complex requirements for species, grades and timing of delivery. But at the same time the FMA must be managed to sustain the complex of other forestland uses and values. The whole approach to management must be based on knowledge and ecological classification that support the whole management system. It is a most challenging undertaking.

The underlying philosophy of forest management has changed substantially in the past 40 years (1955-1995). While sustained yield was the key to successful long-term wood supply, and still is a prime consideration, the movement in the past three decades has been toward sustainability of the ‘forest ecosystem’, the ‘economies’ and the ‘communities’. This has put great pressures on forest planners and practitioners not only in Alberta but also throughout the developed world. Weldwood has responded to the demands of society, locally, provincially and globally by adopting a much more comprehensive approach to forest management.

The words chosen to describe the management approach are often confusing to those not familiar with the topics, but they are very meaningful when considered in retrospect. The FMA began with sustained yield for pulpwood, until a need for sawlog timber developed and the objective changed to sustained yield of coniferous wood. Multiple use management was initiated to recognize the place wildlife and people had in the forest. The popularity and vagueness of this term gave way to integrated resource planning which has a close affiliation with integrated forest management. Management concepts have since evolved toward intensive forest management enhanced forest management and finally, ecologically based forest management. Each of the elements of forest management evolved greatly, and became vastly more complex, during the half-century since large-scale development began in the forests around Hinton. An ever-larger portion of the land area was directly affected by management activities, and a larger portion of the annual allowable cut was actually harvested. New technologies altered every aspect of forest management. Lessons from past successes and failures were incorporated into plans and operations. Scientific knowledge, about forestry in general and the Hinton forest ecosystem specifically, grew tremendously. Our very concept of the values inherent in the forest changed.

The Hinton story shows a progression of values:

- *sustained-yield management*, ensuring a “perpetual” timber supply (circa 1951)
- *multiple use*, with timber production as the primary use (circa 1970)
- *integrated resource planning*, incorporating multiple uses with primary emphasis on timber production and wildlife (circa 1982)
- *sustainable forest management*, aiming to maintain a range of important values of the forest over the long term (circa 1991).

What is “Management”?

Management of natural systems involves interventions in those systems, sometimes to alter system structure, and always to alter system evolution. When management is undertaken, it is, by definition, with the intent of causing some part of the system to evolve differently than it would without management. Because of the costs involved, management is undertaken only when it appears that value in some form can be gained/retained, commensurate with the costs of managing.

-- *Gordon Baskerville, 1997*

Gordon Baskerville, professor of forestry at the University of British Columbia, and former dean of forestry at the University of New Brunswick, kicked off a spirited discussion of forest management and ecological science a few years ago in the pages of the journal *Conservation Ecology*. He stressed that management involves considerably more than mere problem solving.

Management can be defined as “intentional intervention” in human and natural systems. The key to the meaning is the adjective *intentional* – the intervener has some goal or purpose in mind – and yet the most common flaw in management is the failure to monitor the results of intervention. A good manager asks continually, “Are we making progress toward our goals? Can we attain them more rapidly and efficiently?” A really effective manager also considers periodically whether the objectives themselves are still valid and worth pursuing, and he or she restates the goals as new demands and circumstances arise.

For many reasons—including the continuous involvement of scientists for the past 45 years, and the willingness of managers to heed scientific findings—the forest around Hinton provides an excellent “real-life” case study of management evolution. There are practical lessons for present and future generations of foresters, and broader lessons for anyone who cares about the environment. Among other things, the story repeatedly validates the business-school adage, “What gets measured, gets managed.”

Adaptive management

The most important lesson is the need for continual adaptation as knowledge and experience are gained. As early as the preliminary forest management planning in 1955 and 1956, company and government foresters at Hinton developed an adaptive approach. This was explicitly stated in a set of operating ground rules, adopted in 1958 that exemplified the principles of “adaptive forest management” nearly four decades before the term was widely used in forestry:

The initial cutting system and variations thereof shall be on a trial basis. As many modifications of such cutting systems shall be adopted as possible in order, by experiment, to arrive at a system or systems best adapted to the silvicultural requirements of the species in question, the topography and the operational requirements inherent in economical timber extraction....

This quote from the 1958 ground rules captures the essence of the adaptive forest management definition offered by the Canadian Standards Association in its 1996 *Sustainable Forest Management Standard*: “Adaptive management is a learning approach to management that incorporates the experience gained from the results of previous actions into decisions.” The Alberta Forest Management Science Council provided a more elaborate, but still comparable, definition in 1997:

Adaptive management is a process of hypothesis testing at the scale of whole systems. It continually evaluates and adjusts management relative to predicted responses, objectives and predetermined thresholds of acceptable change. Adaptive management includes improvement of the data and analyses on which forest management predictions are based, and testing of the assumptions underlying the management practices carried out on forest lands.

Forest management is challenging because trees have longer lifespans than most other living things, including people. Only a small fraction of the forest can be harvested annually if the forest is to be maintained as a sustainable ecosystem and a renewable resource. Many activities—harvesting, reforestation, tending, protecting —have to occur simultaneously across the landscape. Meanwhile, managers have to adapt to changes in science, technology, economics, politics, public expectations, even weather and climate. The typical cycle is illustrated in Figure 4.



FIGURE 11-4 THE CYCLE OF SUSTAINABLE FOREST MANAGEMENT

Adaptive management meets these challenges by a continual process of preparation, planning, implementation and assessment. This process includes a number of distinct elements that, together, comprise the cycle of forest management. However, it is important to remember that each element is an integral part of the whole, and a change in one element often necessitates changes in all the others. The ultimate goal is to sustain the forest as a healthy, functioning ecosystem.

In review, the four major stages are to: Build Knowledge, Prepare detailed Plans, Implement Plans, and Measure, Report, Adapt and Practice.

STAGE ONE: PREPARATION – GATHERING KNOWLEDGE

The knowledge base has increased tremendously and is expanding as extended and new inventories are conducted. This knowledge is stored in computer-based data systems and the Geographic Information System from which data may be easily retrieved, compiled and presented. Applied and basic research produces a solid foundation upon which management and operational activities are adapted and improved.

STAGE TWO: PREPARE DETAILED PLANS

Planners translate goals, rules and knowledge into reality. Like architects, planners must come up with practical steps to attain an envisioned future. However, forest planners deal with an ever-changing living ecosystem, over a large area, rather than bricks and mortar on a single site. The envisioned future is multi-layered over time—today, next year, next decade, next century. Plans provide the context to answer that basic question, “What to do next?”

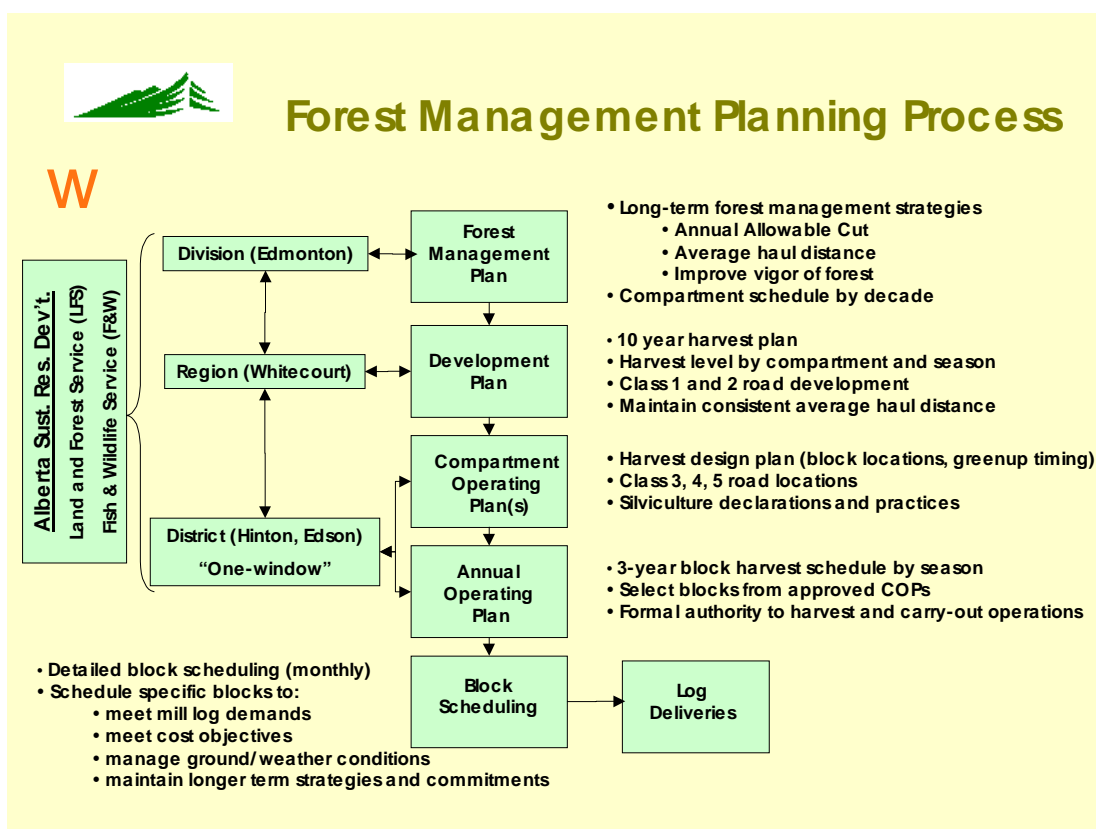


FIGURE 11-5 THE FOREST MANAGEMENT PLANNING PROCESS

As described in the Linked Planning Process, there is a suite of plans ranging from the major Forest management Plan to a variety of annual plans. The focus in this discussion is on the 1999 FMP, the most recent of these guiding documents, as of 2000.

A relatively recent 'tool' is the development of computer-based models that can provide forecasts based on historical trends coupled with relationships established through research and development. Doug Walker introduced the ATAMO model in the 1991 FMP to project various scenarios of harvest levels for different cutting methods. A host of other specialized models has since been created. Although these cannot give precise projections, they are valuable in testing ideas or proposals to show what could happen.

David Presslee's 1996 paper⁴⁰⁶ described how ecologically based forest management would be put to work at Hinton. It provides an excellent summary of how the Company approached planning for sustainability:

With increased demands on the forested lands of west-central Alberta, appropriate management has become extremely important. The most appropriate management involves balancing the use of the resources at a sustainable level without the degradation of other resource values. To accomplish this Weldwood of Canada Ltd., Hinton Division has adopted an ecological approach to managing forests. This involves understanding and working with forest ecosystems in an evolving and adaptive manner whereby new information, ideas, and research results are utilized to achieve environmental, social, and economic goals.

The development of an operational plan is a key step in ecologically based forest management requiring the integration of harvest and silviculture planning. This is often difficult because a large number of variables must be considered to produce a plan that is biologically sound, environmentally acceptable and economically reasonable. Without a systematic approach, essential elements may be neglected or overlooked altogether.



DAVE PRESSLEE, ON A 1999 GROWTH AND YIELD FIELD TOUR. IN THE BACKGROUND IS STAN LUX OF THE CFS WHO DID MUCH TO MAINTAIN AND PRESERVE RECORDS OF HISTORIC CFS GROWTH AND YIELD TRIALS, MANY OF WHICH ARE NOW MAINTAINED BY THE FOOTHILLS GROWTH AND YIELD ASSOCIATION. BEHIND STAN IS WELDWOOD'S THOMAS BRAUN WHO ORGANIZED THE TOUR.

PHOTO BY BOB UDELL

In this paper he described that the process involves four basic steps. These are similar to those in the Figure 4, but he adds three sub-steps that deal with identifying a number of options that would be tested by models and evaluated with reference to the objectives – and done with public participation. The following description is based largely on his paper.

1. Inventory All Resources

This first step in the development of an operational plan, as previously described, begins with inventorying all significant site and resources variables that must be considered in the development of the plan. A field and site assessment will determine, among other things, the physical and climatic characteristics of the area, the soils, the vegetation, the ecological classification, potential hazards and risk, the fish and wildlife use of the area and the presence of other resource values.

2. Development of Objectives

Every operational plan must have a set of goals or objectives to be considered successful. The objectives for an operational plan should be developed only after consideration of the ecological and management factors for the site.

Ecological Factors: Sound successful management of the forest resource will result in forests that are more productive than the natural forests. Such management requires a sound understanding of the forest's nature and characteristics. Because forests are complex, evolving biological systems, an ecological and ecosystem-specific approach must be taken. The failure to do so will result in a forest that does not meet environmental, social and economic goals.

The forest-ecosystem classification system for west-central Alberta⁴⁰⁷ provides the ecological framework for management. Using this ecological classification system as a basis, our knowledge of the characteristics of trees, forest sites, forests and managed forest ecosystems can be used to transfer forest land management interpretations. As new knowledge is gained, it can also be readily introduced to into management.

Management Factors: The Hinton Forest Management Area has been a continuously and progressively managed as a sustained yield unit since 1955. Key to this success is that the Forest has been managed to ensure adherence to the goals and objectives of a management plan. While initial management objectives had a timber emphasis, they have evolved over time to include a broader range of resource values.

Today the management of the Hinton Forest Management Area is based on the concept of "sustainable development," interpreted as providing for the needs of society today, without impairing the use of that resource for future generations. Achieving this often requires balancing competing goals that can be categorized as: community goals for use of the resource, economic goals, which support the community through a viable industry, and environmental goals for resource conservation. During the development of the 1999 FMP workable definitions of what is to be sustained, over what periods of time, and with what geographic pattern were developed. It is these objectives that provide direction to operational planning.

3. Identifying Viable Options and Ranking Suitability

In the preparation of a plan there is often more than one ecologically acceptable way to achieve the desired management objectives. In evaluating each alternative option, the following four factors must be considered: Will the alternative sustain the site productivity? Is it operationally feasible? Will it result in the establishment of a crop that is resistant and resilient to all hazards?

Sustainable Productivity: The productive forest of west central Alberta is the result of a favourable interaction between the climate, soils, and vegetation. Protecting or enhancing the productivity of the forest is a primary concern to forest managers. In this evaluation options are evaluated to ensure that the soil fertility is maintained or improved and that the site is fully occupied by the desired vegetation.

Crop Reliability: A forest crop must survive and grow for many years before it harvested. During this time it is likely to encounter many biological and environmental hazards that it must overcome. These hazards may include animals, insects, fungi, wind, snow, frost, drought, fire and flood. Although periodic catastrophic natural disturbances can occur even in unmanaged forests, developing ecologically sound management prescriptions can minimize the impact of these agents in a managed forest.

Operational plans should be developed which result in the establishment of resistant and resilient communities that can be maintained to harvest at a low cost. Since one disastrous year can destroy the accumulated growth of many years, crop reliability is considered to be one of the most important criteria to be considered when developing a plan.

Operational Feasibility: To satisfy the criterion of silvicultural feasibility, ecologically viable options are evaluated to determine whether or not the plan is feasible under existing management constraints. Several operational considerations affecting operational feasibility include: physical site factors that favour or limit the application of a specific treatment regime (terrain, trafficability, access, etc.), available resources (time, labour, and equipment), worker safety, law and policy related to the available method, and economic viability (all costs to free-to-grow and beyond).

Options that require the fewest and most effective treatments are given preference.

Public Concerns: Over the last few years, we have seen increasing demand for meaningful involvement in management decisions that affect the forest resource. To meet this demand Weldwood developed a public involvement program to promote dialogue between the public and the staff of the Weldwood's Forest Resource Department. This process provides an opportunity for the public to express, in a meaningful way, their interests and concerns in the planning of operations on Weldwood's Forest Management Area.

Public consultation is done as part of the broader information gathering process that also includes the inventorying of timber, fish and wildlife, ecological and recreation resources. The public is canvassed to gather local knowledge of terrain and resources, resource use patterns and timing, inter-resource conflicts of which they are aware, and preferences and opinions. This allows the Company to consider their views in operational planning and in turn result in better, more acceptable plans to the public.

4. Selecting the Best Option

The selection of the “best” option is the final step in the development of an ecologically based operational plan. It must be remembered, however, that no one choice may be superior to the others for all of the selection criteria, and the selection of the final option may be a compromise between competing criteria. Public participation through FRAG is also an important component of selecting the ‘best’ option.

STAGE THREE: IMPLEMENT PLANS

The selection of harvest method depends on many factors, but the most crucial is the way the forest will be regenerated. This is turn varies according to the species and the site—the way different species renew themselves and grow, the availability of conifer seed sources, the ability of some of the hardwoods to sucker or sprout, how much sun or shade the seedlings prefer, and their moisture requirements. This process is part of a “pre-harvest assessment.” From these assessments, foresters can determine the appropriate size and shape of cutting areas, whether to use “clearcut” or “shelterwood cut” methods or some other modified harvest system, as well as the site preparation needs after harvest to ensure suitable seed beds or opportunities to plant. Other pre-harvest considerations are selection of the right species for reforesting the particular sites and ensuring suitable nursery stock if planting is to be done.

Logging has two important purposes. The obvious one is to remove the trees from the site and deliver the wood to the mill. The other important step is to prepare the site for the new, regenerated forest. In this sense logging is both the end and the beginning of forest stands. It is important to plan for both at the same time. Selecting the specific areas to be cut takes a lot of thought. There has to be enough wood in the area to cover the costs of roads and logging, and it should be suitable quality for the intended mill—e.g., larger trees for lumber or veneer and smaller or poor-quality trees for pulp or oriented strandboard (OSB). The hauling distance to the mill is another key factor. Other specific plans are also developed for forest renewal, silviculture, wildlife and biodiversity, recreation and other uses, and forest protection.

STAGE FOUR: MONITORING AND ASSESSMENT

One of the most important features of adaptive management is the monitoring and assessment to keep track of how post-harvest events are unfolding, followed by whatever “intentional intervention” is necessary to meet the goals and objectives. Opportunities for assessment are created during renewal of tenure agreements, forest management plans, annual operating plans and ground rules, as well as during regular reviews within the company and by government agencies. Forest management plans typically include a description of the values to be managed – such as timber, wildlife and water quality – and the yardsticks or “indicators” that will be used to monitor change in those values over time. More recently, additional reviews have occurred during integrated resource planning, stakeholder consultations and third-party audits and certification programs. The results of such assessments are incorporated into all the relevant elements of the management system. Rather than a single, linear cycle, the process is actually a continual series of overlapping cycles, evaluations and feedback loops.

In 1999 the fifth Forest Management Plan revision (1961, 1966, 1977, 1986, 1991, 1999) was prepared using data based on Alberta Vegetation Inventory. The planning process had now become extremely comprehensive and highly integrated throughout the company, as well as with people in government, other companies and contractors, and the various public stakeholders. The following table (Table 2) outlines how the plan components have changed over the years, following the advances in philosophy,

knowledge and technology. This evolution of objectives reflects the gain in knowledge of both the resource and society's needs.

11.5 THE 1999 FOREST MANAGEMENT PLAN

Integration of resources and values, and the results of public input were brought together in the 1999 forest management plan. It was a remarkable document, reflecting the great diversity of interests that must be identified, evaluated and integrated into the plan. Two of the most striking features were its commitment to achieve Sustainable Forest Management and the extent to which public participation had assisted in defining values and goals. Also, Weldwood was the first Alberta company to place its complete plan on its website (www.hintonforestry.weldwood.com) for public review and comment.

This plan reflected three major influences in the decade leading up to it:

1. The 1991 fmp included a commitment to develop an “integrated resource management plan” for the next plan submission. This commitment was loosely defined; therefore it enabled considerable innovation in approach, along with some challenges to consolidate a common vision of what the plan would encompass and how it should be prepared.
2. Early in the planning process, the company decided – based on emerging natural disturbance research at Foothills Model Forest – to adopt a “coarse filter” approach to biodiversity management and conservation. Significant work under researcher Dr. David Andison focused on defining the “range of natural variability (RNV)” for the fire origin forests of the model forest. There were prior and ongoing efforts to develop habitat suitability indices (HIS) and habitat supply availability (HSA) which then became the “fine filter” check against the “coarse filter” outcomes.
3. The Forest Resources Advisory Group (FRAG) was a major influence in pushing for biodiversity conservation as a key element in the new forest management plan.

At the end of the day, a forest management plan is really a consolidation of the knowledge of where we are with regard to values and activities impacting them, and providing direction on where we wish to go in the ensuing decade. This is not always - or often – accomplished through a jump shift but rather in a coordinated series of small steps.

The 1999 forest management plan included a unique feature not found in earlier plans, or in most plans submitted by others in Canada. This feature was a series of 103 footnoted “commitments” which refer to specific and measurable undertakings of the Company in implementing the elements of the plan. Upon approval of the plan, the joint Company/government Integrated Resource Management Steering Committee (IRMSC) adjusted its focus from defining the commitments to the delivery and reporting of them.

TABLE 11-2 FOREST MANAGEMENT PLAN OBJECTIVES 1961-1999

Objective	1961 plan	1966 rev.	1977 rev.	1986 rev.	1991 rev.	1999 plan	Comments
1. Sustain in Perpetuity annual coniferous yield from FMA	X	X	X	X	X	X	1986, 1991, 1999 plans added intent to increase AAC through better management
2. Prepare plan to harvest FMA during a single rotation, logically and systematically	X	X	X	X			1991 plan moved away from traditional view of "rotation"
3. Remove overmature timber as soon as possible	X	X	X	X	X	X	1986 plan added "replace with vigorous regeneration to increase AAC" 1991 plan reworded as "Improve stand vigour" 1999 plan balances oldest first with other considerations
4. Normalize forest in even distribution by 20 year age group	X	X					Little difference from #2, dropped in 1977
5. Maintain uniform haul distance within each W.C. and FMA between cutting cycles			X	X	X	X	Relates to #2 1991 plan: Schedule balanced operations, uniform haul still an objective 1999 plan: Year round supply of fresh timber. Working Circles dropped in favour of 2 sustained yield units.
6. Manage forest so a variety of other uses may be accommodated, simultaneously or sequentially				X	X	X	First introduction of integrated resource management as an objective in 1986.
7. Commitment to Sustainable Forest Management						X	Environmental, social and economic sustainability. Added biodiversity objectives and quantified forestry, wildlife and hydrologic objectives.

This plan also set the stage for enhanced forest management (EFM) by establishing non-timber “boundaries” and assessment methodologies. Within those bounds, the Company could now focus on providing timber opportunities.

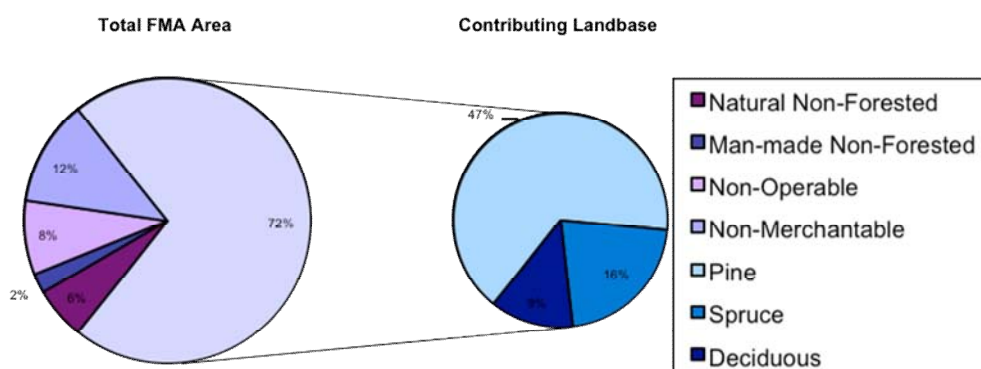
The Forest Management Area is illustrated in Map 1. For the 1999 FMP the area was divided into two forests instead of the previous five compartments. The Forests were named in 1997 in recognition of the two notable pioneer foresters, Des Crossley and Reg Loomis.

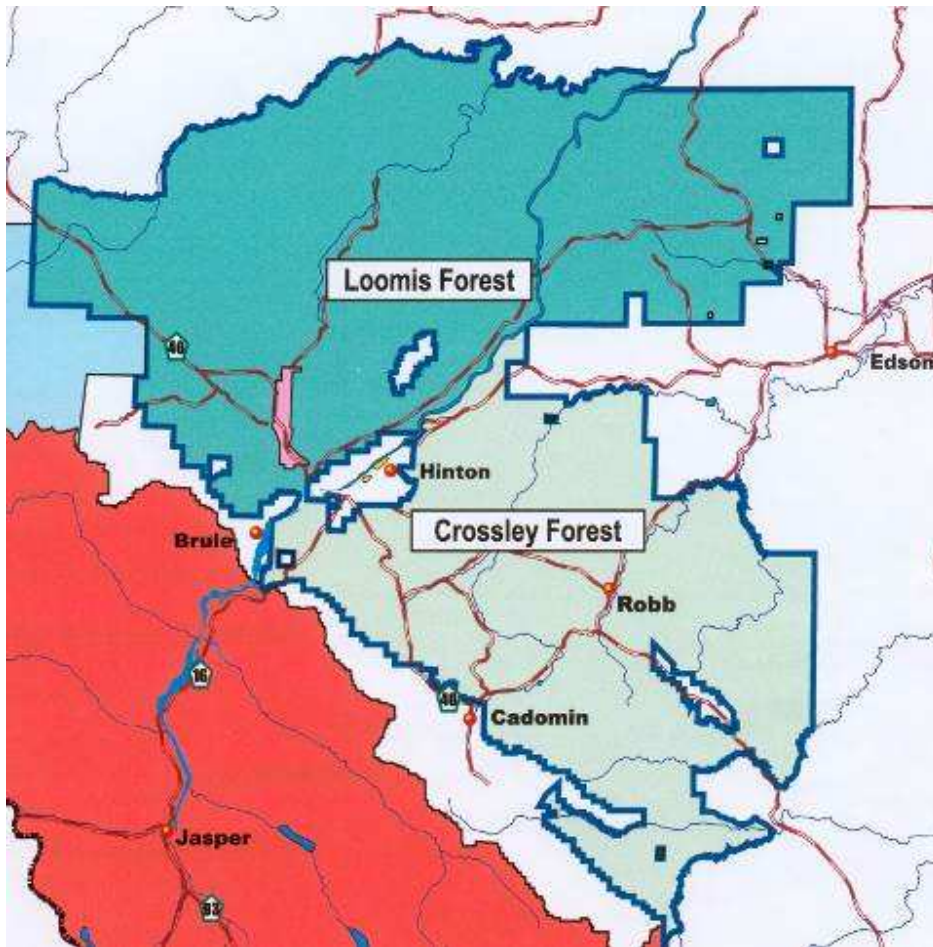
Integrating multiple uses and values has had a major impact on forest management. Out of the 1,038,564 hectares within the perimeters of the agreement area in 2000, only about 715,000 hectares were considered “contributing landbase”—the economically useful and available forest area contributing to the annual allowable cut.

About 33,000 hectares had been withdrawn for purposes such as townsites, parks and protected areas, coalmines and other leased or freehold lands, and another 6,000 hectares were covered by water. This left about one million hectares in the company-managed area. About 940,000 hectares of this area was forested, although about 130,000 hectares were not considered “contributing” due to factors such as unsatisfactory site productivity, lowland black spruce stands and steep slopes.

Environmental, industrial and social considerations removed another 95,000 hectares. Buffer zones to protect watersheds, totalling about 53,000 hectares, accounted for the largest single reduction in the “contributing” landbase. Oil and gas industry activity ranked second, with 6,000 hectares for facilities and pipelines, and 16,000 hectares for seismic lines. Roads—including those built for the oil and gas industry as well as forestry—were the third biggest factor, totalling more than 15,000 hectares. The other 28,000 hectares of withdrawals were due to a wide variety of environmental and social factors, from recreation to wildlife habitat to aesthetics. (Figure 6)

FIGURE 11-6 TOTAL AND NET AREAS OF THE FMA, SHOWING (SMALL CIRCLE) THE DISTRIBUTION OF VOLUME BY SPECIES WITHIN THE 72% MERCHANTABLE AND OPERABLE AREA.





Map 11-1 The Weldwood FMA, renamed in Honour of Pioneering Foresters 1997

Figure 7 illustrates the general flow of elements of the sustainable forest management system with its feedback loop for adaptive management. It also identifies many of the inventories, studies and analyses for the diverse values that were considered. There were ten structural elements to the closed-loop planning cycle. The following review follows that sequence, highlighting the features and commitments of each.

FIGURE 11-7 1999 FOREST MANAGEMENT PLAN FOR SUSTAINABLE FOREST MANAGEMENT: STRUCTURAL ELEMENTS AND CLOSED-LOOP FEEDBACK CYCLE



1999 FMP PHILOSOPHY

The general theme of the 1999 Forest Management Plan (FMP) was described in a number of philosophical opening statements. These included a mission statement and stewardship policies.

Forest Resource Mission Statement (1996)

The Forest Resource Department will continually improve, by working together with their employees, contractors, customers, suppliers and the public, to:

1. achieve world leadership in sustainable forest management and stewardship.
2. create maximum value from the forest and purchased fibre resources, to provide opportunities for the growth of business.
3. provide globally competitive product value by supplying high grade quality products to customers at a competitive cost.

The Company's Forest Stewardship Policy involves accepting corporate responsibility for the full scope of forest resource management with all of its economic, biological, ecological and social components.

Weldwood's environmental stewardship policy states:

Weldwood is committed to be a leader in the responsible stewardship of the environment. Our Company strives to minimize the environmental impacts of our operations in a manner responsive to the needs of our employees, our customers, the communities in which we operate, and the public. We are dedicated to sustainable forestry and continuously improving our environmental performance.

Associated principles guide the Company to:

- Ensure that harvested areas are reforested in a timely manner to site-specific standards and that activities foster a sustainable healthy new forest that supports a diversity of species.
- Manage forest ecosystems entrusted to the Company for multiple use and values that include timber, biological diversity, watershed protection, wildlife and aquatic habitat, recreation and aesthetics.
- Manage the forest and manufacturing operations to protect the quality of air, water and soil resources that constitute the environment.
- Encourage and are open and responsible to, community views and questions about the Company and activities.
- Ensure that the planning, forestry and manufacturing activities provide economic activity and employment now and in the future.

It is interesting that for the first time certification is specifically mentioned:

Certification is a tool used by Weldwood to provide internal and external assurance that its forest management activities and systems are consistent with regional, national and international sustainable forest management initiatives. Certification provides assurance to external stakeholders of the Company's willingness to be evaluated by an external body and of their commitment to sustainable forest management initiatives.

Three forms of certification were described. First was *ForestCare* -- the audit program developed by member companies of the Alberta Forest Products Association to help protect the environment and sustain the many values of the forest. Each of the two mills, pulp and sawmill, and Woodlands had to separately seek certification; all were successful in their first application in 1996. All three passed re-certification audits in 1999.

Second was the International Organization for Standardization (ISO) that developed the ISO 14001 standard for evaluating environmental management systems. This standard was a result of ISO's commitment to support the objective of sustainable development identified at the United Nations Conference on Environment and Development (UNCED) in 1992. The Company implemented an environmental management system. The forest management system was certified in March 2000 under ISO 14001.

Third was the Canadian Standards Association that developed a sustainable forest management standard in 1996. It incorporated the framework of SFM criteria developed by the Canadian Council of Forest Ministers in 1995 as part of a sustainable forest management system including public participation. It is notable that the Company structured the goals of the 1999 FMP to conform to the CCFM classification of criteria. The Company passed a certification audit in 2000 to become the first Alberta company to achieve the CSA/SFM status.

1999 FMP GOALS

Goals are statements of general purpose that express desired states or conditions that have support from the Company and associated stakeholders. As explained in the FMP, the overriding goal in management of the forest resource over the Weldwood FMA was sustainable forest management. The goals identified in this plan were developed in consultation with the public and in discussions with FRAG. The list of goals follows.

1. Conserve biological diversity.
 - a. Conserve species diversity.
 - b. Conserve genetic diversity within species.
 - c. Identify and protect important natural resource values.
 - d. Retain a diversity of forest ecosystems across the landscape and through time.
2. Conserve forest ecosystem condition and productivity.
 - a. Conserve ecosystem productivity, including composition, structure and function.
 - b. Preserve the FMA land base allocated for timber management.
3. Conservation of soil and water.
 - a. Protect water quality.
 - b. Keep changes of quantity and timing of water within reasonable limits.
 - c. Maintain or enhance soil productivity.
4. Maintain contribution to global ecological cycles.
 - a. Ensure that contribution of the forest to carbon sequestering is maintained.
5. Multiple benefits to society.
 - b. Minimize the short-term visual impacts of timber management and identify
 - c. priority areas of high visual sensitivity.
 - d. Restore the long-term visual quality of the forest landscape.
 - e. Assure access to the forest for consumptive and non-consumptive resource uses.
 - f. Provide recreational opportunities on the FMA.
 - g. Have a sustained supply of timber for wood products.
 - h. Maintain long-term economic viability of the enterprise.
 - i. Avoid endangering human life and property as a result of forest management
 - j. activities.
 - k. Balance the management and use of timber and other resources.
 - l. Coordinate industrial/commercial activities, minimizing conflicts between them.
 - m. Minimize impact of other commercial users to forest values

6. Sustainable development.

- a. Identify and protect important cultural and heritage resource values.
- b. Have a national and international reputation for good stewardship of the forest resource.
- c. Maintain a planning process that enables adaptive forest management.
- d. Ensure key resource management policy decisions are made in a timely, open and equitable manner.
- e. Increase awareness of Sustainable Forest Management through communications.

INVENTORIES AND STUDIES

Inventories are an essential first step in forest management planning. They provide the knowledge and data about resources and values that influence management decisions. After forty years at Hinton the Company had accumulated a wealth of data as a result of visionary surveys begun right from the start. Many additional surveys and studies were added in the meantime, including several new ones to meet the complex needs of planning for sustainable forest management. This complexity stems from a number of factors

1. increasing knowledge in growth and yield (regenerated and fire origin stands) demands site-specific forecasting
2. large areas of reforested stands (and immature fire origin stands) which require specific and detailed information
3. management plans must incorporate a variety of forest values
4. increasingly precise information on forest and tree characteristics is critical to the success of the new pulpmill and sawmill
5. inventories must be spatially referenced and stored in the Company's Geographic Information System

The collection of inventories for sustainable forest management was a formidable task, and went far beyond the scope and content of previous inventories designed for sustainable timber supplies and forest management. The Company spent over \$2 millions on forest inventories for 1999 FMP, plus about \$1 millions on wildlife and fisheries inventories (See Table 3).

RESOURCE ANALYSES

The Resource Analyses were printed in Volume 2 of the FMP. They described resource inventories and associated resource projections for hydrologic, aesthetic and timber resources. Biodiversity was also considered a 'resource' that was analyzed using a combination "coarse filter" and "fine filter" approach.

The Analysis Report contained the following four components:

Timber Resources

The Alberta Vegetation Inventory (AVI)/timber assessment was the foundation of both the biodiversity and timber analysis. Description of the current landscape and forecasting of future landscapes was conducted using the AVI inventory. A timber supply model (Woodstock) was used to project future landscape scenarios. From these landscape scenarios, the Recommended Landscape Forecast was identified.

Biodiversity

Biodiversity was assessed using AVI information. Coarse filter assessments addressed seral representation of ecosystems derived from the landscape forecasts with those associated with the natural range of variability. Fine filter assessments addressed the availability of habitat for various species using Habitat Suitability Index models and specific strategies for species of particular interest, such as caribou, grizzly bear and the Pinto Creek mountain goats.

Hydrologic Resources

Hydrological assessment was conducted for the 143 basins within the FMA. The analysis was limited to the first three decades of the plan. Of the 143 basins, 131 (92%) were predicted to be within 'acceptable' levels of impact. Twelve basins scored as 'potential concern' for either fish habitat or stream morphology. Special management consideration was directed to these areas.

Aesthetics

Aesthetic values were inventoried and accounted for in the landscape forecasts.

These resource analyses were conducted to assess outputs for both timber and non-timber resource values, and generally followed the steps outlined in Figure 8. The idea is to use the inventory and yield data in a forecasting model -- in this case the Woodstock Forest Modelling System -- to project what would happen over time by following a variety of scenarios. The outputs are evaluated against the forest management goals, refined and re-run to try to come as close as possible to the desired ends.

TABLE 11-3 THE COMPLEXITY OF INVENTORIES FOR SUSTAINABLE FOREST MANAGEMENT

1960 forest management plan: "sustained-yield forest management"	1999 forest management plan: "sustainable forest management"
<p><i>Forest inventories</i> (for calculation of sustainable AAC)</p> <ul style="list-style-type: none"> Permanent sample plots (Continuous Forest Inventory) Inventory listing all forest types, based on the Continuous Forest Inventory Age classes of the forest 	<p><i>Forest Inventories</i> (for calculation of sustainable AAC)</p> <ul style="list-style-type: none"> Permanent Growth Sample plots Inventory of forest types based on Alberta Vegetation Inventory Age classes of the forest Regenerated stand inventory Ecological site classification
<p>Additional Inventories for the 1999 Forest Management Plan- Sustainable Forest Management</p>	
<p>Visual landscape inventory</p> <ul style="list-style-type: none"> ➤ Basis for developing "visual quality objectives" (similar to B.C. visual landscape inventory) 	
<p>Cultural/historic inventory</p> <ul style="list-style-type: none"> Basis for protecting sites of unique historic or cultural value 	
<p>Seral Stage/ Forest Type classification</p> <ul style="list-style-type: none"> Basis for "Natural Forest Management" program Basis for broad scale/ coarse filter habitat supply 	
<p>Riparian corridor inventory</p> <p>Basis for special management zones</p> <ul style="list-style-type: none"> ➤ Physical landform (active channel, floodplain, terrace, fluvial slopes, etc.) ➤ Site sensitivity (high, medium, low) ➤ Management access ➤ Management history pre-1956 ➤ Basis for appropriate silviculture design 	
<p>Regional Hydrology Study</p> <ul style="list-style-type: none"> ➤ Catchment basin hydrologic characteristics ➤ Hydrologic "triggers" – i.e. threshold limits of management activities ➤ Hydrologic operations manual (Foothills Model Forest) 	
<p>Fish and Stream Inventory</p> <ul style="list-style-type: none"> ➤ Identify streams with fishery management concerns ➤ Primary use for operational planning 	
<p>Wildlife Inventory</p> <ul style="list-style-type: none"> ➤ Species grouping of 153 habitat-related species into 17 "habitat associations" ➤ 30 representative species selected for habitat supply analysis spanning all 17 groupings ➤ Development of Habitat Suitability Index (HIS) models for 18 species linked to habitat associations ➤ Preparation of habitat inventory from Alberta Vegetation Inventory (AVI) ➤ Habitat yield and change forecasting ➤ Habitat supply analysis models (Critter-cruncher, Wild-weasel, Tribble) 	

LANDSCAPE FORECASTS

As explained earlier, the present forest resulted from a combination of the two major forces of growth and succession on one hand, and disturbances such as fire and harvesting on the other. The result has been a mosaic of forest communities of different ages (seral stages), plant communities and sizes of stands.

Using computer-based “models” such as the Woodstock Forest Modelling System it is possible to reasonably predict what the present forest would look like in, say, 20, 40, 100 or 200 years from now if it was just allowed to grow. In the model, each age class would continue to grow older and its appearance would be changed accordingly in the successive projections through to old age.

But disturbances in these forests are necessary to maintain biodiversity. Different species of plants and animals need different combinations of light and forest cover to provide conditions in which they may live and grow. For example, some need full sunlight, others shade; some need openings, others closed-canopy forests; and birds and mammals move around so they also need a variety of conditions throughout their life cycles. For example, moose need young age stands with willow and other browse for feeding, quiet sheltered areas for calving, and dense forest for hiding. These combinations of necessary forest conditions are referred to as “habitat.”

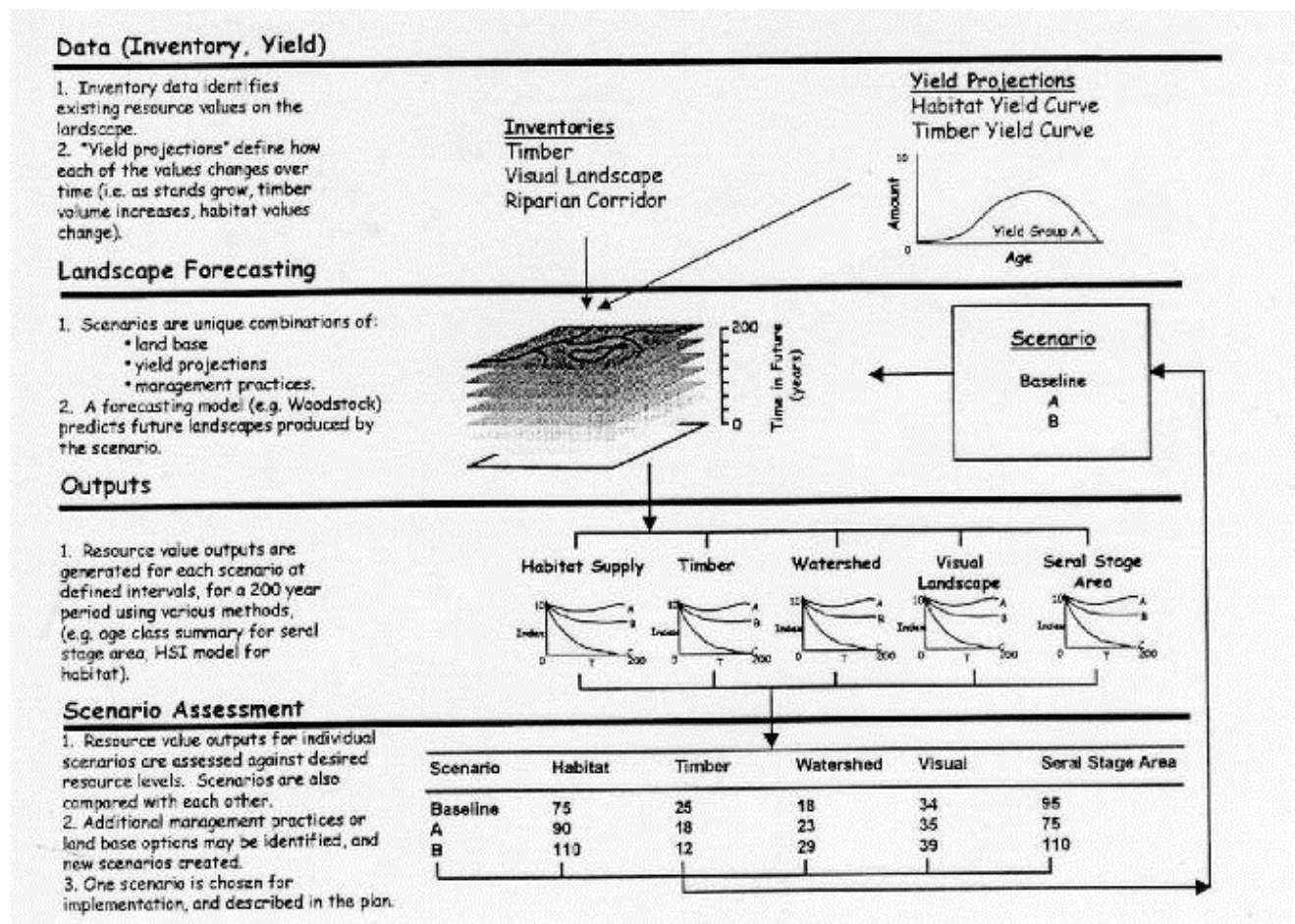


FIGURE 11-8 RESOURCE ANALYSIS PROCESS⁴⁰⁸

One of the most notable series of studies was to try to relate needs of wildlife to various combinations of forest conditions. This was done through a habitat supply analysis, a program started in 1988. As outlined by biologist Rick Bonar and his colleagues in 1990:⁴⁰⁹

The original goal of the habitat-modelling program was to develop analysis tools to predict a future habitat supply, using a method that was integrated with timber supply analysis. Species were selected for modelling because they are in demand for consumptive or non-consumptive human use (e.g. moose, American marten), because they were believed to have ecological importance (e.g. pileated woodpecker, snowshoe hare), or because they are species at risk and there is a concern that a coarse-filter strategy may not conserve the species (e.g. barred owl, fisher).

To select species for habitat modelling, species groupings and selection were used to evaluate 289 terrestrial vertebrate species known or thought to occur on the FMA. Each of 153 species associated with forest habitat was grouped into one of 17 habitat associations, based on the association that represented the best habitat for the species. Thirty species were selected to represent the species allocated to each of 16 terrestrial associations (Figure 9 species habitat associations).

Species selection criteria were used to evaluate individual species. The original species selection process was based on an assumption that a successful habitat conservation strategy for the 30 selected species would also serve as a coarse filter strategy that would conserve the entire vertebrate species assemblage, and, by inference, all biological diversity on the FMA.

By using these relationships, habitat conditions could be deduced from forest conditions predicted by the forest modelling system. Similar relationships are being developed for hydrology, stream habitat and aesthetic qualities.

In the past, fire was the major cause of disturbances. Today, the objective is to try to substitute planned harvesting for fire as the major disturbance. Fire and logging are not the same processes. The results of 40 years of harvesting have demonstrated that forests may recover from logging and fire along different successional pathways. However, characteristics of both tend to converge in about 20 to 40 years, after which time it is often difficult to discern significant differences in terms of ecological services between harvested and fire originated forests. However, there is still much to learn from the effects of fire. Another notable series of studies, conducted through the Foothills Model Forest, is the Natural Disturbance Project.⁴¹⁰

Continuous representation of major forest types and seral stages within a Range of Natural Variation (RNV) was the main goal of the coarse filter component of the biodiversity conservation strategy. The assumption was that maintaining representation within RNV at a variety of scales, and maintaining variability of representation, would conserve biodiversity and the ecological integrity of the FMA landbase.

Management Emphasis Species (Fine Filter)	Habitat Associations																
	Non-forest				Riparian		Immature Age 25-60 Height 8-16 m			Mature Age 50-150 Height >16 m			Old Age >90 Height >16 m				
	Water/Aquatic	Grass/Forb	Upland Shrub/Sapling	Edge	Riparian Shrubland	Riparian Forested	Coniferous	Mixedwood	Deciduous	Coniferous	Coniferous Leading	Deciduous Leading	Deciduous	Coniferous	Coniferous Leading	Deciduous Leading	Deciduous
American marten					■	○	○		■	■	○		■	■	○		
Barred owl						○	○	○	○	■	■	○	○	■	■	○	
Beaver		■	■	■	■		○	■		○	■	■		○	■	■	
Black bear	○	○	■	■	■	○	■	■	○	○	■	■	○	○	■	■	
Boreal owl						○	○	○	○								
Brown creeper					■				■	■	○		■	■	○		
Clay-colored sparrow		■	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
Common yellowthroat	■	○		■													
Elk	■	○	■	○	○				■	○	○	■		○	■	■	
Fisher					○	○	○	○	■	■	○		■	■	○		
Golden-crowned kinglet						○	○		■	■	○		■	■	○		
Great gray owl		○	■	○	○					○	■	■		○	■	■	
Great horned owl	○	○	■	○						○	■	■	○	○	■	■	
Grizzly bear	○	○	■	■	■	○	○	○	○	○	○	○	○	○	○	○	
Hairy woodpecker					○				○	■	■	■	○	■	■	■	
Hermil thrush			■	○	○	■	■	■									
Hoary bat	○	○	■	○					○					○			
Long-toed salamander	■	○		■	■	○	○	○	○	○	○	○	○	○	○	○	
Mink	■			○	■												
Moose		○	■	○	○		○	○			○	○		○	■	■	
Mule deer	○	○	■	○	○	○	○	○	○	○	○		○	■	■		
Northern flying squirrel					■	○	○	○	○	■	■	○	○	■	■	○	
Northern goshawk						○	■	■	○	○	■	■	○	○	■	■	
Ovenbird							○	■		○	■	■			○	○	
Pileated woodpecker					■	○	○	○	○	■	■	■	■	■	■	■	
Red squirrel					○	○	○		■	○	○		■	○	○		
Ruffed grouse							■	■		○	■	■		○	■	■	
Savannah sparrow	■																

FIGURE 11-9. WILDLIFE SPECIES AND HABITAT ASSOCIATIONS, 1999 FOREST MANAGEMENT PLAN

Landscape Forecasts were made using the Woodstock model. The results of different scenarios for forest harvesting can be projected on the basis of age classes, stand sizes and shapes, and post-harvest plant species over time. These can then be compared to the representation of these elements in their historic ranges of occurrence as defined through the natural disturbance research series. In most cases, species groups were forecasted to remain within their historic ranges of natural variability, but some cases, e.g. old seral stage spruce, the presence was forecasted to exceed this natural range due to the lack of expected disturbance in non-contributing areas. See Figure 10.

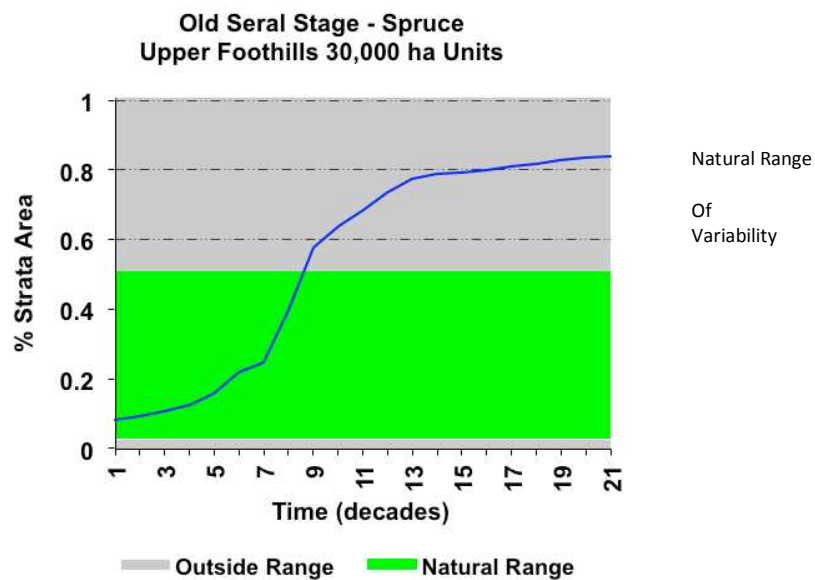


FIGURE 11-10 FORECASTED PROPORTION OF OLD GROWTH SPRUCE ON THE FMA OVER A 200 YEAR PERIOD

Also, by comparing these results to habitat needs, projections of the probable effects on wildlife species can be made. For example, Figure 11 shows the proportion of age classes (seral stage) that would result over time for a variety of species in the three major forest regions. In this illustration, 'pole-sized' pine stands show an increase in proportion. Interestingly, the proportion of 'old' forest also increases in pine and spruce over time during this first 18-year cycle. The influence of these changes is reflected in the habitat quality composition (Figure 12) in a 2-3-pass scenario for six selected indicator species. Some of these are increasing, some declining, but all changing in response to the changing conditions.

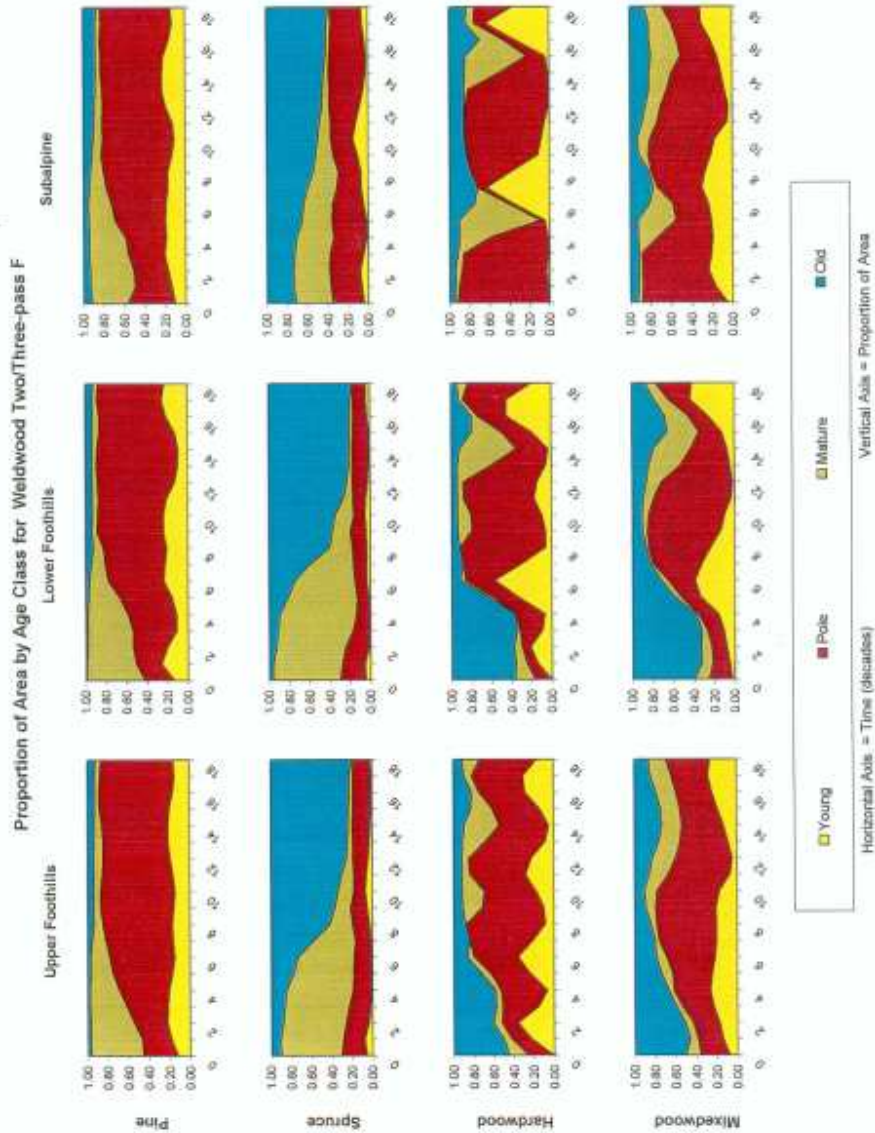


Figure 4-9. Distribution of seral stage area by strata for Weldwood Two/Three-pass.

June, 1999

FIGURE 11-11 DISTRIBUTION OF SERAL STAGE AREA BY STRATA, LFS TWO/THREE-PASS.⁴¹¹

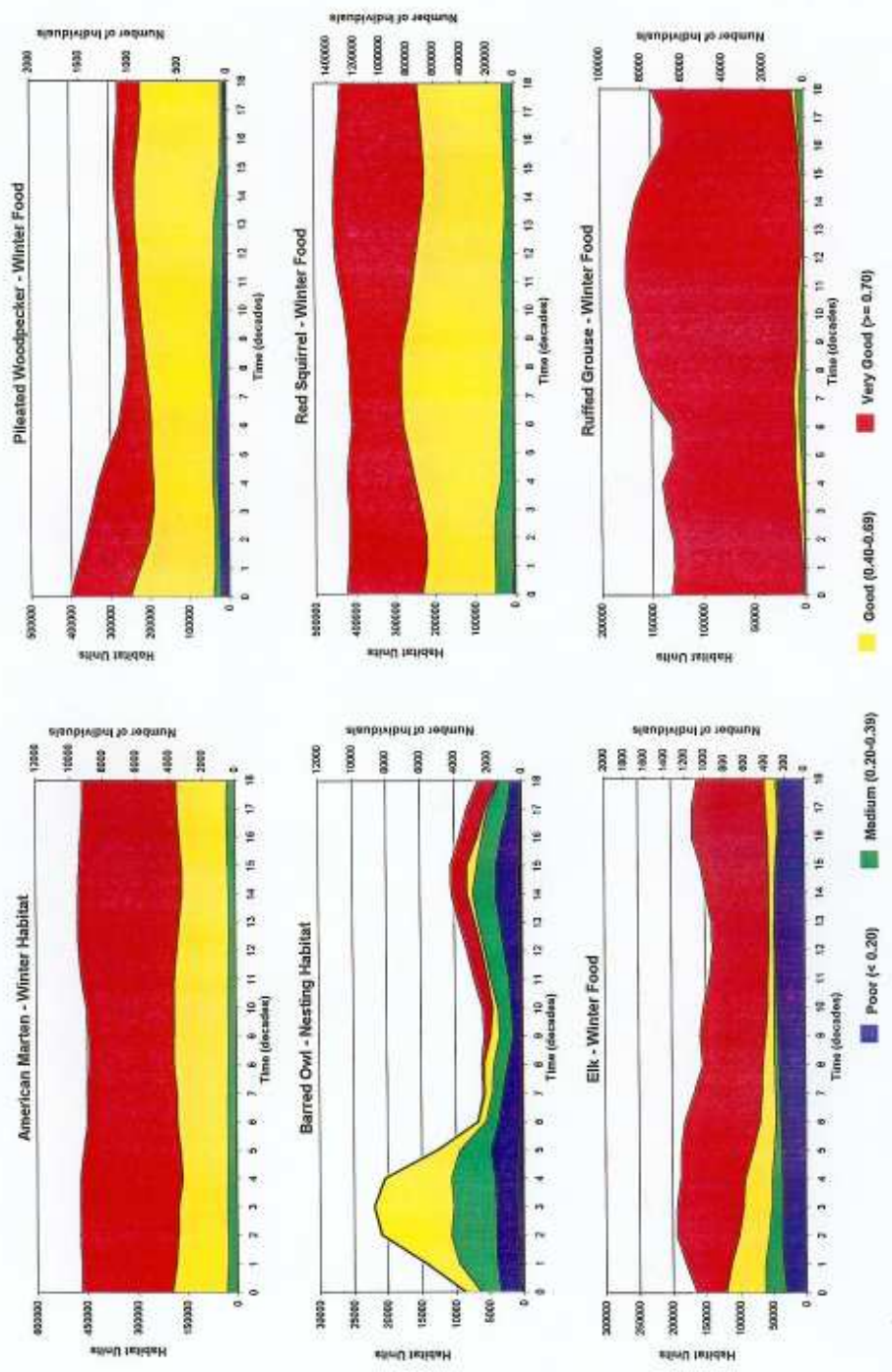


Figure 4-15. Habitat quality composition, Weldwood Two-Three-pass scenario.

June, 1999

4-46

FIGURE 11-12 HABITAT QUALITY COMPOSITION, WELDWOOD TWO/THREE-PASS SCENARIO.⁴¹²

ANALYSIS OUTPUTS – AND COMMITMENTS

The outputs of modelling included projections of wood production and AAC, aspects of biodiversity conservation, habitat supply, watershed quality, landscape aesthetics and seral stage areas. These were applied in the next planning step.

Scenario Assessment and Choosing

The scenario that best meets the goals can be selected from among the various projections. Several candidate scenarios may be evaluated, modified and re-run to try to obtain the best possible fit. Public participation at this stage is also a part of the process to provide perspective and represent public interests.

To address particular or site-specific concerns, one option is to establish special ‘zones’ within which to tailor different management opportunities. These special zones may affect the land base allocation to wood production and, in turn, result in a reduction of AAC. These represent part of the trade-offs between environment and economy that are inherent in sustainable forest management. However, using this approach helps to focus on the more specific needs of the zones and enables tailor-made strategies to be created.

Strategies

Once the preferred scenario has been chosen, more specific management strategies may be developed to achieve the intended results.

The “meat” of the 1999 plan was the series of nine strategies and 44 related values, along with the 97 specific and measurable commitments to be undertaken to achieve the goals set forward in the plan (Table 4). These described in varying levels of detail the activities the Company planned to undertake during the term of the plan relating to management of the FMA. These ranged from physical activities on the FMA, to research aimed at better understanding the values present on the landscape. All the activities stemmed from the identified goals with many directly or indirectly related to more than one goal.

In preparing the strategies, Lougheed noted two primary interests – sustaining the *in situ* values on the FMA, and sustaining the timber values that support the Company’s mills and surrounding communities. To meet these interests for example, strategies for biodiversity conservation must be accompanied by enhanced management strategies to achieve sustainable forest management.

TABLE 11-4 SUMMARY OF COMMITMENTS IN THE 1999 FOREST MANAGEMENT PLAN

Strategy Grouping	Values	Commitments
Mission, Sustainable Forest Management, Stewardship		7
Environment	4	15
Biodiversity	3	19
Access	2	6
Timber	12	16
Forest Renewal	8	6
Enhanced Silviculture	6	15
Forest Protection	2	5
Other Uses	7	11
Communication and Education		4
Total	44	104

1. Environment

The long-term ability of the FMA to sustain forest and other resources, such as fish and wildlife populations, is dependent on the regional environment that includes water, soil and air. Ultimately, all organisms are dependent on these resources for their survival. The following describes Weldwood's strategies to conserve natural environment values (water, landforms, soils and air) on the FMA.

Intent: To maintain the air and water quality in the FMA; to conserve the inherent productivity of the region's soils and conserve unique landforms.

Strategies and commitments were noted with respect to four identified values - water, landforms, soils and air quality.

a. Water

Watershed protection was recognized as a high priority under the 1984 Eastern Slopes policy. The 1999 fmp included, for the first time in Alberta a hydrologic assessment procedure to assess the impact of changes on the landscape to three values: stream geomorphology, fish habitat and infrastructure.

Roads can also have a significant impact on water quality, especially where they cross watercourses. An inventory of watercourse crossings was initiated in 1995. A remediation program was directed to any crossing that was creating or had the potential to create problems. A watercourse corridor inventory completed in 1996 to study and map the watercourse/flood plain/terrace/fluvial slope complex, and the

report defined areas by degree of sensitivity to harvest operations. High sensitivity areas were not considered available for timber harvest while medium and low sensitivity areas were made available with specified operating constraints. These areas were also given special attention within the 1996 harvest planning and operating ground rules.

b. Landforms

Landforms were mapped early in the history of the FMA. These have been of great value in operational aspects such as forest renewal, forest harvesting and road construction. The FMA contains unique natural landforms including: sandstone hoodoos, glacial erratics, cliffs, talus slopes, waterfalls and mineral deposits. Many of these special features receive heavy recreational use so the Company proactively addressed conservation of many of these unique sites through unilateral decisions to reserve them from timber management activity. Most of these have been incorporated into the Company's 'Special Places in the Forest' program and the province's Special Places 2000 program.

c. Soils

Maintaining or enhancing the inherent capacity of the soil to grow vegetation is central to forest management, and was fundamental in Weldwood's commitment to forest stewardship. Soils protection was incorporated into all aspects of the Company's forest management practices, from timber harvesting to silviculture. Strategies to enhance soil or maintenance of soil quality included the ecological classification that was completed for all compartments before developing the operating plan. This information was used in planning to identify preliminary harvesting and silvicultural treatments that were appropriate for the site and soil conditions. Before harvest, a Pre-harvest Assessment (PHA) was conducted in all blocks to provide detailed site and soils information. It was used to confirm that scheduled harvesting and silviculture treatments were appropriate for the conditions. The operating ground rules contained additional guidelines.

d. Air

With respect to air quality, the FMP recognized that forest growth and protection sequesters carbon that reduces the atmospheric CO₂ associated with climate change. Emissions from fires and fossil fuels increase atmospheric carbon levels, and other emissions associated with human activity can act as pollutants when deposited on land or water. Strategies to help to minimize the negative impacts included:

- Partnership in a Foothills Model Forest (FMF) program to evaluate carbon budgets for the FMF landbase. The Company was also a founding partner in the West Central Alberta Regional Airshed Society, initiated in 1994, to address air quality issues in the region.
- Weldwood reduced the need to burn residue piles by increasing use of stumpside delimiting and residue spreading in harvest blocks.
- Prompt forest renewal positively contributes to the carbon balance for the FMA landbase. Weldwood's policy of prompt reforestation, the ability to better match silvicultural prescriptions to the ecological characteristics of sites, and the improved quality of nursery stock has resulted in discernible improvements in stand establishment and growth.

- To contribute to carbon sequestering, the Company identifies, reclaims and reforests abandoned dispositions and areas that were once SR (Satisfactorily Restocked) but have now become NSR because of brush competition.

2. Biodiversity

Ecosystems are defined as the interactions of plants, animals, and microorganisms with climatic and physical factors in their environment (CCFM, 1995). In the broadest sense, Bunnell⁴¹³ defined biodiversity as the ‘variability of living organisms’ in ecosystems. Assessment of biodiversity should occur through time and across the landscape at various scales. The CCFM⁴¹⁴ recognized three important elements of biodiversity: ecosystem diversity, species diversity and genetic diversity.

Weldwood addressed biodiversity conservation primarily at the ecosystem and species levels, with specific genetic issues included. A Biodiversity Conservation Strategy was underway through the Integrated Resource Management Steering Committee (IRMSC).

Intent: The Company proposed to use a coarse filter approach to biodiversity conservation to focus on approximating natural (historical) variation in ecological processes and patterns at several scales from landscapes to individual ecosystem elements. Concurrently, it would use a fine filter analysis to demonstrate that providing ecological habitats, for the most part, results in acceptable conservation for individual species of interest.

Specific strategies and techniques were developed to consider biodiversity on an ecosystem basis, and also considering individual species including those threatened or at risk, and strategies related to genetic conservation.

a. Ecosystem Biodiversity

The plan assessed ecosystem biodiversity at three scales:

- Landscape-scale (30,000 ha+)
- Meso-scale (Operating compartment 100’s to 1000’s of hectares)
- Stand-scale (One ha to several hundred)

Landscape-scale

The plan used a coarse-filter approach to ensure future landscapes and their ecosystem/seral stage representation fell within the historic range of presence on the landscape. This analysis was at the Natural Subregion scale. For this purpose, the FMA was divided into Natural Disturbance Units of approximately 30,000 ha each, which provided an excellent context within which to compare alternative management scenarios.

Meso-scale

At this scale, the Company stated its intention to continue to pursue adapting its practices to more closely approximate the pattern of natural disturbance events at a compartment level. Of particular interest was research at the model forest looking into such things as variability in patch size, influences of soils and landscape features on patterns and sizes, and the behaviour of natural disturbances in riparian corridors.

Stand-scale

Stand-level practices would evolve over time, supported by research, from the conventional two-pass clearcut system to one more closely approximating the structure and processes resulting from natural disturbances. This would include investigations and adaptation in such areas as remnant islands, structure retention, variable patch size, etc.

b. Species Biodiversity

The FMA, at the transition zone between two continental biophysical regions, has a rich diversity of species, 318 vertebrates in all. Of these, seven terrestrial vertebrates and two fish species were listed as of “special concern.” In almost 50 years of operation, all known species continued their presence on the FMA.

The “coarse filter” approach assumes that representative seral stages will sustain the majority of species in a region, but the Company implemented a “fine filter” approach to ensure this assumption was being realized in results. This approach included two elements – habitat supply analysis and specific actions designed to conserve site-specific habitats and species. The latter included specific conservation strategies for seven species: Woodland caribou, mountain goat, grizzly bear, trumpeter swan, northern long-eared bat, Columbia spotted frog, and the black-throated green warbler.

c. Genetic Biodiversity

The plan noted that, with the possible exception of the Pinto Creek goat herd, there was little cause for concern regarding loss of genetic biodiversity in wildlife species. Also, it was continuing investigations into the relationship between tree improvement programs and potential loss of genetic diversity in tree species.

3. Access

The road network within the FMA is essential for conducting all types of forest management activities, from harvesting to reforestation, stand tending and fire control. The network of roads also provides access to the area for other commercial and non-commercial users.

Under the FMA, Weldwood had the right to construct and maintain access for timber management purposes. Timber management includes harvesting, reforestation, tending and protection. Two key issues that affect the short and long-term success of the Hinton operations are: ensuring fibre is provided to the mills year-round (requiring summer access), and maintaining adequate access for fire protection.

Intent: To ensure roads are planned, constructed and utilized in a manner that is safe and economically efficient while minimizing impact on the environment.

a. Road Development

Weldwood required an extensive network of permanent roads that provide access to the FMA, in five classes ranging from permanent mainline roads accessing broad geographic areas to temporary summer or winter within-block roads.

Planning road development must take into account economic, safety and environmental considerations, along with coordinated development opportunities with other resource industries.

The public generally has had unrestricted access to permanent roads except where safety, security or other resource values are of concern. Currently, access development and management issues were addressed in an *ad hoc* fashion through several regulatory processes. Direction regarding integrated use were potentially to be provided in provincial Integrated Resource Plan (IRP) Access Management Plans. Environmental impacts associated with road development are addressed through such legislation as the federal Navigable Waters Act, the Canada Fisheries Act and Alberta's Water Act (1999). Operationally, Weldwood's Harvest Planning and Operating Ground Rules defined road planning and construction standards.

b. Road Management

The management of a permanent road network exceeding 4,000 km in 1999, and increasing yearly by almost 100 km was a challenging task. The plan noted the following road management objectives:

- minimize entry of sediments into watercourses and water bodies
- maintain unrestricted passage of fish
- ensure safe use of all roadways

To accomplish the objective of watershed and fisheries conservation, Weldwood developed a road management plan and related database. The plan was to be incorporated into the Linked Planning Process via revisions to the Harvest Planning and Operating Ground Rules. A key component of this plan was a database describing necessary information about road location and condition. This database would be used to provide road status reports for use in the Road Management Plan. The watercourse crossing inventory and to some degree the fish and stream inventory would be consolidated wherever possible into the more comprehensive roads database.

On the safety side, considerable efforts were noted in the area of road design and employee, public and contractor safety programs.

4. Timber and Allowable Annual Cut

In 1999 the FMA provided about 70% of the fibre requirements for the Hinton processing facilities. Mill production, both in terms of quality and quantity, is sensitive to the freshness of the fibre. This requirement translated into year-round deliveries of freshly harvested timber to the mills so it was a primary consideration in the timber harvest and haul program.

Intent: To harvest and deliver timber, year-round, in an efficient, effective manner using practices that minimize the impact on fish, wildlife, water, soil and air resources.

The Resource Analysis described the technical detail of the Annual Allowable Cut (AAC) calculation and underlying assumptions. The AAC was calculated in the Resource Analysis to be 1,936,067 m³/year for coniferous, and 151,823 m³/year for deciduous. The deciduous AAC was calculated as an average of the 20-year harvest.

a. Inventory

Wood supply calculations are based on inventories and projections of growth and yield. The several inventories used in planning have been mentioned. The initial growth and yield program centred on the extensive network of permanent growth sample (PGS) plots, the data from which have proved to be invaluable. An inventory strategic plan was in preparation which would consider:

- procedures to upgrade management inventories to operational inventories
- development of regenerated stand inventories that better forecast future conditions, and
- outline annual update procedures for harvest activity.

b. Growth and Yield

A growth and yield strategic plan was nearing completion to identify growth and yield products and information needs, and how the Company could best address them. The growth and yield strategic plan included five components:

- data capture and management –programs to collect the data needed to develop the models and predictive systems to support the following components:
- site productivity – to estimate the productivity of natural and regenerated stands on the FMA, with the priority being regenerated stands;
- yield projection – to predict the yield of existing and future stands on the FMA;
- silviculture support –to help evaluate silvicultural options and incorporate results into timber supply analyses and other planning activities – including predictions of wood quality and quantity for existing and future stands;
- log profile models –to predict log quantity and quality in existing and future stands) species, diameter, taper, length and grade).

c. Harvest Priorities and Compartment Scheduling

Up to and including the 1991 FMP, AAC was calculated for each of five Working Circles, then added to show total harvest. The 1999 plan broke the FMA into two sustained yield management units – the Crossley Forest and the Loomis Forest, each with its own AAC. This increased the options for sequencing of harvests to accommodate the multiplicity of requirements such as for year-round operations, constant haul distance, meeting specific mill and market needs and fulfilling SFM objectives.

Some of the strategies that were used to help meet objectives that are impacted by harvest priorities included:

Scheduling the oldest Compartments first to help improve overall forest productivity levels since older stands are generally slower growing. The older, less vigorous stands also tend to be more susceptible to insect and disease damage. The oldest Compartment first rule must be balanced by additional considerations.

Selecting and sequencing Compartments that allowed the Company to balance the average haul distance provided stable haul costs over time.

Weldwood also intended to supply half its total volume from summer-accessed Compartments. This ensured year-round employment for its Company and contractor harvest crews and for log haulers, and met the mill requirements for fresh timber.

To provide a consistent supply of timber to Weldwood's mills, wood quality had also to be considered in development of a harvest sequence, and these factors would be incorporated over time.

d. Harvest Design

Appropriate harvest block design is critical for ensuring that many of the objectives identified in higher order plans are successfully implemented on the ground. The design must accommodate other resource values (e.g. aesthetics, wildlife) and must protect any significant resource features (e.g., cultural sites, mineral licks) as well as ensure that the Harvest Planning and Operating Ground Rules requirements are being met.

Opportunities also exist for utilizing harvest design to help reduce the risk of catastrophic fire losses. In areas considered at high risk for fire, implementation of harvest patterns that could reduce susceptibility to fire spread would be pursued.

Although the traditional two-pass system with green-up restrictions was shown to have produced no evident undesirable effects in 40 years, the plan noted that it might need adjustment. In some cases, it might be necessary to alter the proportions of timber harvested in each pass or use additional passes or alternative harvesting methods to accommodate other, specific management objectives. For instance:

- A relatively shorter interval between passes would lead to harvest of the entire compartment in a shorter period, leading to less forest fragmentation over the long term
- Three or four-pass systems were being employed where non-timber values were particularly high or very sensitive to disturbance. The effect on the AAC of moving some Compartments from standard two pass to three or four pass systems was accounted for within the timber supply analysis (i.e., Woodstock accounts for two, three and four pass situations).
- Alternative pass systems were considered in Compartments where identified wildlife, hydrologic or aesthetic resource values were an important consideration and where the reduced rate of harvest would contribute to maintaining or enhancing the resource.
- Four-pass systems might be used where aesthetic and hydrological resources were particularly sensitive.
- Another option called "Trickle cuts" was suggested in Compartments considered important caribou habitat (Berland 1 and 16 at the time). In this approach areas would be harvested through lighter cuts over a much longer time than typical two- or four- pass systems – 30 to 40 years instead of 10 to 20. The wood supply from the area would therefore be more of a "trickle" than a surge.

Harvest block size was being increasingly determined by non-timber resource objectives such as wildlife requirements and aesthetic considerations. Weldwood recognized the need to continue this adaptation during the term of the FMP.

e. Harvest Methods and Safety

Harvest methods evolve in response to a combination of forest stewardship, safety, silvicultural and economic factors.

Weldwood employed both company crews and contractors in harvest operations. Table 5 summarizes the harvest systems used on the FMA at the time of the plan preparation.

TABLE 11-5 HARVEST SYSTEMS SUMMARY - 2000

System	Type	%
Feller buncher, grapple skidder, in-block delimiting	tree length	45
Feller processor, grapple skidder	tree length	22
Feller buncher, grapple skidder, roadside delimiting	tree length	10
Feller buncher, in-block topping, grapple skidder, bush chipping	chips	9
Feller processor, clambunk forwarder (can also do shortwood)	tree length	6
Feller processor, shortwood forwarder	shortwood	4
Hand falling, topping, line skidding, roadside delimiting	tree length	4

**SKIDDER WITH
HIGH FLOTATION TIRES
WELDWOOD PHOTO COLLECTION**



Careful selection of logging equipment is important for maintaining site productivity and was allowing Weldwood to operate within a wider range of environmental conditions. For example, over 80% of all skidders used within the FMA had flotation tires to help protect the soil.

The safety aspects of harvesting operations are an important consideration. Over time, Weldwood changed the methods used by the Company’s harvest crews from hand falling to mechanical felling. The Company also encouraged its contractors to make similar changes. Using mechanical harvesters reduces the chance of serious injuries associated with conventional hand falling operations (Figure 13).

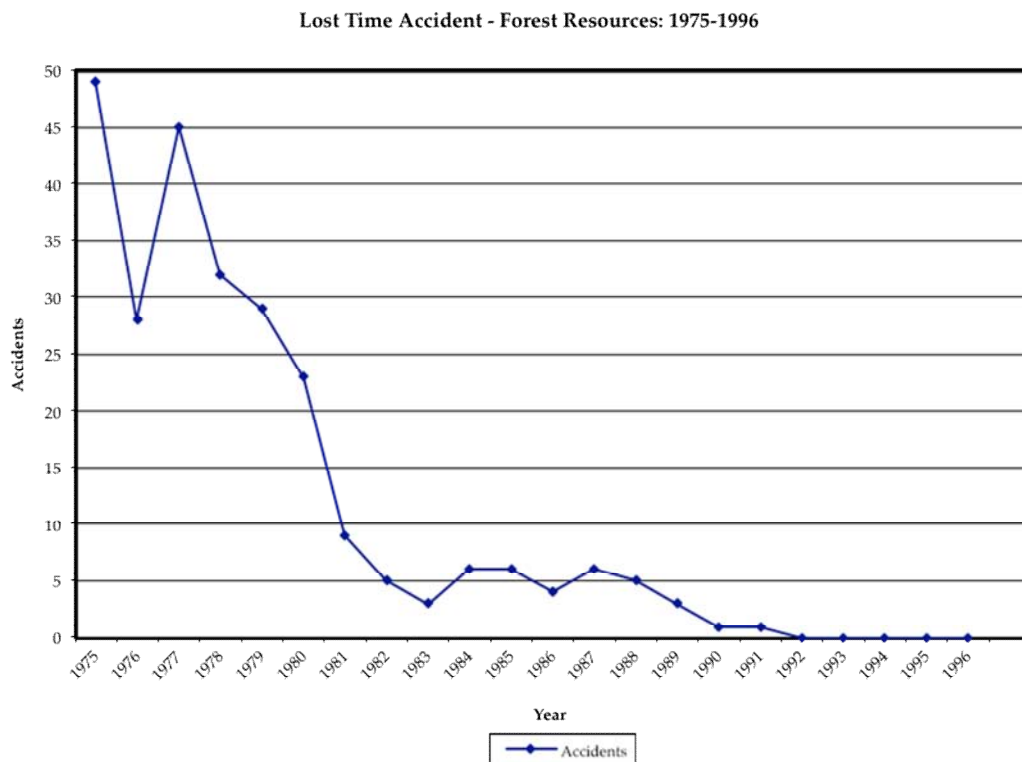


FIGURE 11-13 LOST TIME ACCIDENTS – FOREST RESOURCES 1975-1996.

f. Seasonal Distribution

Weldwood’s Hinton pulp mill required a year round supply of relatively fresh wood. Ideally, no wood entering the mill would be greater than 20 days old. This system also helped reduce wood inventory costs. Harvest planning took this requirement into consideration, ensuring that – annually - one-half of all harvested wood volume was logged in the summer. This required careful planning since many sites within the FMA are not suitable for summer operations.

g. Stand Utilization

All merchantable operable stands which contribute to the 1999 FMP AAC were considered available for harvest. A merchantable coniferous stand was defined as one where the stand:

- was within the merchantable landbase as defined by the FMP,
- was greater than 2 hectares in size, unless isolated,
- had a merchantable volume > 47.5 m³ per hectare, and
- was capable of producing 47.5 m³ per hectare of merchantable volume within 110 years.

The utilization of aspen stands, and aspen growing in mixedwood stands, was noted as a continuing challenge. Over 100,000 metres per year were being developed and marketed in the course of coniferous operations. Aspen growing within riparian special management areas, or on blocks where the volume was less than 100 cubic metres per hectare was not required to be harvested.

h. Tree Utilization

The company, in the plan, changed its coniferous tree utilization from a 13/10 (stump diameter in cm/ top diameter in cm for a minimum 3.66 m log) to a 10/8 standard.

The plan noted the trend towards the retention of standing dead and (potentially) merchantable trees in cutover blocks and committed to developing an operating procedure to formalize the appropriate practice.

i. Monitoring

The plan noted improvements planned for residue and utilization surveys, scaling and cut control to ensure plan assumptions were being addressed and met in practice.

j. Salvage

The plan recognized the risks posed by fire, insects and disease. These were accounted for through direct deductions against the standing green AAC, and the Company had a high vested interest in minimizing this impact. The Company committed to salvaging 95% of annual losses to these agents.

k. Timber Permits

The Company noted its plans for accommodating and supporting the commercial timber permit program on the FMA, established at 8500 metres coniferous, 1500 metres deciduous under the terms of the Forest Management Agreement. The Company does the reforestation on such harvest areas.

5. Forest Renewal

Weldwood Hinton Division had a long history of successful reforestation based on sound techniques developed using both science and local expertise. Reforestation techniques pioneered by the Company's first chief forester, Des Crossley, had continuously evolved, incorporating new knowledge to ensure efficient and effective renewal practices.

Renewal of harvested areas is a legislated requirement. Weldwood, however, recognized that the structure and performance of regenerating stands also affects timber supply and achievement of non-timber resource objectives.

Intent: To maintain an ecologically based renewal program that meets and exceeds legislated requirements and sustains timber supply.

a. Pre-harvest Surveys

Planning for successful reforestation requires the integration of both silviculture and harvest planning. This is often difficult because a large number of factors have to be considered to produce a reforestation plan that is biologically sound, environmentally acceptable and economically reasonable. Without a systematic approach, essential elements may be overlooked. The underlying objective was to increase productivity of regenerated stands through application of site-specific silviculture practices.

Since 1997, Weldwood had completed pre-harvest assessments (PHAs) on all blocks planned for harvest. All sites were ecologically classified, providing an effective framework linking harvest and silviculture planning.

b. Silviculture Systems

The silviculture system employed for each cutblock was based on the ecological characteristics of the site, the current health, structure, and species composition of the stand, the ecological characteristics of the tree species to be regenerated, and the operational feasibility and economic viability of the proposed regime throughout the life of the stand. Because most of the FMA is comprised of fire-origin, even-aged, “pioneer” stands, the predominant silviculture system was clearcutting. To mitigate impact on non-timber resource values, this system was implemented using a two-pass strategy, although in areas with high resource values, three or four pass strategies might be employed. Insights gained through the Natural Disturbance program indicated that some variance from this pattern might be desirable to meet biodiversity objectives (e.g., patch retention).

Harvesting methods must support the silviculture treatment. For example, stumpside processing may be required to leave lodgepole pine cones on site to provide seed for natural regeneration. Conversely, roadside processing may be required where potential excessive slash loading may impede planting.

c. Regeneration Methods

Site preparation followed by natural regeneration, planting or a combination of these methods was commonly used on the FMA. Regeneration treatments usually commenced within one year of harvest.

The plan noted that site preparation was completed on over 6,000 hectares annually.

d. Pre-treatment Surveys

Prior to initiating any silviculture treatments on harvested blocks a Management Opportunity Survey was conducted. The Survey ensured the proposed silviculture tactic was still appropriate, and that site-specific plans were developed. Specific treatments were amended as required through the Compartment Operating Plan and Annual Operating Plan process.

A variety of regeneration methods were in use, based on species mixes and sub-region types. A list of the most common is summarized in Table 6.

Yield Group	Natural Subregion ¹	Regeneration Methods
Mixed Spruce	SA	Disk trench and plant with approximately 1,600 sph white spruce.
	UF/LF	Donaren mound (excavator mound on wetter sites) and plant with 1,600 (less rich sites) to 2,200 (nutrient rich sites) ² sph white spruce.
Black Spruce/Larch	SA/ UF/LF	Excavator mound (Donaren mound on drier sites) and plant 1,800 to 2,000 sph black spruce and/or lodgepole pine.
Aspen	UF/LF	Natural regeneration to aspen.
Other Hardwood	SA/UF/LF	As per Aspen.
Aspen/Softwood	SA/UF/LF	Natural regeneration to aspen with option to site prepare and fill plant with up to 2,000 sph of white spruce.
Other Hardwood/Softwood	SA/UF/LF	As per Aspen/Softwood.
Pine	SA/UF	On drier less rich sites, drag scarify and leave for natural lodgepole pine regeneration. On rich, moist sites, Donaren mound and plant 2,000 sph of white spruce or lodgepole pine. Intermediate sites are drag scarified for natural lodgepole pine regeneration and fill planted with 1,000 sph white spruce.
	LF	As per SA/UF, except threshold for Donaren mounding occurs at lower nutrient regimes.
Pine/Black Spruce	SA/ UF/LF	On drier sites drag scarify and leave for natural lodgepole pine and black spruce regeneration (may be supplemented by planting 800 to 1,200 sph lodgepole pine or black spruce). On wetter sites, Donaren mound (or excavator mound) and plant with 1,200 to 1,800 sph lodgepole pine or black spruce.
Pine/Fir	SA/ UF/LF	Donaren mound and plant 1,800 to 2,000 sph white spruce on the richer, moister sites. On drier, more nutrient poor sites, drag scarify and leave for natural lodgepole pine regeneration, supplemented with planting of 800 to 1,800 sph lodgepole pine if appropriate.
Pine/Hardwood	SA/ UF/LF	Donaren mound and plant 1,200 to 2,200 sph lodgepole pine (less rich sites) or white spruce (nutrient rich sites). On drier, more nutrient poor sites, drag scarify and plant to lodgepole pine.
Pine/White Spruce	SA/ UF/LF	As per pine/fir.
Spruce/Hardwood	SA/ UF/LF	Donaren mound (disk trench on drier sites) and plant 1,800 to 2,200 sph white spruce.
White Spruce/Pine	SA/ UF/LF	Donaren mound the wetter, more nutrient rich sites and plant 1,800 to 2,000 sph white spruce. On the drier sites, disk trench or drag scarify and plant 1,200 to 1,800 sph lodgepole pine and/or white spruce.
White Spruce	SA	Donaren mound (excavator mound the wettest sites) and plant 1,800 to 2,200 sph white spruce. On the drier sites, disk trench or drag scarify and plant 1,800 to 2,200 sph lodgepole pine.
	UF/LF	Donaren mound (excavator mound the wettest sites) and plant 1,800 to 2,200 sph white spruce. On the drier sites, disks trench and plant 1,800 to 2,200 sph lodgepole pine.
Fir	SA/ UF/LF	As per White Spruce.

¹ – Prescriptions for alternative harvest systems, such as shelterwood and group selection are made on a site-specific basis.

² – Range of density reflects presence of advanced regeneration, anticipated natural ingress and expected survival depending on site moisture, nutrient and competition conditions.

³ - (SA – Subalpine, LF – Lower Foothills, UF – Upper Foothills; sph – stems per hectare)

TABLE 11-6 SUMMARY OF COMMON REGENERATION METHODS¹ DESCRIBED ON THE BASIS OF YIELD GROUPS.⁴¹⁵

e. Evaluation of Regeneration Success

Provincial regulations require that harvested blocks be surveyed to determine whether or not they meet reforestation standards. This standard ensures both regeneration and growth targets are achieved on coniferous, deciduous and mixedwood areas. Specifications assessed include stocking, species, height and free-to-grow requirements. Allowance is made for reduced standards on wet sites and at high elevations.

Reforestation standards were under review at the time of plan preparation. The intent of the review was to develop standards that were ecologically based, reflecting the growth potential of sites encountered within the FMA and the management regimes applied to these sites, as outlined in the FMP. The revised standards would provide the ability to directly link regenerated stand performance and FMP regenerated growth and yield assumptions.

f. Stand Maintenance

Competition from grass, shrub and hardwood tree species was noted as a concern. Stand tending, either through manual or chemical control of competing vegetation on conifer and mixedwood harvest blocks was an integral part of Weldwood's forest renewal program. Approximately 15 per cent of the area harvested required tending to ensure legislated stocking standards and FMP yield assumptions were met. Under legislation, tending was a Company's responsibility on all areas harvested after March 1, 1991.

Almost all competition control carried out on the Hinton FMA had been conducted using manual techniques such as mechanical brushing and stem girdling. These techniques are appropriate for the control of brush and hardwood species, but the potential need for chemicals to control grass competition and operational trials was noted, and trials were underway.

g. Silviculture Record Keeping and Reporting

Weldwood noted problems with its current record-keeping system and efforts underway to change over to a GIS-based system for internal use.

h. Tree Seed

The Company maintained sufficient seed supply to meet reforestation requirements. In any given year, Weldwood collected between 100 and 500 hectolitres of coniferous seed cones primarily from wild stands. Additional tree seed was procured through the seed orchard and tree improvement programs. Cone production in white and black spruce is cyclical, influencing the volume of cones collected in any given year. Lodgepole pine cones are available on a more consistent basis.

To ensure that the tree seed used was of the correct origin, species and quality, the procedures outlined in "A Forest Tree Seed Manual" (1993) were used for all collections. Seed transfer guidelines limit the geographic area to which seed can be transferred (e.g., within natural sub-region, similar elevation).

Silvicultural Site Preparation Equipment in use Late 20th Century



Donaren Moulder



Disc Trencher



Excavator Mounding on Wet Sites



Deep Duff Blading for Planting – Wet Sites



Shark-fin Barrels and Chain Scarification



Site Prep for Planting with Craig-Simpson Ripper Plough

6. Enhanced Silviculture

Enhanced silviculture refers to silviculture treatments that exceed those required by legislation. The goal of these treatments is to provide an incremental increase to the allowable annual cut and to offset AAC reductions that arise from landbase reductions or non-optimal (from a timber perspective) management strategies. It includes activities that increase merchantable volume growth, as well as activities that increase the merchantable landbase. During the term of the 1999 FMP, Weldwood proposed to develop an Enhanced Forest Management program to support an increased AAC. This would include yield projections based on enhanced silviculture initiatives such as tree improvement, pre-commercial thinning, commercial thinning and fertilization for use in the 2008 Forest Management Plan.

Intent: To maximize the return of silviculture investment thereby reducing wood costs while sustaining or improving the quality of the resource and to manage forests in a manner that creates opportunities for business growth.

a. Tree Improvement

Opportunities to increase yields may be realized through tree improvement, pre-commercial thinning, commercial thinning, fertilizing and reclamation.

The plan outlined tree improvement programs to be implemented to enhance growth and yield from plantations, contributing to increased AAC, while sustaining wood quality and disease resistance, and to guarantee seed supply for planting stock both now and in the future. These included elements such as selection of superior trees, progeny testing, and seed orchard establishment (seed or clonal).

b. Pre-Commercial Thinning

The ability of lodgepole pine to regenerate and survive in excessively dense stands is legendary. Excessive stand densities can reduce average stand height, average stand diameter and total merchantable volume, and in extreme cases, cause stagnation. Pre-commercial thinning can increase merchantable yields in young stands by accelerating stand development. The Company estimated, based on literature review and analysis, that that pre-commercial thinning could improve merchantable yields by up to 30% in dense fire origin stands and up to 100 % or more in excessively dense fire origin stands and stated that an operational spacing program would commence in 2000, focusing on regenerating stands 3 to 6 m in height with densities above 10,000 stems per hectare.

c. Commercial Thinning

Commercial thinning can increase volume production by capturing mortality that otherwise would be lost. A lack of long-term local data hampered Weldwood's ability to reliably estimate increases to merchantable and total volume obtained through commercial thinning treatments. But preliminary interpretations based on literature review, European data and expert opinion were positive. One estimate on high productivity sites suggested that commercial thinning could produce an incremental 50 to 100 cubic meters per hectare.

During the term of the FMP Weldwood would begin operational trials to develop expertise in operational commercial thinning. Development and implementation of an operational commercial thinning program was scheduled for 2008.

d. Fertilizing

Forest fertilization can increase both total and merchantable yields. However, despite documentation from work in other areas, the limitation to implementing an operational fertilization program is the ability to predict stand response to fertilization. The Company was developing a trial fertilization program, using ecological classification for ranking candidate stand response to treatment.

e. Reclamation Program

The Company was planning rehabilitation and reforestation of several smaller sites including well sites, roads and gravel pits returned to the FMA, reforested areas that are no longer sufficiently restocked due to excessive brush competition (approximately 1500 hectares), and reforested areas burned by wildfire.

f. Growth and Yield of Enhanced Treatments

The Company committed to develop yield functions for enhanced forest management in time for the 2008 plan, on its own and through participation in the Foothills Growth and Yield Association.

7. Forest Protection

Protecting the timber resource against damaging agents is a major challenge yet is it crucial to sustaining the forest resource. A catastrophic wildfire or infestation can destroy vast tracts of timber, including young regenerating stands and high value plantations, critical wildlife habitat, and industrial and recreational infrastructure. A well-developed protection program includes prevention, detection and control strategies to reduce risk of occurrence and minimize the impact of occurrences.

Intent: To limit the average annual burn due to wildfires on the FMA by preventing fires where possible and containing and extinguishing fires once they are started. The Company will work cooperatively with other agencies to monitor and suppress insect and disease epidemics and infestations before they become uncontrollable.

a. Fire

The original forests on the FMA developed under conditions dominated by wildfires, burning on the average every 50 years. Losses were charged directly against the AAC for the year in which the damage occurs.

Weldwood had a Fire Control Agreement with the Province that identified the Company's fire prevention and control commitments. The Agreement outlined:

- the responsibility the Company had for informing its employees regarding current fire hazard conditions and corresponding presuppression readiness;
- the Company's right to request and administer closure of Company roads within the FMA during periods of high fire hazard.

In 1998 Weldwood became a partner in the Hinton Wildland Urban Fire Interface initiative. This provincial initiative is aimed at reducing the risk of wildfires threatening urban areas as well as the occurrence and spread of wildfires originating from urban sources. The Hinton-based program represented one of three provincial pilot programs. The program included risk definition, fuel modification and education components.

Abatement of hazards associated with harvest residues (slash) is generally achieved by utilizing appropriate harvest techniques. The Hazard Abatement Policy called for yearly inspection of harvested areas by LFS and Weldwood staff to determine those blocks requiring hazard reduction (i.e., those blocks with greater than 11 tonnes per hectare of fine fuels).

Careful planning of harvest and reforestation activities can help reduce the risk associated with wildfire. Weldwood proposed to use fire growth modelling as a tool to identify compartments at high risk for wildfire and would revise compartment schedules accordingly. Opportunities to utilize harvest design to help reduce the risk of catastrophic fire losses were noted. In areas considered at high risk for fire, implementation of harvest patterns that could reduce susceptibility to fire spread would be investigated and, if effective, implemented on an operational basis.

b. Insects and Disease

Insect and disease have not posed serious threats to the Hinton FMA, although Mountain pine beetle was noted as a growing concern, particularly as the forests within and surrounding the FMA continued to age.

Company staff were given training in insect and disease recognition, either through formal education or in-house training sessions. The Canadian Forest Service and LFS were often involved in the in-house sessions. Staff collected samples for verification. Once a problem was identified, the approach to be used for monitoring or control was determined.

Weldwood attempted to salvage all accessible timber damaged by insect and disease outbreaks and was proactive in ensuring that further spread was controlled by timely action.

To reduce potential losses associated with outbreaks, the plan noted that compartment schedules might be adjusted to facilitate harvesting in affected areas.

8. Other Uses

Weldwood was one of many commercial and non-commercial users of the FMA. Management for other users and uses within the FMA is the responsibility of the Province, however, much of the integration of day-to-day activities on the FMA was conducted directly between Weldwood and the other users.

Tourism and recreation are important contributors to the regional economy, as are relatively high levels of commercial oil, gas and mining activity. All these significantly impacted Weldwood's productive landbase. Trapping and grazing are other activities that rely on and impact forest management operations.

Intent: Ensure other commercial and non-commercial uses of the land are considered in the management planning process and provide them with the opportunity to provide input into the process. The Company's preference is to incorporate other uses through modified forest management practices rather than landbase reductions.

a. Tourism

Weldwood noted the importance of commercial operators offering tourism services within the FMA and the need to provide these stakeholders with opportunities for meaningful input into the planning process.

Because the tourism industry is generally dependent on the forest resource (e.g., timber, wildlife, aesthetics, historic and cultural site, natural features, etc.), the strategies associated with these resource values all have implications for the industry.

b. Trapping

The Weldwood FMA contains all or part of 64 Registered Fur Management Areas (RFMA). Within the RFMA, trappers have the right to establish and maintain traplines and any necessary supporting structures (i.e., cabins). Trappers rely on populations of fur bearing wildlife species such as beaver, marten, fisher, fox, wolf, coyote, lynx, weasel, muskrat, mink, wolverine and red squirrel.

Accommodating the needs and interests of the trapping industry has two components:

- avoiding physical conflicts between forestry operations and trapper infrastructure (e.g., cabin locations,
- maintaining habitat to support populations of fur bearing wildlife species.

c. Grazing

Land and Forest Services issued grazing permits within the FMA as the need arose. The Company noted its policy had been to approve these permit applications in those areas where regenerating stands were not threatened, and where no harvesting was scheduled in the short term.

The plan noted that past experience had shown that horse grazing was inappropriate in areas where young forests were in the early stages of regeneration. Inordinate levels of grazing damage had been caused to tree seedlings in areas where grazing had been permitted.

d. Energy

The energy and mining industries were very active in the Weldwood FMA and had a significant impact on the landbase and on forest management planning and operations. All Working Circles in the FMA have been subject to exploration, drilling, pipeline, powerline and facility development.

Over the previous ten years (1988-1998), an average of some 200 applications were received annually. Applications had been on the increase since 1995, with an estimated 400 applications received in 1999. Combined with these permanent dispositions were another 50 geophysical (seismic) exploration programs per year. The FMA had also seen diamond field exploration. Pipeline development also increased in 1996, and was currently double the long-term average of approximately 80 kilometres per year.

Recent additions had increased the total number of producing gas fields, including oil production, to over 30 fields. In some cases very large gas plant facilities had been constructed to capture, process and transport this product. Over 20 large and small plant sites were located within the FMA.



GAS FIELD DEVELOPMENT NORTH OF HINTON, 2004.

BOB UDELL PHOTO

Four major coal mining operations were operating on or adjacent to the FMA: Cardinal River Coals, Gregg River Resources, Luscar Sterco (1977) and Obed Mountain Coal Ltd. (all Luscar companies). All four of these developments represented major land withdrawals from the FMA, with a combined deletion of over 8,000 hectares. A new development, the Cheviot Mine Project, was still in the proposal stage. Luscar Sterco (1977) and Gregg River Mine⁸⁰ were both planning expansions that would further impact up to 1,000 hectares of productive forest land.

Significant areas were disturbed annually by the energy and mining industries, resulting in substantial timber losses. Weldwood employed numerous strategies to address these impacts. The underlying intent of all strategies was to work cooperatively with the energy and mining industries to minimize the extent of disturbance, and to salvage as much damaged timber as possible.

The Company's Land Use group was responsible for liaison with other commercial users with respect to coordination of dispositions (e.g., access planning, mitigation of impacts of dispositions, salvage, etc.). The primary focus was to reduce the area of productive land disturbed, reduce the volume of timber affected by dispositions and obtain merchantable salvage volume.

The Company had two contract log-haul picker-trucks dedicated to the salvage program, providing the mobility and flexibility to obtain over 45,000 m³ per year of salvage material.

⁸⁰ The Gregg River mine closed operations in 2000, citing problems with coal reserves and difficult markets

By encouraging low impact seismic operations, the Company reduced potential timber losses and improves aesthetics. Mining disturbances were negotiated with the mining industry on a project-by-project basis. A cooperative approach was used to coordinate mining development with existing harvest schedules wherever possible. Salvage timber from mining disturbance was obtained and utilized by Weldwood wherever possible.

Weldwood was a key player since 1989, in the development of the current Timber Damage Assessment (TDA) methodology and the current Stand Damage Appraisal Table (SDAT) that was considered the Provincial standard. The SDAT was based on agreed-upon principles that currently recognized three components for compensation:

- the standing timber value,
- transferred future reforestation costs, and
- the long-term AAC effects of timber removal.

By accepting the transferred future reforestation costs, the Company accepted the reforestation responsibility for the dispositions and, once they had been successfully reclaimed, the dispositions were to be returned to the FMA land base. Formal tracking of reclaimed land dispositions was incorporated into the silviculture program.

TDA funding contributed to Weldwood programs aimed at replacing lost fibre and increasing productivity from remaining contributing area, and represented the means to recoup timber damage losses (both standing timber and AAC).

Weldwood was becoming more aggressive in its reclamation program. For example, the former practice of not rehabilitating seismic lines (for fear of reuse damaging the planted stock) had been phased out. Seismic lines were only left open when other stakeholder or management concerns existed. Once disposition operators had completed their reclamation obligations, Weldwood was attempting to ensure the sites were suitably reforested to quickly return them to the productive landbase. Hog fuel was being used as a soil ameliorator to facilitate reclamation of abandoned dispositions, such as gravel pits.

e. Aesthetics

Over the long-term and large-scale, Weldwood noted that, by managing for biodiversity at the landscape level, the long-term health of the aesthetic resource would be maintained, ensuring that a variety of ecosystems and seral stages are present. Weldwood was actively managing change to maintain aesthetic values over the short-term.

A visual landscape inventory of the portions of FMA visible from numbered highways and major river corridors was conducted using British Columbia Ministry of Forests standards, and was being incorporated into the compartment planning process.

In compartments where high value aesthetic resources warrant, Weldwood was using a three or four pass harvest system to minimize aesthetic impacts. This management strategy, however, raised concerns over the long-term health of forests in these areas, and other alternatives were proposed for investigation, including incorporating natural disturbance patterns into the harvest design.

One of the more basic strategies for reducing the impact of the Company's operations on aesthetic resources was to ensure that reforestation occurred quickly and effectively. A second strategy involved an educational component. A public information program would be developed to provide information about the dynamics of visual change.

f. Recreation

Non-commercial recreation use on the FMA was high and increasing steadily, partly due to restrictions on activities in the Provincial and National Parks adjacent to the FMA. Popular recreational activities included sport fishing, hunting, hiking, camping, mountain biking, canoeing, ATV riding, horseback riding, skiing, snowmobiling, wildlife viewing and swimming.

Weldwood had worked cooperatively for many years with local groups to support their recreation initiatives. At the time of plan preparation, the Company was maintaining recreation areas or facilities at Emerson Lakes, Gregg Cabin, Little Sundance Creek, Petite Lake, Willow-Wildhay, Eccles Pond and Obed Lake. Trails maintained included: Bighorn, Canyon Creek, Emerson Lakes, Happy Creek, Pine Management, Spruce Management and Wild Sculpture.

Weldwood had completed an inventory and developed a related database with detailed information regarding recreation facilities and resources (e.g., campgrounds, trails, etc.). The updated information would be included in a revised recreation map for distribution to the public.

Weldwood's long-term recreation strategic plan included:

- continued contact with local recreation groups
- maintenance of selected campgrounds and trails
- assumption of responsibility for camping facilities associated with Forest Recreation Areas
- periodic surveys of the public to identify needs and improve program delivery, and
- production of an Annual Recreation Plan.

Weldwood viewed Forest Recreation Areas as providing opportunities to reduce the volume of random camping within the FMA. Although the Company supported increasing backcountry recreation opportunities on the FMA, there were concerns regarding the increased fire risk associated with this activity.

g. Historic and Cultural Resources

The FMA has a history of land use activities that include native and non-native populations. The legacy of the region's land use history is the presence of numerous significant historic and cultural resources.

Protection of any resource requires appropriate knowledge about the resource. To assist with this, Weldwood would develop a Potential Historic Resources map for the FMA. An inventory of historic and cultural resources was underway, to be updated as additional resources were identified (e.g., through the unique finds program).

9. Communication and Education

In 1999 Weldwood created a new Public Affairs Forester position in the Forest Resource Department. The Company's communication and education programs were targeted at two distinct groups: stakeholders with a vested interest in Weldwood's activities and the general public.

Weldwood's Forest Resources Department had a five-year Public Affairs and Communications Plan (1997-2002), which identified the Company's main goal in relation to communications and summarizes many of the strategies related to communication and education.

Intent: To maintain public involvement in forest operations. To raise the level of understanding of forest stewardship among the general public and be recognized as a leader in forest stewardship within Alberta.

a. Stakeholders

In its communications program the Company noted a number of stakeholders and target audiences, including Company employees, local and provincial governments, commercial and non-commercial users and the general public.

The Company's Forest Resource Advisory Group (FRAG) was then composed of representatives from approximately 20 stakeholder groups, actively involved in the Company's planning and operations. To ensure that FRAG was able to effectively provide input, a fairly sophisticated level of forestry knowledge was often necessary. Weldwood and FRAG both committed the time and resources needed to ensure that the required background knowledge existed to support FRAG's ongoing involvement.

b. General Public

Several strategies to engage and inform the general public were noted, including such things as open houses, newspaper articles and advertisements, tours and speaking engagements.

11.6 PLAN IMPLEMENTATION

SENSITIVITY ANALYSIS

The company examined the impact of variances from assumptions inherent in the final analysis and scenario plan. This was done through a series of Woodstock model runs wherein model inputs were deliberately varied from those expected by the Company. In so doing, the Company was able to characterize the 'risk' and significance of such variances.

LINKED PLANNING PROCESS

The Linked Planning Process was noted as the core of the adaptive management approach Weldwood utilized to establish goals, develop strategies, monitor results, and improve performance. The Process ensured that forest management continued to progress as information gaps were addressed and understanding of forest dynamics became more complete.

Strategic forest management directions are established in the Forest Management Plan. For these broad-level directives to be implemented operationally, however, a series of increasingly detailed plans are required. Arising from the strategies and resource priorities specified in the Development Plans and Compartment Operating Plans, operational tasks are scheduled in the Annual Operating Plans. These

series of plans are the mechanism whereby the strategies for achieving the goals of the FMP are implemented operationally.

The planning framework described above provides a mechanism for translating strategic goals into tactical strategies for implementation. Weldwood also developed an associated monitoring and reporting framework that ensured that the strategies were implemented in a way that achieved the goals in the various levels of planning. Results from a series of monitoring initiatives were reported and compared annually to pre-defined objectives. This monitoring and reporting mechanism provided a continuous assessment framework to measure incremental progress towards long-term goals.

All forest management activities, including all monitoring programs, were reported annually in the Stewardship Report. All activities were described, and accomplishments were compared to planned levels in each program. These include such parameters as areas and volumes harvested, areas site prepared and planted, etc.

STEWARDSHIP REPORT

The Stewardship Report addressed specific forest management goals established by Weldwood. To date, those goals included:

- Areas approved for harvesting (target is three years of harvesting approved)
- Average hauling distance (to be maintained over time)
- Volume harvested (to conform to cut control)
- Timing of reforestation treatments (to occur within same year as harvesting)
- Area burned (target is less than 0.1% of FMA)
- Area of land lost from productive forest landbase (area should be minimized)

These goals reflected Weldwood's commitments from the previous FMP. With approval of the 1999 FMP, new commitments would be established and incorporated into monitoring programs, with the results reported in the Stewardship Report. Specific monitoring programs would be developed to measure the commitments and/or indicators identified in the FMP. Monitoring could be activity based (e.g., number of hectares reforested) or results based (e.g., number of hectares of high value caribou habitat).

These monitoring and reporting protocols were the final link in the Weldwood planning process. They provided the information necessary to compare actual forest structure and growth to that projected in the FMP. Using that information, operational strategies could be altered in order to more fully achieve the goals and objectives of all stakeholders in the Weldwood FMA. Where attainment of objectives was not realized, the subsequent implications for all levels of planning would be evaluated and appropriate actions would be identified and undertaken (e.g., redefining the objective, conducting sensitivity analysis to evaluate the implications to AAC, etc.).

FOOTHILLS MODEL FOREST

As a principle member of the Foothills Model Forest, Weldwood was an active participant in numerous basic and applied research projects that dealt with a wide variety of subjects, including biodiversity monitoring, disturbance processes, fish and wildlife, and socio-economics. Through its participation in the FMF, Weldwood also had access to leading edge and applied research that is relevant to its FMA.

CONTINUAL IMPROVEMENT

The concept of continual improvement is inherent in sustainable forest management. Weldwood has a long history of forest management in the Province of Alberta and is recognized for its continued efforts in improving both the science and the art of forestry. These efforts are the result of three main factors:

1. The availability of information about the resources being managed. Weldwood has materially increased the fund of knowledge about the resources of the FMA through programs such as the AVI, ecological classification, fish and stream inventories, landscape and recreation inventory and Permanent Growth Sample plots.
2. An environment in which to make that information effective in resource management. The Linked Planning Process is instrumental in providing a structure for applying new information into day-to-day resource management and in monitoring the effectiveness of implementation.
3. Research and education initiatives. Acquiring and distributing basic information about FMA resources and, if necessary, providing management interpretations, ensures information is used in management planning and decision making.

The plan noted Weldwood's intent to continue its long tradition of supporting in-house and external resource inventories and research and monitoring programs. The Company would also continue to seek ways for ensuring efficient and effective transfer of this information to its planning programs and its operational forest management practices. By doing so, the Company expected to maintain its position as one of the Province's leading forest management practitioners.

MONITOR AND ADJUST

The final important step in the SFM cycle is to keep track of what is actually happening in the forest. It is essential to continually observe the changes taking place and to evaluate them to ensure that practices are achieving the desired and predicted results. If they are, that provides a measure of learning by the experience, and gives assurance that the approach is on the right track. If the results are not as anticipated, then the practice must be reassessed and adjusted to try to get the desired results. This corrective action also provides a measure of learning more about the forest ecosystem and its management.

Finally, at the end of the planning cycle of five to ten years, the results must be fully reassessed, and all comments re-evaluated and reconsidered -- from the philosophy through goals, inventories, analyses, forecasts, strategies and implementation.

This is adaptive management in application and, as described in the previous sections, the 1999 forest management plan – through the linked planning process, the sensitivity analysis and the tracking of activities and commitments in the annual stewardship report – had a well thought out process to accomplish effective monitoring and adjustment.

CHAPTER 12. REVIEW AND CONCLUSION

By understanding our past, we shape our future

Slogan of the Forest History Society, Durham N.C.

Several ongoing issues continue to influence the Agreement and Forest Management Plans. Policies and strategies will emerge to reduce their potential impacts in the same spirit as past issues have been resolved.

12.1 COSTS OF SUSTAINABLE FOREST MANAGEMENT AND INCREASING RESPONSIBILITY

Sustainable forest management requires consideration of a broader range of values that complicates the forest management planning process. Accommodating these additional values may also result in reduced AACs or, at least, may constrain efforts to fully increase them through silvicultural treatments. The government and the Alberta Forest Products Association committed to sustainable forest management through signing the National Forest Accords of 1993 and 1998. Sustainable forest management was also a tenet of the *ForestCare* program of the Alberta Forest Products Association and of Alberta's *Forest Legacy*. However, it is still necessary to develop an equitable means for sharing the additional costs incurred.

A possible cooperative means to address at least some of the components of sustainable forest management was provided within the 1988 agreement in a so-called "stewardship clause" which states 8(3):

The Company and the minister may enter into an agreement for forest management activities on the forest management area which will define and outline the roles and responsibilities of each party with respect to the planning and operational activities on the forest management area.

This clause was further clarified in the preliminary 2000/01 discussions surrounding a possible Agreement renewal:

The Company and the Minister may enter into an agreement for resource management on the forest management area, which will define and outline the roles, responsibilities and authorities of each party with respect to the planning and implementation of resource management on the forest management area, specifically related to resource values not currently the responsibility of the Company under this Agreement.

In the meantime, at the request of the forest industry, the Canadian Standards Association developed a standard for sustainable forest management⁴¹⁶, and the Company achieved registration of its FMA in 2000. Evidence of commitment to achieving sustainable forest management is an important marketing requirement for forest products.

Fred McDougall⁴¹⁷, former Deputy Minister, also reflected on the ability of the Agreement concept to address such issues as biodiversity and paying the costs of sustainable forest management:

As far as biodiversity is concerned -- I think that has to happen in the forest management planning work that is done, and the Agreements are flexible enough to allow this. They have to be. Public expectations do change over time. They are not static. And as some of our disagreements over the years have shown, there does have to be some change to the forest management system and the incorporation of biodiversity...

The FMA concept is flexible enough to allow those adjustments to take place. You know at some point in time if it got to the point where it was threatening wood supply then a trade-off is going to have to be made. But that trade-off would have to be made in the economy regardless.... So I think it is wrong to blame the tenure system for that. I mean that becomes a public policy debate in its own right and probably can be resolved just as easily under the FMA system as any other and a lot easier than if you had private ownership.

[With respect to costs] I think he who benefits should pay. If you are taking land and managing it for fibre production then I think it is proper and correct that the person utilizing the timber should pay all the costs of that. But if you want to set aside land base in areas for other uses, say songbird production or elk production or whatever, then those people who visit the area to enjoy those resources should pay. One of the challenges to public policy is to define a fair and equitable way for other users to bear their share of those costs. It shouldn't all be dumped on the shoulders of the guy who is utilizing just the fibre.if you want to insist on public ownership of the forest land base, if you want public ownership of forest land that brings with it a certain responsibility and a certain obligation of stewardship. If you are the landowner there is only so much that you can fairly ask the tenant to pick up.... At some point or other either the user (the direct beneficiary of those benefits), or the land owner has to be involved.

12.2 FOREST LAND MANAGEMENT AND CUMULATIVE IMPACTS

When the original FMAs were written it was presupposed that forest harvesting would be the major land use, in fact later designated as the 'prime' use. However, the extensive impact of energy sector, petroleum and coal, had not been anticipated, nor had the greatly increased year-round recreational use with power toboggans and all-terrain vehicles. The cumulative impact of these activities, combined with the backdrop of natural disturbances has become a concern with respect to conservation of biological diversity and aesthetic features. Many of these influences are beyond the authority of the Company to manage. The previous timber damage assessment mechanism has encouraged more cooperation with the energy sector. The Land and Forest Service in 1999 established a new Integrated Resource Planning division to try to develop workable solutions. However, in the meantime, the further influence of provincial authority also became necessary. As Udell commented⁴¹⁸:

Recent concerns about the cumulative impacts of uncontrolled, or at least un-integrated, activities on the landbase have led the Province to embark on a new integrated resource management (IRM) process to address this issue. This approach is:

being prototyped in the North East Slopes Region, with Foothills Model Forest as the heart of the information base for the development of planning tools.

A parallel on-the-ground process is underway by the Alberta Chamber of Resources looking at how the two industries [energy and forestry] can work together to reduce their footprint on the landscape.

12.3 ENVIRONMENTALISM AND MARKETING

The emergence of the environmental movement in the early 1970s served to sound alarms about a host of problems affecting the global ecosystem. Among these are water, soil and air pollution, loss of agricultural soils, forest degradation, endangered species and spaces, and climate change. Some of those whose mission is directed at forests have focussed on such questions as 'old growth', wildlife habitat and forest species diversity, fragmentation, wilderness and forest harvesting influences on soils and watercourses as they affect fisheries habitat.

Actions by the Company, some in anticipation of these very problems, others in response to them, resulted in changes in policies and practices, as have been described. The sum total of ecosystem influences is reflected in the term 'sustainable forest management' (SFM), a commitment to the achievement of which was started as early as 1985 with the advent of the forest wildlife program. The Company reordered its 1999 FMP to reflect the Criteria for SFM that had been developed by the Canadian Council of Forest Ministers, and achieved successful certification under the Alberta Forest Care, ISO 14001 as well as the demanding Canadian Standards Association (CSA) SFM standards. The CSA standard for sustainable forest management incorporated elements of ecology, environment, economics and social values, developed through a technical committee representing a balance of interests including environmental and industry.

However, in Canada and elsewhere, ENGOs continued to express concern about the levels of harvesting in so-called primary and secondary forests -- essentially the only kinds of forests growing in Alberta. A growing concern about forest management activities in the boreal forest was reflected in aggressive campaigns in European and US markets targeting Canadian forest products and producers.

On the local or working level on the Weldwood FMA working relationships were made possible through FRAG with opportunities for exchanges of views and discussion.

12.4 ADAPTIVE FOREST MANAGEMENT AT HINTON -- LOOKING AHEAD

In the early years, the main focus was avoiding the mistakes that had been made elsewhere. Then it moved to creating a science-based forest management, which became known as sustainable forest management in the 1990s. I think we are now moving into a new phase where we focus more on the needs and demands of the end user.

– Jim Lelacheur, 2001

Jim Lelacheur, general manager of forest resources and lumber, offered this observation during a wide-ranging "think tank" discussion among senior managers at Hinton in January 2001. Lelacheur referred specifically to the customers for pulp, lumber and panelboard, who can now choose among a vast array of options, from around the world, to meet their needs for construction materials and print media. With a relatively slow-growing northern forest resource, located 1,000 kilometres from ocean ports, foresters

and mill managers at Hinton will certainly need continued cleverness to remain competitive in terms of cost and quality. This is the bottom line. The revenues from the products are the mainstay of the regional economy and pay the bills for forest management.

The remark also reflects a deeper truth. Forest managers today are making an unprecedented effort to understand the end users of the living forest as well as the end users of the products extracted from it. Socio-economic research by the Foothills Model Forest has already identified a challenging dichotomy among the values of users. People who live and work in forest areas tend to have a “utilitarian” view of the landscape – as a source of goods and services, which can be as varied as wood, jobs, wildlife, recreation, clean air and water, scenery or solitude. On the other hand, the urban population seems to have a more “biocentric” view of the forest ecosystem as a living entity to be nurtured and protected for its inherent qualities.

Both of these visions were already well developed in the period between 1985 and 1995 when politicians, bureaucrats, industry foresters, academic scientists, environmental activists and members of the public debated what would constitute “sustainable forest management.” The definition that was adopted, in Canada and internationally, embraces both of the popular concepts – multiple benefits (utilitarian) and biological integrity (biocentric). In addition, the definition of sustainability includes closely related concepts such as maintaining forest productivity, conserving soil and water resources, contributing to global ecological systems, and fulfilling social responsibilities. It is a complex, interconnected definition for a complex, interconnected task. Communicating this goal, and charting progress toward it, has been a difficult challenge. Yet it is essential that “end users” understand the framework if they are going to support sustainable forest management and make wise decisions affecting our future forests.

Hugh Lougheed, forestry manager for Weldwood at Hinton, was the lead author of the 1999 Forest Management Plan (FMP), the first to be based explicitly on the sustainable forest management framework – one of the first anywhere to quantify the conceptual framework and apply it to a large “working forest.” He noted that there is one significant flaw in the way the framework was presented to the public. Virtually all the documents, including the FMP, started with biological diversity as the first criterion and ended with social responsibility as the last one. “It gives the impression that there is a hierarchy, but in fact all of them are equally important and none can be achieved unless they all are,” he commented. “Sometimes I think we should present them in a different order each time.”

In July 2000, the Hinton forest management area received singular recognition when it became the largest in Canada to be certified for sustainability under demanding standards established by the Canadian Standards Association (CSA). This was the culmination of three years’ preparation and analysis by the company to ensure its systems and performance could meet the CSA criteria. However, this did not mean Hinton foresters and managers could settle back and rest on their laurels. The achievements of 2000 were the direct result of adaptive management over the previous 45 years, and the future would depend on continuing that commitment to ongoing adaptation. The company’s Sustainable Forest Management Plan identified 48 “indicators” that would be monitored to ensure that the goals of management continue to be met.

12.5 LEARNING FROM THE PAST

I am impressed by the Weldwood performance. I noticed numerous occasions where Weldwood had exceeded the standards of practice, had taken the first initiative to address concerns of the environment, adopted more than adequate responses to wildlife, and took aggressive actions in reforestation, safety and silviculture. I appreciate that Weldwood has an open attitude of learning and presents itself as willing to try innovative responses to problems that arise. I believe that Weldwood should 'toot its horn' a little more. The general public has little or no understanding of the work, effort, time and money that is invested to be responsible stewards of the environment.

-- Bill Bulger, 1996

Lutheran minister Bill Bulger, a long-time Hinton resident and member of the Forest Resource Advisory Group (FRAG), wrote the above comment in 1996 after participating in an external audit of Weldwood's Hinton operation for certification under the Alberta Forest Products Association's FORESTCARE Codes of Practice. Beginning in 1990, the company played an active role in developing FORESTCARE as a unique industry initiative for self-monitoring and self-improvement, several years before national and international certification systems began to emerge. The need for dialogue with stakeholders is one of the enduring lessons of the Hinton story. Equally important is the need for continual adaptation to new circumstances.

Looking back on the history, one can see many "forks in the road" where different decisions or actions could have resulted in very different outcomes. At various points, for example, the federal and provincial governments could have sold the foothills forest lands to private owners, but they decided to retain public ownership – to protect watersheds and to reap the benefits of renewable and non-renewable resources, for present and future generations. In establishing forest management agreements, however, Alberta decided boldly to let private companies undertake the responsibility for inventories, planning and reforestation. In the early 1970s, some public opinion in Alberta favoured turning the East Slopes into parks, like Jasper and Banff, but the government opted instead for multiple use and integrated land management.

The people of Alberta, as the owners of the land and its resources, establish the goals for its management. In the 1950s and 1960s, it was assumed that the government spoke for the people; public input was informal or indirect through the political process. The government's principal goal was economic development – Alberta was still very much a "frontier" province, and memories of desperate poverty during the 1930s were still fresh. The particulars of sustained-yield management originated largely from individuals in the Alberta Forest Service rather than from popular demand or grand government policy.

The role of such individuals in this story cannot be underestimated. Reg Loomis and Eric Huestis shaped the government's approach on the basis of their knowledge, experience and beliefs. Likewise, Des Crossley set the company on the progressive course that continued over the decades. Jack Wright, a keen outdoorsman himself, recognized in 1970 that recreation would play an increasingly important part in the company's future sustainability. Jim Clark saw the benefits of working with Aboriginals in the 1970s and of developing a new approach to wildlife in the 1980s. Bob Udell, serving on the province's

expert panel on forest management in 1990, recognized the need for new levels of stewardship to meet demands of public, government and customers. David Presslee enthusiastically revitalized the silviculture program between 1994 and 2000. Hugh Loughheed was one of the architects of the linked planning process. These are a few examples of the scores of committed individuals who made unique contributions based on their experience, professionalism and commitment.

By the late 1980s, it was no longer sufficient to receive public input indirectly through the government. Hinton matured into a modern community, and roads opened up access to the forest management area for both the public and for other industrial and commercial users. The company created a mechanism for direct dialogue with stakeholders through FRAG and its predecessor group. This led to remarkable innovations in the 1996 Operating Ground Rules and the 1999 Forest Management Plan. FRAG helped the company address controversial issues such as the harvest plan for Athabasca 4, an operating compartment near Brule Lake. Foresters gained new insights into their work when they had to explain it to non-professionals, and interested members of the public gained new insights into forestry. The final plan for Athabasca 4, incorporating the results of consultation, was significantly different from the original one.

Exponential increases in knowledge, about this particular landscape and about forestry in general, made it possible to meet the ever-increasing demands for sustainability and multiple use. It was fortuitous that the first mainframe computers became available at the same time the first inventories were conducted, and equally fortuitous that even more powerful personal computers emerged in the 1990s to meet the information-handling needs of sustainable forest management. Basic knowledge, including John Stelfox's wildlife studies and Bob Carman's silvicultural planning systems, allowed later generations of biologists and foresters to understand the basic processes of the ecosystem. Des Crossley's commitment to research, and his close relationship with researchers in the federal and provincial forest services, laid the groundwork for the advanced research of the Foothills Model Forest in the 1990s.

The concrete result of this accumulated knowledge, and its application, was an agreed-upon increase in the annual allowable cut from 1.1 cubic metres per hectare per year in 1960 to 2.7 cubic metres per hectare per year in 2000.

In addition to computers, other technologies utterly transformed both forestry and production. Aerial photography largely eliminated the tedium of on-the-ground timber cruising. The danger and drudgery of logging were reduced dramatically by the introduction of mechanical skidders and feller-bunchers. Today, stumpside harvesters and forwarders have made logging an intellectually challenging assignment in forest stewardship and wood utilization. Mills now produce higher quality, with less pollution, than could be imagined even 20 years ago.

One enduring legacy of forestry at Hinton is the commitment to silviculture, based on the simple yet profound concept that logging should not be seen as the death of a forest stand but rather the birth of a new one. No aspect of the operation better exemplifies the principles of adaptive forest management. Crossley's basic research led to one of the first and best corporate reforestation programs in Canada. Even his earliest efforts had a 75 per cent success in restocking within seven years, and the resulting stands had much better growth rates than those resulting from natural disturbance. Subsequent refinement brought continual improvement in stocking, survival and growth. The "regeneration delay" between harvest and establishment of the new stand has been reduced almost to zero (when year-old seedlings are planted in the same year as harvest).

However, silviculture is not the only defining legacy of forestry at Hinton. Company foresters were also

pioneers in the development and testing of forest policy and forest management systems. The forest management system developed at Hinton, and the inventory and growth and yield systems that provide the foundation for it, are unparalleled in North America, perhaps in the world. These systems provided the framework to link forest growth to economic, social and ecosystem values – the underpinnings of sustainability. Ultimately the legacy is the culmination of many achievements rather than any single achievement.

None of this could happen, of course, if the operation was not economically viable. By setting royalty and tax rates that allowed a competitive return on capital, the government made it possible for the company to continue investing in the mills and forest. The transition to sustainable forest management in the 1990s saw a major increase in the cost of forest management, and the government set aside a portion of stumpage revenues in a special fund (Forest Resource Improvement Program) to assist in resource management initiatives beyond the regulatory requirements. In 1999, spending on “discretionary” items (beyond regulatory requirements) totalled \$3.9 million, including more than \$2 million for enhanced silviculture trials and the tree improvement program. During the 1990s, the company’s total forest management spending at Hinton soared from less than \$2 million annually in 1991 and 1992 to more than \$10 million in 1999. The big-ticket items in 1999 were inventory, growth and yield studies (\$1.2 million) and the normal silviculture program (\$5.1 million) plus a smaller amount for management and planning (\$100,000).

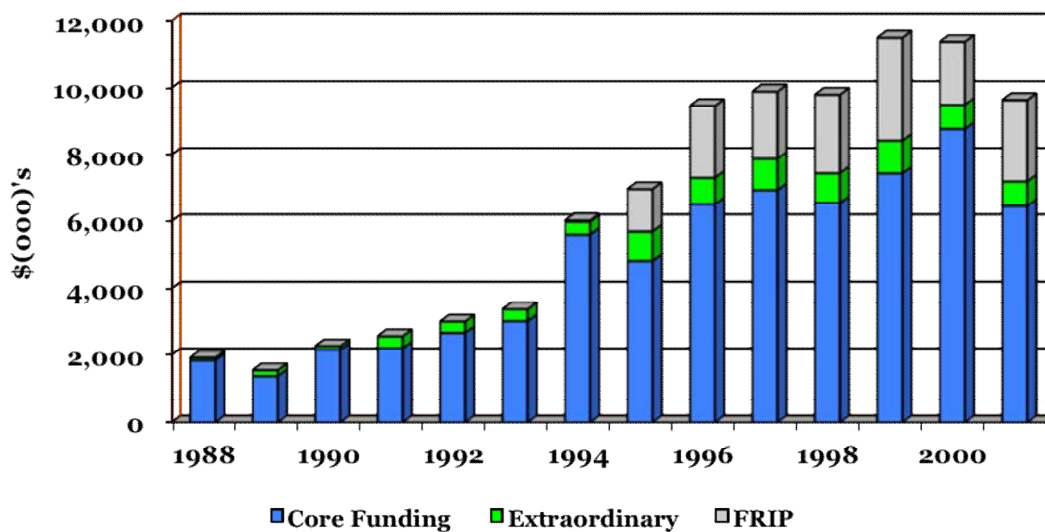


FIGURE 12-1 TOTAL ANNUAL FOREST MANAGEMENT EXPENDITURES 1988-91

12.6 PREPARING FOR THE FUTURE

Should we be seeking maximization of wood production? Or is it not more realistic to aim for optimization of yield for each of the wild-land resources?

Des Crossley, 1975

The new approach to forest management in the 21st century actually includes both the options suggested by Crossley, who was (as usual) thinking far ahead of his contemporaries. However, forest management now extends much further, beyond growing wood and husbanding wilderness. Foresters must meet new standards of social responsibility and accountability, not only to government and other stakeholders but also to employees and investors. Competitiveness, communications and consultation are as important as science and technology in today's forestry. "Forestry isn't rocket science," observed Fred Bunnell, professor of forest science at the University of British Columbia, in a 1999 article. "It's much more complex."

As Alberta began the new Millennium, Alberta's basic strategy to address complex and overlapping objectives was the "triad" approach, under which some land would be managed for non-timber values, some for multiple use, and some for maximum timber yield. At Hinton, where key elements of the triad were already in place when the official strategy was adopted, Weldwood expected the annual allowable cut would rise from 2.7 cubic metres per hectare per year to 3.1 cubic metres per hectare per year, as early as 2010, and intensive management could produce even more dramatic increases in future decades. A crucial question, though, is whether the contributing landbase will be maintained or whether it will continue to be whittled away by industrial uses and protected areas. One suggestion is that there should also be a "protected" status for intensively managed areas to make sure that they remain in timber production.

The company's relationship with the Alberta government, for so long a mutually beneficial partnership based on negotiation and consensus, is another critical consideration. In 2002, with 17 forest management agreements now in effect and two more pending, and sizes ranging from 56,000 hectares to 5.8 million hectares, there was a concern that the province would adopt a "cookie-cutter" approach to ground rules and regulations. However, adaptive management depends crucially on innovation and flexibility. The past approach led to remarkable achievements such as the 1996 Hinton ground rules developed in consultation with the Forest Resources Advisory Group.

Thanks to adaptive approaches in the past, Hinton foresters were among the first to develop and apply the "natural disturbance model" as a means to conserve biodiversity, but there are challenges in this realm too. As more is learned about natural disturbance, for example, it might suggest a need for much larger clearcuts, or more harvest in riparian zones, than citizens would ever tolerate on aesthetic grounds. Multiple use of the forest management area also can undermine the natural disturbance model. The numerous linear disturbances for oil and gas industry activity – roads, pipeline corridors, power lines and seismic cutlines – are a serious concern. Renewed coal-mining activity, or development of other mineral resources, would pose further complications. Meanwhile, several environmental interest groups were seeking to create a broad "wilderness" corridor along the east slopes of the Rockies – ultimately from Yellowstone to Yukon – yet it is not clear how their objective could be achieved, or indeed how or if it would differ from properly practised, properly understood sustainable forest management.

Perhaps the greatest challenge in the coming years will be reaching a consensus definition of sustainable forest management, and then assuring all stakeholders that it is actually being practised on the land. At Hinton, foresters have laboured heroically in recent years to meet standards developed by their regional peers (Alberta Forest Products Association FORESTCARE certification), provincial and national political leaders (Alberta Forest Legacy and Canadian Council of Forest Ministers criteria and indicators), the Canadian Standards Association (CSA sustainable forest management certification) and the International Standards Organization (ISO 14001).

Yet some environmentalists insist that yet another standard, developed by the Forest Stewardship Council (FSC), is the only one they recognize. It may be difficult to reconcile the other certifications with the FSC, despite the fact that they appear superficially to include the same key criteria. Many foresters, including the Weldwood team, prefer the CSA-type approach because it is based on science -- "the effect on the forest" as Aldo Leopold prescribed -- and then fits social and economic values into this framework as two sets of quantifiable variables among a half-dozen. On the other hand, many environmental interest groups prefer the FSC approach because it begins with social values and then fits in the science as just one part of the determination. (It seems ironic that purported "biocentrists" favour a system that is based initially on social values.)

The delay in developing a single, widely accepted certification system for sustainable forestry is certainly unfortunate, but perhaps the result will ultimately be a sounder synthesis of both approaches. The social sciences and natural sciences that underpin sustainable forestry are moving ahead rapidly, at Foothills Model Forest and around the world, and social values change over time too, so convergence among definitions and certifications could indeed happen more easily and quickly than now seems possible.

Knowledge, technology, social values and the ecosystem itself will, of course, continue to evolve, often in unpredictable ways. What if, for example, the natural disturbance model – based on historical ranges of variability in species and habitat – is no longer applicable because of climate change? What if pulp or building materials can be manufactured much more cheaply from genetically engineered crops than from wood fibre? What if electronics and alternative materials eventually make paper and lumber as obsolete as buggy whips? Thus far adaptive management has enabled Hinton foresters to meet each challenge as it has arisen.

Occasionally their peers and other stakeholders criticize the Hinton foresters as being slow to react to new thinking in forest management. But ever aware of their past and the trust placed in them by distinguished foresters who have passed the torch from generation to generation, they continue to insist on careful thought and scientific examination before jumping on the latest bandwagon. They know it takes continual vigilance, as well as continual improvement, to maintain their position as leaders in Alberta and Canadian forest management.

By continually learning from past experience, testing the current hypotheses and projecting possible futures, an adaptive approach offers the best way to map the way through the thicket of uncertainties. "We can know the past, but cannot change it," Rene Dubos observed. "We cannot know the future, but we *can* change it."

APPENDIX ONE – HISTORICAL TIMELINE OF MAJOR EVENTS AND DECISIONS IN THE WELDWOOD
HINTON STORY TO 2004

A Summary for Reference and Discussion

By

Peter J. Murphy and Robert W. Udell

Adaptive Forest Management and History Program

Foothills Model Forest

INTRODUCTORY NOTE:

We compiled this Timeline of historical events as part of the Weldwood history project. Our objective was to help us to record and keep historical events in proper chronological order. As it transpired, it also served as a repository of events of interest that shows the diversity of influences that affected the history as well as recognizing the contributions of so many of the people involved.

We found that this was very much a 'living' document -- that we were continually adding to the body of events through recollections of those involved as well as extending the chronology year by year as events unfolded. In this respect we are indebted to the many contributors to the document whose names are listed at the end.

In particular, we extend thanks to Jack Wright, retired Chief Forester, who not only described many of the important events from his encyclopedic memory and meticulous notes, but who diligently reviewed successive drafts to correct us as we misinterpreted data or strayed from the facts. His contributions are very much appreciated. We also extend special thanks to Stanton Hart, retired Woodlands Manager, who also provided a rich store of events and insights, sent from his home in St. Stephen, NB. His notes and e-mail messages were always illuminating and refreshing. And Jim Clark, also a retired Woodlands Manager, described many of the initial events and stories through his memoirs and colourful tales.

In the spirit of this as being a 'living' document, we would welcome additional contributions and comments.

This timeline was initially compiled to 2001 but Bob Udell continued to maintain and update it until his retirement in 2004, which corresponded with the sale of the Hinton Operation to West Fraser Mills Ltd.

Peter J. Murphy and Robert W. Udell
January 2014

2002-10-25

WELDWOOD HISTORY PROJECT

HISTORY TIMELINE -- SIGNIFICANT EVENTS 1948 - 2004

On-going Summary for Discussion and Comment

Year	V-P Mill	Woods Mgr	For.	Events
1948				<p>New Department of Lands and Forests created includes Alberta Forest Service</p> <p>Green Zone defined by Order in Council - defines forested area</p>
1949				<p>New <i>Forests Act</i> for Alberta passed 29 March 1949 – contains new clause (Section 96) authorizing Agreements for <i>growing continuously and perpetually successive crops of forest products</i>.</p> <p>Alberta contracts for aerial photography and mapping for the province– and starts a forest inventory south of 57 north latitude.</p> <p>Frank Ruben, President of New Pacific Coal and Oils Ltd., in mid-1949 visited Bryan Mountain coal mine near Robb – impressed with vast forest stands – felt needed only money, cheap fuel and know-how to make marketable products. (PP)</p> <p>In the meantime, the first Agreement in Alberta signed in 1949 with Edmonton Pulp and Paper Mills Ltd. (R.O. Sweezey, Montreal timberlands businessman with US partners) – cancelled two years later.</p>
1950				<p>Frank Ruben visits with N.E. Tanner, Minister of Lands and Forests and deputy John Harvie to discuss. (PP) (Note: the timing is not clear – done in 1949 or 1950 – note first Agreement approved in 1951. PJM)</p> <p>Note: Although (PP) stated that the Alberta forest inventory was sufficiently advanced to provide</p>

				some preliminary data, Loomis commented this was not the case.(PP/RL)	
1951				<p>North Western Pulp and Power Ltd. incorporated in Alberta by Frank Ruben on 23 May 1951.</p> <p>Frank Ruben signs his first Pulpwood Agreement with Alberta for North Western Pulp and Power Ltd. - O/C. 836/51 dated 8 June 1951. Area is a rectangular block around Edson. Agreement contains clause “ ... to assure a perpetual sustained yield”.</p> <p>Ruben begins search for partners. (PP) (Note: Search details not given, presumably he started early. PJM)</p> <p>In the meantime, Edmonton Pulp & Paper Mills agreement cancelled 19 November 1951.</p>	
Year	V-P Mill	Woods Mgr	For.	Events	19 52
1952				<p>Frank Ruben signs revised Agreement with Alberta - O/C. 1018/52 dated 12 July 1952</p> <p>Area changed to west of Edson lying between Athabasca and Pembina Rivers. Map area change suggests revision by R. D. Loomis to ‘watershed’ basis with natural boundaries, better conifer timber, wood flow to Edson. (PJM)</p> <p>Ruben continues search for partners – spent considerable time and money in timber and market surveys. (PP)</p> <p>Sweezy gets a new agreement for Beverly Pulp & Paper Mills 16 January 1952 - lease proposal includes blocks in Slave Lake and Hinton areas. It expires 16 January 1954.</p>	

Year	V-P Mill	Woods Mgr	For.	Events	
1953				<p>No great interest shown by outside groups by mid-year – in June 1953 Ruben arranges purchase of remaining NWPP shares by North Canadian Oils, of which he was also President, from New Pacific Coal and Oils Ltd. (PP)</p> <p>New owners (North Canadian Oils) spent more money on detailed evaluation and inventory of the pulpwood in the reserved area. Estimated volume on 6000 square miles 64 million cords. (PP)</p> <p>Frank Ruben signs <i>Extension of Time to Agreement - O/C. 1424/53</i> dated 15 October 1953 -- extended for 1 year at cost of \$10,000 for an additional deposit.</p> <p>Beverly Pulp & Paper Mills gets 1 year extension to 16 January 1954.</p>	
1954				<p>Frank Ruben met Roy K. Ferguson, President of St. Regis Paper Co. in April 1954 – Ferguson impressed. (PP)</p> <p>St. Regis sent 7-member cruising party under George Abel to Edson and area 18-28 May 1954 to check government maps and timber, and other company-related factors. C.D. Schultz representative Robin Caesar was also there. (SH)</p> <p>Joint announcement 17 June 1954 by St. Regis and North Canadian Oils stated plans had been finalized for the financing and construction of a bleached sulphate mill in Alberta. (PP)</p> <p>NWPP also signs agreement with Bryan Mountain Coal to supply hard coal for the entire fuel requirements of the pulp mill for 15 years. (PP)</p> <p>St. Regis responsible for design and construction of mill –led by Justin H. McCarthy, vice-president and chief engineer – engaged H.A. Simons for engineering work locally, later took over supervision of mill construction and ordering equipment. Early surveys showed Edson site not entirely suitable. (PP)</p> <p>Frank Ruben signs for NWPP in Agreement with Alberta - O/C. 1250/54 dated 14 September 1954</p>	

Loomis adds phrase “ ... on a sustained yield basis” to the clause describing authority to cut timber to emphasize the intent of the Agreement. (PJM)

St. Regis sends second visiting team 21 October to 15 November 1954 to check timber, visit with Forest Service and possible timber operators – H. V. Hart, Dyer Phillips and Stan Hart. (SH) Further studies after the change of location to Hinton showed natural gas preferable to coal fuel – citing savings in expensive coal handling equipment and to avoid coal dust problem, critical in high-brightness product proposed. North Canadian Oils took over the fuel contract from Bryan Mountain, extended contract to 20 years to keep price same, looked for gas supply. (PP)

Officers and Directors of North Western Pulp and Power Ltd. were appointed:

<u>Officers</u>	
Chairman of the Board	F. E. Ruben
President	W.R. Adams
Executive Vice President	B.R. Cancell
Vice President	A. Carswell
Vice President	R.L. Vayo
Secretary	Homer Crawford
Treasurer	J.E. Cowles
Asst. Secretary/Ass't Treasurer	R.F. Ruben
Asst. Secretary/ Asst. Treasurer	E. F. Stabergy
Directors	W.R. Adams, G.H. Allen, A. Carswell, J.E. Cowles, R.K. Ferguson, H.B. Griffith, F.E. Ruben, R.F. Ruben

Year	V-P Mill	Woods Mgr	For.	Events
1955	TE	G. McN	DIC	<p>The "trip west" to see about a possible better location for the mill in concern about footings and water at Edson was probably made 24 January 1955. It involved H.V. Hart, Justin McCarthy and probably both Frank and Robert Ruben. Hinton was the location where railroad, road and river came together on a site with suitable footing material, and the decision was made then to move the mill construction site to Hinton. (SH)</p> <p>St. Regis team (Dyer Phillips, Frank LaDuc, Bill Hamilton, Stan Hart) visits 8 March to 6 April 1955 to look at existing roads, possible sites for camps, check some volumes. Also met with Minister Ivan Casey and MLA Norman Willmore. Dyer and Stan handed in Lease area maps and descriptions to AFS in Edmonton on 5 April 1955 to Reg Loomis – this was the area which they had, on behalf of the company, selected to be Alberta's first Forest Management Lease Area. (The area was a further refinement of a proposed realignment developed by Reg Loomis for a mill sited at Hinton. RU) This was the culmination of several months of cruising which had started in May of 1954. This trip also involved checking on possible temporary staff housing, in Brule, Jasper, Pocahontas, Edson, as well as Hinton. We also were checking the area North of the Athabasca, re volumes, quality of timber, existing roads. On 18 March 55 we had a meeting in Edson with the area lumbermen and Messrs. Willmore and Casey to bring them up to date on developments, followed by a "social hour". Others involved were Ivan Gingrich and Opie Hayes from Accounting Dept in St. Regis mill in Tacoma, WA, and Alex Smalley, executive from St. Regis Personnel Dept. in New York City. On 11 May 55 we met with Hinton residents Ray Fuller, Rod Gregg, Lloyd Begg and Vic Webb at the Athabasca Ranch to discuss school needs in Hinton. (SH)</p> <p>St. Regis team (H.V. Hart, Charlie St. Denis, Edward McMahon, Stan Hart) visit again 3 – 25 May 1955 to get Bar-BQ Ranch cabins fixed up for Woodlands staff temporary housing, buying office equipment and making contact with suppliers, government people. (SH)</p> <p>Engineering studies and design under direction of Justin H. McCarthy of St. Regis in conjunction with H.A. Simons of Vancouver -- completed March 1955.</p> <p>Ground broken and mill construction started 23 May 1955 (Calgary Herald 1958)</p>

			<p>Tom Easley appointed Resident Manager</p> <p>Construction workers on new mill numbered 1400 (RW), cost was to be \$14 million.</p> <p>Woodlands Department organized in May 1955. (PP)</p> <p>Desmond I. Crossley hired in Deferiet NY on 6 March 1955 as Chief Forester. (SH)</p> <p>Stanton Hart and Ruth arrive in Hinton 15 June 1955 (SH)</p> <p>FMA Agreement amended by O/C 882/55 dated 13 July 1955 – major change was moving the Lease Area west and defining the Provisional Reserve Area (PRA) to the north and south – each about 3000 square miles.</p> <p>Hiring of first staff: (JDC/SH) -- Tom Lewko, Des Crossley, Gordon McNab, Jim Clark, Bob MacKellar, Robin Huth, Philip Gimbarzevsky (photogrammetrist), Guy Dempsey, Stuart Allen, Vern Truxler, Ken Williams. Nick Tomkiw (first contractor), H.A. Simons employees -- Roy Morton and family . Note that Stan Hart and Frank LaDuc were already St. Regis employees (JDC/SH/HH)</p> <p>This group became known as the “55ers”. Hazel Hart commented, though, “these North Western pioneers are not to be confused with the Hinton “Originals” who had lived through several boom periods and are the true frontier people of the area”. (HH)</p> <p>Frank LaDuc, a member of the original 1954 reconnaissance party, seconded to Hinton operation in late April 1955 to help organize operational inventories and harvest plans. Returned to St. Regis operations in northeastern USA in April 1956.</p> <p>John Miller, another member of the party, also seconded to Hinton operations to set up the management inventory program (CFI). He would return to St. Regis in 1958 to set up a CFI system for their New Hampshire/Vermont Division. Subsequently, he took a job with a school district in Vermont, as computer manager.</p> <p>Gordon McNab had been manager of Rhineland/St. Regis operation at Hornpayne, ON. (SH)</p> <p>Improvements to Woodlands campsite buildings (the Webb Cabins – Home of the 55ers -- made with hourly employees and staff building porches, propane tanks (1000 gallon) installed and piped</p>
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				<p>to cabins, office. (JDC/SH)</p> <p>Winter onslaught of cold set in late October. (JDC)</p> <p>Cruising continued search for initial timber harvest areas</p> <p>Aerial reconnaissance of FMA flown with Beaver aircraft in September from Jasper & Edson airstrips. (JDC)</p> <p>Decisions about Camp locations made on basis of cutting oldest timber first, initial access and costs, and setting "constant haul distance" policy. (SH)</p> <p>Continue cruising/inventory to refine and adjust FMA and PRA area boundaries.</p> <p>Contracts let for cutting pulpwood and construction of camps. Program for cutting 175,000 cords before 1956-57 hauling season to ensure a wood supply for the proposed spring 1957 start-up. (PP)</p> <p>Started planning for 300,000 cords for the following season for full-year' operation. (PP)</p> <p>Tenders called for construction camp, repair shops, main office and warehouses in March 1955 (PP)</p> <p>Ground broken and construction on mill started on 23 May 1955 (PP)</p> <p>Frank Ruben, North Canadian Oils, bought the King Ranch from Dorin and the James Ranch and Bar BQ Ranch from Vic Webb for the future Valley townsite. (JCW)</p> <p>Construction camp (Canada Catering) building was started (kitchen/dining room) which was used that winter for bingo, recreation by Woodlands/other as first Hinton Community Club. (JDC)</p> <p>Company office building started in May and used for Christmas party (1st) on 20 December 1955. (JDC/SH)</p> <p>Access and haul roads to Camp 1 and Anderson Creek approved and construction of the Camp 1 road started in the fall of 1955. (SH)</p> <p>Stan Hart and Nick Tomkiw trip in late fall 1955 to look for skidding horses to buy for starting Camp 1 operations. (SH)</p>
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				<p>Two experienced contractors, Nick Tomkiw and Webb Frissel, set up Camp 1 and Camp 2 during the fall and winter of 1955-56 (SH)</p> <p>Aerial Photography of FMA done August 1955 under direction of Philip Gimbarzevsky -- with mapping laydown started November in new office. (JCW)</p> <p>First annual Woodlands Picnic at Jarvis Lake held on 27 August 1955 (JCW). This was the year when the then St. Regis Woodlands Manager, H.V. (Pete) Hart, originated the outdoor picnic habit and celebration of his birthday on August 27, to be shared also with Tom Lewko and Margaret Clark as a trilogy yearly celebration, which was (later) held at Camp 1, on the shore of Wildhorse Lake. (JDC/SH correction re year)</p> <p>The only wood delivered to Hinton in 1955 was 1 cord "prepared with a bucksaw by Steve Pozniak, one of our first employees, and piled by him in front of the first NWPP Woodlands Division office at the Webb cabins. This was for the benefit of the members of the Association of Pulp Consumers and their wives, who were the first group to tour our operations. (SH)</p> <p>Dr. R. Watson hired by NWPP to look after personnel in Woodlands Division. His office was in a small cabin behind Bill Switzer's Drug Store. (HH)</p> <p>Norman Willmore, MLA from Edson, appointed as Minister of Lands and Forests. He held this office until 1965 when he was killed in a car crash on his way west to a constituency meeting. He was first elected in 1944.</p>
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Year	V-P Mill	Woods Mgr	For.	Events	
1956	TE	G. McN	DIC	<p>Company/Community</p> <p>Aug. 23. News bulletin that mill construction well ahead of schedule. 2,000 foot log flume under construction in mill yard – steel lined, 3 feet wide. 1,400 people involved in construction Timber cutting also well underway. Log flume upon completion later was 1810 feet. (RU)</p> <p>Temperature was – 60 F on 15 February at the mill pumphouse on the Athabasca River. (SH)</p> <p>Deep cold wreaks havoc with frozen water lines and inadequate heaters. (JDC)</p> <p>Panabode cabin complex finished construction in late spring (June) for Company employees to rent. (JDC)</p> <p>July 1956...Highway 16 paving gets to Hinton. (SH)</p> <p>First movies shown in Hinton in office basement -- 25 cents for adults--children free. (JDC)</p> <p>Dysentery outbreak early 1956 due to well water contamination in the hill townsite. Doctor Watson busy treating patients in his house/office. (JDC/SH/JCW)</p> <p>Valley Townsite (Drinnan) housing construction begins in spring, and Athabasca Development Co. homes in Valley on the north side of Hardisty Avenue were completed and on market in fall of 1956 (JCW)</p> <p>North Canadian Oils constructed 140 mile, 10.75" o/d gas pipeline from Wabamun at cost of \$4 million. (PP)</p> <p>Highway 16 paving completed in 1956 (JCW)</p>	

Woodlands

The first load of wood from Camp 1 was delivered to the mill's woodyard on January 9, 1956 (SH)

Reforestation trial began later that year.

600 to 700 men and horses logging in the bush. (RW)

Camps 1 to 10 inclusive (including 7, 7a), 13 and 16 were in operation in 1956 -- see separate list (JCW)

All camps except 7a, 9, 13 and 16 were designed as 100-man camps for 25,000 cords per year. (JCW)

Camp 1 and 2 roads built with camps established at Wildhorse Lake and Maskuta creek. (JDC/JCW)

Winter road to Camp 10 built in 1956. (JCW)

Peppers Lake and Camp 7 roads built in 1956, connected to the Lower Road for summer access to the mill by the winter-only bridge behind the mill. (JCW)

John Pope of Hay River, NWT, approached NWPP with his design for a mechanical falling, limbing, bucking and piling attachment for mounting on a crawler tractor. This unique concept was the fore-runner of our present-day feller-bunchers, limbers and multi-purpose harvesting machines. St. Regis bought the patents, and financed the construction and trials of the machine, as well as numerous unsuccessful attempts to market the idea to potential manufacturers. I have the original report on the machine, with photos, which was the basis of a presentation I made at a CPPA Woodlands Convention. The delimeter portion of the machine was tested in Hinton on 7 and 8 January 1956. (SH)

First Pettibone-Mulliken "Cary-Lift" started forwarding and loading pulpwood at Camp 1 on 9 January 56. First load of pulpwood hauled to Hinton on that day. (SH)

Some staff hired in 1956, including Supt. Ron West, Purchased Wood Buyer Jack Janssen, Supt. Arnold Homan, Safety Supervisor Jack McBride, Fire Marshall Dexter Champion, Mechanical Supt. Newton Hamilton, Chief Scaler Elmer Dolph. (SH) Forester John Miller was a St. Regis employee

sent to establish the Continuous Forest Inventory. (JCW)

Jack Janssen retired from AFS (former Senior Superintendent of Forest Protection), and was hired by the Company as purchased wood buyer ion 1956. (JDC)

Robb road built past Anderson Creek at \$23,000/mile, and grade extended to the Gregg River. (JCW)

Camps 4 & 5 built east of mile 11 with P. Guimond & H. Anker respectively contracting. (JDC/JCW)

3 February 56...Large woods equipment demo held at Camp I for St. Regis and North Canadian Oils executives. (SH)

4 April 56...Hon. Norman Willmore left for Southern U.S. for orientation tour of St. Regis woods and forestry operations. (SH)

Two unions, IWA and Lumber and Sawmilling Workers, express interest in unionizing woods workers in April. Negotiations with IWA started 16 July, first contract signed 24 August 1956. Hart believes one of the catalysts was the low piecework rate as compared to the east -- rate for cut and piling 8-foot wood was \$4.25 per cord. (SH)

1 May 56...Hon. Norman Willmore officiates at opening of "Monte" Montemuro's Hinton Theatre. (SH)

9 May 56...Tom Easley, Resident General Manager, takes up permanent residence in Hinton. (SH)

May 1956...Company approached to have clouds seeded to help combat bad forest fires. (SH)

22 June 56...Samples of both green and fire-killed wood sent to Deferiet, NY mill for testing. (SH)

Negotiations with IWA union start, with union agreement signed 24 August 56. (SH)

31 October 56...Heavy influx of woods labour to Hinton area, resulting in serious lack of accommodations. (SH)

19 December 56...NESCO Slashmobile set up, with large, off-highway Autocar tandem trucks hauling from it to Hinton mill. (SH)

Forestry

FMA Agreement amended by O/C 882/55 dated 26 April 1955 – major changes refining of FMA area boundaries, setting single rate of dues for all species, conditions for timber sales on PRA.

Licensed Timber Berths (LTBs) legislation on FMA was finalized for 13 LTBs with 15-year tenure in early 1956. (JDC)

Several major forest fires created great concern about fire control capability.

Gregg fire started south of Hinton in May 1956 by seismic crew (never verified) to 32 square mile area—burned to late September. (JDC)

Cruising of Gregg burn started fall of 1956 - MacKellar involved. (JCW)

Fire north of Edson also 1956, and one in the Berland River area. (JDC/JCW)

Fire also south of McLeod River in Svedberg quota area. Canadian Army used on this fire, one (or two?) soldier drowned crossing the McLeod River. (JDC)

Meetings with the Alberta Forest Service about fire control concerns. (JCW)

Ongoing Inventory Reconnaissance to a) locate areas of mature timber and to report on Timber Berths and operations. To 28 July entire Marlboro WC covered. (JCW)

The Continuous Forest Inventory (CFI) program was started to establish 3,000 1/5-acre plots in three years. John Miller of St. Regis was in charge, and J. Wright of NWPP took over when Miller returned to the US in 1958. Field data being recorded on IBM "Mark-Sense" cards, permitting the use of automatic compiling The program name was changed to Permanent Growth Sample in 1972. (JDC/JCW)

Foresters Phil Appleby and Herman Oosterhuis hired to supervise the CFI and cruising crews. (JCW)

Experimental scarification trials begun at Camps 5 and 10 by Des Crossley using Flecco Rakes and angle blades among others during the fall of 1956 (JCW) -- subsequent surveys showed that successful natural regeneration had been achieved. This first naturally re-established lodgepole

				<p>pine stand lies north of Quigley creek in section 35 of Township 50. Range 24, West of the 5th meridian, on a prominent westerly facing aspect of the valley slope of Quigley creek which originates in "Audubon" Pond, just to the north of the Robb road at Mile eleven (11). (JDC/JCW) Audubon Pond referred to as Beaver Lake on maps. (JCW)</p> <p>First wildlife/forestry study --John Stelfox – first 4 plots established in Camps 1, 5 and 9. (RU) -- this study was to be summarized in 1998 as a 40-year review.</p> <p>Reference in minutes of staff meeting 4 August that a blacksmith at Bliss was now making tree tongs and shoeing horses, etc. -- a sign of the times, an art soon lost. (SH)</p>
1957	TE/ HC	G. McN/ AP	DIC	<p>Company/Community</p> <p>Harry Collinge hired as a consultant to resolve start-up problems (JCW)</p> <p>Batch-cooking at pulpmill started 17 April at 2:05 PM (SH) Many problems. (JDC)</p> <p>Mill production commenced April 22. Cost of construction \$42,000,000. St. Regis announcement of 500 people employed in the mill, 1500 in logging operations.</p> <p>Pulp price in April US\$176.40 per metric tonne. (RU)</p> <p>Woodlands Manager G. McNab was asked to resign on 26 May 1957, and did (SH) Adrien Provencher replaced him. (JDC). McNab incorporates Albertawest Forest Products 4 July 1957, and signs an FMA 21 May 1958 for the Whitecourt area - rights later sold to MacMillan Bloedel (PJM) At that later time (c 1959 or 1960) point, as Jim Clark noted, Macmillan-Bloedel employees T. Stringer and W. Leasing became monthly visitors to NWPP as a consequence. (JDC/JCW)</p> <p>Adrien Provencher appointed Woodlands Manager effective 15 July 1957. He moved from a St. Regis affiliate company in Hearst, Ontario. (Bulletin 9)</p> <p>Official Mill Opening Ceremony on 28 July 1957 (JCW/SH date) Guests of honour included Premier E.C. Manning, NWPP President Frank E. Ruben, and St. Regis President W.R. Adams. Guest Speaker Roy K. Ferguson, St. Regis Chairman of the Board, gave on address "Canada's Part in St. Regis History". Other notable guests included Hon. John J. Bowlen, Alberta Lt. Governor, members of the board and executive officers of St. Regis and NWPP, Hon. Norman A Willmore, Minister of Lands and Forests and his deputy H.G. Jensen along with Eric Huestis, Reg Loomis, J.R.H. Hall, and Hank</p>

			<p>Ryhanen of the Department. (RU)</p> <p>Company takes over operation of the Clinic. Dr. Ian Reid appointed staff doctor, and announcement that dysentery is no longer prevalent in epidemic proportions. 12 April bulletin.</p> <p>Jim Clark wins Company's Crest contest for design of official insignia for NWPP. Bulletin 2, 3 April.</p> <p>Valley housing south of Hardisty Avenue under construction. (JCW)</p> <p>The New Town of Hinton was established 1 April 1957 -- .'New Town' status meant that it was administered by a government-appointed Board under W.B. Isbister. I.K. Sutherland of NWPP was a member.</p> <p>Hill townsite land switch with T. Eaton and Hin-Del Corporation, the developers, approved by Department of Municipal Affairs. (JCW) Two townsites were now allowed. (JDC)</p> <p>Company announces "No Christmas parties this year" due to start-up costs - with regrets. Bulletin 6, 2 December</p> <p>First Junior Forest Warden Club in Alberta – in Hinton, sponsored by NWPP. Suggested by Crossley at a follow-up meeting of the Formal Opening Committee – draft Agreement with CFA of BC in December. The idea was popular, JFWs taken on officially by Alberta government in 1960 - Terry Whiteley named Chief Warden, headquarters in 1961 at FTS in Hinton. (RH/PM)</p> <p>Pulp production in 1957 34,371 tonnes. Published price (Pulp and Paper North American Fact Book) US\$169/ metric tonne.</p> <p>Woodlands</p> <p>Camp 1 becomes a show-piece with over 100 loggers mostly skidding 8-foot wood with horses. (JDC) Forwarding and loading was being done with Pettibone-Mulliken "Cary-Lift" loaders. (SH)</p> <p>Yarder logging with 2 Skagit and 2 Timberline yarders started in January 1957 on 15-chain-square blocks with contractor Claude Eccles and foreman Stan Jobb at Camp 7 west of Obed Tower. Both were failures economically. (JDC/JCW)</p> <p>Owen Bradwell and Bill Hanington locate the extension of the Robb Road from about a mile west of</p>
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			<p>the McLeod River to Robb during the fall and winter of 1957-58.</p> <p>The Green Timbers road from Wildhorse Lake at Camp 1 to Entrance was laid out and built in 1957. (JCW)</p> <p>N. Tomkiw in Camp 1 (JDC) and Webb Frizzell contractor in Camp 2. (SH)</p> <p>Camps 12 (Jock Hart), 15 (E.B. Johnson) and 16 (Rosaire Morin) started operation in 1957. (JCW)</p> <p>Site for Camp 20 cleared.</p> <p>Forestry</p> <p>Jack Wright starts - -arrived Hinton 7 January 1957</p> <p>Owen Bradwell, forest engineer hired in fall of 1957 from Eastern Rockies Forest Conservation Board. (JCW/PJM)</p> <p>Four graduates of the Maritime Forest Ranger School arrived in January -- Len Smith, Bill Murray, Fred Pettis and Bob Nesbitt. Bill Hanington hired late January or early February. (JCW)</p> <p>Review of 1956 forest fire history continued with Alberta Forest Service (AFS). Need for improvement recognized, commitment made to try to reduce rate to .1 of 1% annual average burn. (JDC/JCW)</p> <p>Temporary agreed upon AAC was set at 350,000 cords (85 cubic feet per cord - and based on 100-year rotation) in discussion with AFS. (JDC/JCW) This AAC figure had been used in the 1954 FMA agreement. (JCW) This figure appears in the April 26, 1956 O.C. 543-56. (PJM)</p> <p>First experimental planting: 1. with transplants from Gregg burn and 2. with bare-root seedlings from Oliver Provincial Tree Nursery in Camps 1 and Pedley area -- not planted on cutovers but under-planting, (JCW)</p> <p>Charlie Miles and Ed Latchuk worked on the evaluation of the Provisional Reserve Area during 1957 and early 1958 - for timber areas and to recommend areas to include/exclude. (JCW)</p> <p>The fall meeting of the Rocky Mountain Section, CIF was held in Hinton Sept. 27-29. Activities included a luncheon at Camp 2, and a tour of the new pulpmill. (RU)</p>
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Year	V-P Mill	Woods Mgr	For.	Events	19 58
1958	HC	AP	DIC	<p>Company/Community</p> <p>Tom Easley, Resident Manager resigned 14 May 1958, returned to US after end of school term. Bulletin 25 14 May.</p> <p>Harry Collinge named Resident Manager effective 15 May 1958. Bulletin 25 14 May. Collinge had been at Hinton since November 1957 as a consultant with Sandwell to tackle pulp production problems.</p> <p>10 April announcement: - pulp production 451 tons, 100% Alberta Hi-Brite - production materially exceeded the 400 ton mark on several occasions over the last 12 days. Inf. Bull 23.</p> <p>Successful trial production of a special pulp for photographic paper. Inf. Bull. 26 September.</p> <p>Collinge announces 3 October that production of pulp for six days ending 8.00 am 2 October averaged 436 tons per day, 6 tons over the rated capacity. He also noted serious consideration to doubling mill capacity. Inf. Bull. 32.</p> <p>Pulp production "soared over the top" as 464 tons rolled off the layboy -- cigars and chocolates passed around. Inf. Bull. 41 - 11 November 1958.</p> <p>Pulp production in 1958: 93984 tonnes. Published price (Pulp and Paper North American Fact Book) US\$173/ metric tonne.</p> <p>Hinton Chamber of Commerce called for establishment of a provincial park near Jarvis Lake. Recent improvements to Highway and the interest of local sportsmen were factors that were taken into account by the Provincial Parks Board. In 1958 Entrance Provincial Park. At this time include in the park were a Royal Canadian Air Force survival training school, a forestry service reservation with picnic facilities, a North West Pulp and Power timber reservation, a Kiwanis youth camp, and a junior Forest Wardens Camp reservation. All had to be cleared before current boundaries could be established</p>	

Woodlands

Camp 20 Blocks 1-10 harvested in 1958 began operating under contractor Harry Anker and foreman D. Frowen. It became a Company camp in 1968 foremanned by Ken Snyder. (JDC/JCW)

Logging Camps were temporarily closed during the summer due to over-production (JCW)

The yearly contracts averaged 25,000 cords except Camp 9. (JDC/JCW)

Several Licensed Timber Berths (LTBs) became operative under terms of the FMA. Bill Nigro was the only one who was persuaded to cut pulpwood from smaller logs and tops – making a profit and setting a precedent cutting “peckerwood”. Nigro represented Hett & Sibbald of Edson. (JCW)

First Ground Rules - three-page document in Company files dated 11 March 1958 the first on record: “... cutting system to be adopted *on a trial basis* will appropriately be some pattern of clear cutting. *As many modifications of such cutting systems will be adopted as possible* in order, *by experiment*, to arrive at a system or *systems best adapted* to the silvicultural requirements of the species in question, the topography and the operational requirements inherent in economical pulpwood extraction.” Preamble statement reflects experimental approach and adaptation -- early definition of ‘Adaptive Management’.

Annual Operating Plan requirements amalgamated into a more comprehensive format including renewal, protection and logging plans. (JDC)

The "Brule" POWs who had worked for Albert Garneau in 1941-1945 at Brule had now returned to work for NWPP -- some of them were Hans Matte, Hans Bruckner et al. (JDC)

Harvest planning layout and annual operating plan submissions were now mandatory. (JDC)

Stan Hart recalled: “Eric Huestis once asked me if I would turn the road from Hinton to Robb over to the Province, as part of the Forestry Trunk Road System. I said I would be glad to, providing that the Province would agree to our continued use of it with oversized and overweight loads, and would maintain it completely, to our standards. Nothing came of this offer. (The timing of the offer may have been upon completion of the Robb road)” (SH)

				<p>Government agreed to build the McLeod River bridge as their contribution to the building of this major connector road. (JCW)</p> <p>Forestry</p> <p>Preliminary Forest Management Plan submitted. Lead Authors John Miller and Jack Wright.</p> <p>Start was made on the 3-year FMA Age-Class Program.</p> <p>Scarification trials with Dick Corser's D-9 and a blade with 3 ripper bars welded to the blade (predecessor to the Crossley Plough) commenced in 1958 under Owen Bradwell. (JCW)</p> <p>John Miller returned to St. Regis in New Hampshire effective 1 July 1958.</p> <p>Jack Wright takes over as Forester i/c of Inventory and Management. He continues the CFI project and later extends it to include permanent sample plots in younger stands in the fickle Lake, Robb and McCardell Creek areas. (JCW)</p> <p>In May 1958 Charlie Miles takes over CFI Party Chief under direction of Jack Wright. (JCW)</p>
1959	HC	AP	DIC	<p>Company/Community</p> <p>Hinton municipal elections were first held and Resident Manager Harry Collinge encouraged employee participation. Len Veats, Ed Gitzel, Jim Clark, and Ken Williams were all Company employees elected as Councillors. Jack Fleming was the Town Manager. (JDC) General election for Town of Hinton moves it beyond New Town status. William A. Switzer becomes mayor by acclamation, re-elected and served until 1964. Switzer was raised in Edson, served in RCAF recognized as a flying 'ace', returned to run a drugstore in Hinton.</p> <p>Pulp production in 1959: 121345 tonnes. Published price (Pulp and Paper North American Fact Book) US\$173/ metric tonne</p> <p>Woodlands</p> <p>Yarding cranes sold – focus on 8-foot wood with horse skidding. (JDC) A brief trial of yarding with cranes was undertaken at Camp 2 under Ozzie Hansen before selling them -- doomed from the start. (JCW)</p>

			<p>Drapeau (Camp 6) moved to Camp 29 in the same Compartment Athabasca. 13.</p> <p>Camp 22 clearing and construction completed December 1959. (JCW)</p> <p>Adrien Provencher and Jim Clark become members of the AFS Forest Advisory Committee – Provencher representing the pulp and paper industry, Clark the Canadian Institute of Forestry. (JDC)</p> <p>The Queen's visit to Alberta in 1959 occasioned invitations to two Company employees (Jim Clark and Adrien Provencher) to lunch with Her Majesty and Prince Philip on the Legislative Grounds since the employees were members of the Forestry Advisory Committee to the Alberta Director of Forestry. As Clark noted, the forest fire on Maskuta Creek got second priority for the two Company employees dining with the Queen. (JDC)</p> <p>Camp 32 started operating under Albert Garneau, Contractor. (JCW)</p> <p>Gregg River Road was completed up the Gregg valley in 1959 (JCW)</p> <p>Claude Eccles operated Camp 42 along Gregg River -- cut first 7 Blocks in Compt. II McLeod. (JCW)</p> <p>Camp 33 site at Warden Creek cleared, Camp opened, and Blocks 1-24 harvested 1959-60. Helge Nelson was foreman at Camp 33. (JCW)</p> <p>Camp 23 site cleared and Camp also opened in 1959 (JCW) Note Camp 23 probably first company-run operation. The first foreman at Camp 23 was Del Brown who came from Camp 10 -- Wright brothers folded their tents and left town. Dick Frowen believed to be scaling at Camp 23. . (JCW)</p> <p>Bill Makal started operating Camp 31 north of Gregg River in Compt. 7 - former Imperial Lumber LTB – never operated by Imperial. (JCW)</p> <p>Forestry</p> <p>Scarification program intensified. (DIC2)</p> <p>Maskuta Creek fire 1959 – started from propane stove in a “shacker’s” trailer. Trailer was located on the cut block, on the road, rather than in Camp 2 - from then all workers had to stay in the main Camp whether in bunk houses or in their own trailer or shack. Webb Frizell (Camp contractor Camp 2) had a big log sign at the entrance to his Camp “Shackers Haven”. This was a major firefighting</p>
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				<p>effort – aerial attack used. (JDC) The fire burned up the slope to the east of Maskuta (Prairie) Creek then jumped to the ridge to the west. (JCW) This was a major fire (347 ha (RU)), involving 400 men, 16 dozers, 6 bombardiers, 4 spray aircraft, 1 helicopter and 2 bird-dog aircraft. Sometime after the fire was out, a post-mortem meeting of company personnel discussed the concerns over the lack of initiative by AFS personnel supposedly in charge of firefighting. Company staff found themselves forced by circumstances to assume the major supervisory role in fighting the fire. One of the results of this meeting, and subsequently others, was a new forest fire fighting agreement with the Alberta government. (SH). This fire may have been one of the first in Alberta involving aerial attack (PM).</p> <p>Forestry Department cited in NWPP Safety bulletin for working almost 1200 days without a lost time accident, and over 350,000 injury-free miles. Bull. 79 - 7 December 1959</p>
1960	HC	AP	DIC	<p>Company/Community</p> <p>Forest Technology School in Hinton officially opened October 1960. Originally located in Kananaskis, it was moved to Hinton to a more central location, added value seen to be close to a new and innovative forest management program. School director was Peter Murphy.</p> <p>On Aug. 24, the company sold 120.4 acres of land abutting the north side of the McLeod River in NW-34-52-17-5 to the Town of Edson for one dollar, for use in parks and recreation. Later, the town made this into a park (Willmore Park). Earlier, 6 acres on the east side of the parcel had been sold to a private individual for \$500. The remaining 792 acres were retained in company ownership, the so-called “Tollerton” properties originally purchased for the millsite in Edson. These properties were later sold (1973). (RWU)</p> <p>Pulp production in 1960: 147815 tonnes. Published price (Pulp and Paper North American Fact Book) US\$172/ metric tonne</p> <p>Woodlands</p> <p>Jim Clark transfers to Woodlands as a District Superintendent under Adrien Provencher effective 1 August 1960 - job included Camps 1, 22 and 33. Clark moved from Forestry where he had been Forester i/c Cruising and Production Layout, and Assistant Chief Forester. AP/JDC)</p> <p>Camp 22 operations started – initially run as a contractor camp by Harvey Usenek, formerly the contractor at Camp 3 – problems with blowdown, and research led to learning about block layout</p>

refinements. (JDC)

Several small operations (Camps 35,46 and 47) started operation in northeast corner of Marlboro WC in stands missed by 1956 burn. (JCW)

Dick Corser started operating Camp 25 for NWPP in Erith River area. (JCW)

Company Woodlands safety program among the Camps became one of safety meetings once per month, with a movie following as entertainment. (JDC)

Mrs. D. Scott volunteered to teach English to the camp employees in the McLeod Working Circle for 2-3 years. (JDC)

Camp 33 was established at the confluence of the Gregg River and Drinnan Creek as a Company operation under foreman Helge Nelson, as a horse-logging operation. (JDC/JCW)

It was at Camp 33 where the Garret Tree Farmer, an articulated-frame, wheeled skidding tractor, manufactured in the State of Washington, was first demonstrated for the Company. The inventor, Mr. George Garrett, was in attendance. (SH)

It was during this year that a study was undertaken by Woodlands and Forestry to determine the specifications of the "sawlog tree" that was noted as reserved for the sawmilling industry in Provisional Reserve under the original Forest Management Agreement. (JDC/JCW)

Forestry

Camp 2 Fire of 1960 A second fire at Camp 2 started on 4 April 1960 from a 'hold-over' in an old slab pile near the highway that had been burned by the Company before the start of the fire season. The fire burned along the flats along Maskuta Creek, skipping across cutover strips and burning residuals. (JCW) Fires of 1959 and 1960 led to negotiation of a Forest Protection Agreement with the province. (PM) Note: The 1964 compartment history map does not have this fire recorded, nor is it referenced in AFS fire history records. But the fire history records show a total of 35 ha burned in the FMA in 1960. (RU).

Sept. 28. Representatives of newspapers, T.V. and radio attended Pulp and Paper Day in Hinton. Tours and presentations, including lunch at Camp 33. (RU)

				<p>First silviculturist hired - Gordon Jones - October 1960</p> <p>Phil Appleby promoted to Forester i/c Production Layout, takes over from Jim Clark.</p> <p>Steve Ferdinand starts 15 October</p> <p>First Production planting using the Walters Bullet. (JCW)</p> <p>Cone drying shed constructed. (RR)</p> <p>Introduction of wedge-prism cruising. (DIC2)</p> <p>The company began its own aerial photography of cutover areas. (JCW)</p> <p>Crossley "finally broke down" and approved the purchase of two trailers for the CFI crew to give up tent camps and utilize the Company's developing road system. Roadway Industries built a 10x20' Cook/Dining/Office trailer (sleep up to 4) and an 8x18' sleeping trailer (for up to 8). (JCW)</p>	
Year	V-P Mill	Woods Mgr	For.	Events	1961
1961	HC	AP	DIC	<p>Company/Community</p> <p>Amendment to FMA Agreement by O/C 986/61 dated 29 June 1961 – clarified rights and terms on PRA.</p> <p>Three teenagers from Hinton were killed on Highway 16 near Bar-F ranch in early morning when their car hit a horse. Donna Laughy and Warren Shoeppe were two of the students killed. May 27. (SH)</p> <p>Pulp production in 1961: 146364 tonnes. Published price (Pulp and Paper North American Fact Book) US\$160/ metric tonne</p> <p>Woodlands</p> <p>Camp 27 opened in Athabasca XIX under Nick Tomkiw. (JCW)</p>	

				<p>Schnur, Makal and Basaraba were small pulpwood contractors. (SH)</p> <p>May 27 – NWPP camp clerk Herman Voskuylin accidentally shot and killed himself at Camp 33. (SH, JDC)</p> <p>Forestry</p> <p>First detailed Forest Management Plan 1961 completed 31 October 1961. Lead author Jack Wright. (RU)</p> <p>Completed establishment of CFI plots. (JCW)</p> <p>Re-measurement of Marlboro commenced May 1961. (JCW)</p> <p>One CFI crew (Ron Whyte) started using a tape recorder in summer and fall of 1961 for field tally of permanent sample plot data - thus eliminating the need for a tallyman, reducing crew size from 3 to 2. (JCW)</p> <p>Scarification program further intensified. (DIC2)</p> <p>Gordon Jones leaves, Hank Somers administers silviculture operations under Des Crossley.</p> <p>Nosehill fire of 1961 – blow-up fire</p> <p>First Forestry Song Book. (RU)</p>
1962	HC	AP/ SGVH	DIC	<p>Company/Community</p> <p>January 16 – Gas pipeline explosion north of Edson killed 8 men. NWPP and Hudson’s Bay Oil and Gas people met on March 15 regarding potential hazards to NWPP operations in that area. (SH)</p> <p>Pulp production in 1962: 138320 tonnes. Published price (Pulp and Paper North American Fact Book) US\$158/ metric tonne</p>

				<p>Woodlands</p> <p>Adrien Provencher moves to St. Regis Woodlands North, office in Montreal, to replace H.V. Hart on his retirement 1 September 1962.</p> <p>Stanton G.V. Hart becomes Woodlands Manager 1 September 1962, replacing Provencher.</p> <p>Harvey Kennedy started operating Camp 51 (and later camp 52) in former Camps 8 & 10 area (Berland Compartments 4, 5, & 10) (JCW)</p> <p>Forestry</p> <p>Continuous Forest Inventory (CFI) changed from Unit Record Computer System (wired boards) to high speed (relatively) data processing using 1401 and 1620 computers at IBM Service Bureau. (JCW)</p> <p>Initiated seeding and planting programs. (DIC2)</p> <p>Introduction of fine-type photo-cruising. (DIC2)</p> <p>Jack Wright produced Aerial Stand Volume Tables prepared from CFS plot data -- based on stand cover type, crown density, average stand height weighted by merchantable volume -- Bill Hanington compiled tables used to prepare operational inventories based on strip or prism cruises. (JCW)</p> <p>Bought first double track Skidoo (first in Alberta) for CFI – after renting a single track from Bill Ruddy of Maligne Tours for a while (JCW) And first Tote-Gote (powered 2-wheel scooter) purchased to enhance access in the bush. (JCW)</p> <p>First regeneration surveys were done on 1956/57 cutovers (JCW)</p>
1963	HC	SH	DIC	<p>Company/Community</p> <p>Price of pulp in January 1963 was US\$156.50 per metric tonne, the lowest price in the history of the Company. (RW)</p> <p>January 15 – Trial of poplar for pulping in mill. Barking quality was fair in barking drums and quality of pulp was good. (SH)</p> <p>New nine-hole golf course opens in Hinton. Built by volunteers with the support of the pulp mill and</p>

				<p>woodlands management. Key players in the development were Harry Collinge, who believed the mill should be part of, and active in developing, the community; and Jim Bowersock, a keen golfer who later rose to executive VP levels in the St. Regis and Champion international offices.</p> <p>Pulp production in 1963: 159199 tonnes. Published price (Pulp and Paper North American Fact Book) US\$153/ metric tonne</p> <p>Woodlands</p> <p>Decision made for a trial of mechanical logging with skidders. (SH)</p> <p>Charlie Miles bought a C4 Tree Farmer wheeled skidder. He was given a couple of blocks to log but they were not appropriate to prove the real value of the equipment -- he cut and skidded to a landing and used a crawler tractor-mounted loader to pile it. (JCW)</p> <p>Introduction of tree-length extraction. (DIC2)</p> <p>The buildings at Camp 22 in the McLeod Working Circle burned just before Christmas. (JDC)</p> <p>Forestry</p> <p>All CFI crews using tape recorders for field tallies. Field crews reduced from 3- to 2-man size as a consequence. (JCW)</p> <p>Land-form mapping / Site Classification mapping project completed – Philip Gimbarzevsky. (RU)</p> <p>Philip Gimbarzevsky, Forester i/c Photogrammetry and Drafting, awarded Ellwood Wilson Award for his paper on measurement of pulpwood by low altitude stereo photographs –CPPA March 1963.</p>
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Year	V-P Mill	Woods Mgr	For.	Events	1964
1964	HC	SH	DIC	<p>Alberta</p> <p>Canfor awarded an FMA in the Grande Prairie area, with 287,863 ha. (BB)</p> <p>Pulp production in 1964: 167642 tonnes. Published price (Pulp and Paper North American Fact Book) US\$161/ metric tonne</p> <p>Company/Community</p> <p>Owen Bradwell elected Mayor of Hinton, succeeding Bill Switzer. He hold this position for two terms until 1968. (HH, T of H)</p> <p>Woodlands</p> <p>The initial horse-logging operation called for some 1,200 men and approximately half as many horses. These numbers diminished as mechanical logging was phased in. The availability of wood and wood chips from purchased sources was very limited at the time. Mechanization was undertaken because of an increasing scarcity of experienced horse-loggers as well as marked decreases in costs of mechanical logging, due to increases in machine availability, reliability and efficiency. (SH) There was also an increasing difficulty in obtaining suitable draft horses. (JDC)</p> <p>Trial of mechanical long-logging and hauling was undertaken at Camp 22, with slashing done at the mill with a NESCO Slashmobile. (SH)</p> <p>December 14 - A woodyard crane was buried by a collapsing woodpile. Temperature was minus 30 degrees F. (SH) Operator Tommy Thompson escaped with only a broken heel after crawling between the tracks of the crane. (JCW)</p> <p>Bill Parks, Dir. of Forestry, and Tom Hill, Industrial Development Dept., both of the province of Saskatchewan, were two of many visitors to NWPP woods operations during the year. (SH)</p>	

Forestry

Bob Carman hired as silviculturist. Hank Somers, silviculture technician, reports to Carman.

Carman hired from Ontario Lands & Forests. He built the first Company and forest industry greenhouse in Alberta. He establishes first containerized seedling program in Alberta using Ontario split plastic tubes ½ and ¾ inch which were then out-planted. Start of containerized seedling production in Alberta. (RUSTF)

Carman also introduced a formal post-harvest silviculture assessment program, the “Management Opportunity Survey”. (RU)

Initiated thinning of stagnating regeneration stands in Gregg Burn. (DIC2)

Analysis of CFI plot data indicated that the peak of the MAI curve for white spruce and lodgepole pine on the FMA was less than 75 years -- recommended to government that Rotation Age be reduced from 100 years to 80 years -- with four 20-year cutting cycles rather than five. This was accepted by the Department following a major Forest Management meeting between the two parties in March 1964. (JCW)

December 9 -- Dept. Lands and Forests gave approval for change in rotation age to 80 years, at a NWPP/AFS meeting in Hinton. (SH)

AAC increased to 317,291 cunits (from 249,800) by switching to an 80-year rotation – case for approval based on CFI and regenerated growth rates. (DIC2)

Year	V-P Mill	Woods Mgr	For.	Events	1965
1965	HC	SH	DIC	<p>Alberta</p> <p>New coal mine authorized at Grande Cache, along with new one-industry town.</p> <p>Alberta Resources Railway established. Line to run north from Brule to service the coal mine at Grande Cache. Was to result in additional disturbances and unresolved land disputes with clearings. Existence of Grande Cache to become an issue in the Berland-Fox Creek decision in 1980.</p> <p>Pulp production in 1965: 172460 tonnes. Published price (Pulp and Paper North American Fact Book) US\$165/ metric tonne</p> <p>Company/Community</p> <p>3 February – Hon N. A. Willmore, Minister of Lands and Forests, killed in car accident on his way to a constituency meeting. (SH)</p> <p>29 March – William (Bill) Switzer elected Liberal MLA from Yellowhead riding in a by-election to fill the seat vacated by Willmore. (SH)</p> <p>Woodlands</p> <p>The lesson of 1964 precipitated a study program to determine the most effective mechanized system of logging for our future operations, and the preparation of a capital budget to fit our changed needs. The time-frame of the study program was six months. One planning-engineering employee (Owen Bradwell) was assigned as leader on the project with assist members to help as needed. (JDC/JCW)</p> <p>Bighorn Forest Products was a private fencepost operation established in Compartment 2 of the McLeod Working Circle in 1965 to harvest the dense, stagnant lodgepole pine stands abundant in the Gregg River valley. This combined operation of fencepost-material harvest/processing and Company pulpwood/sawlog harvest made dual-use of the road system an economical system. A NWPP employee ran the successful fencepost company (Dave Benbow) and the removal of the stagnant pine stands allowed the Company to scarify the cutover areas and convert the areas to</p>	

				<p>viable new forest, properly spaced. (JDC/JCW) Operated in Blocks 127, 128 and 128a -- operated until about 1983. Dave Benbow resigned from NWPP in 1970 to devote full time to his other business interests. (JCW/ RWU)</p> <p>18 March – Gas well near Edson blowing wild, Camp 20 evacuated. Well came under control 26 March. (SH)</p> <p>13 October – First controlled burn by Company Forestry, for regeneration purposes, at Camp 6. (SH)</p> <p>23 November - Start of cooperative effort with Canadian Army on effect on troop movements through a European-type managed forest which had been subjected to a nuclear explosion. Site chosen near Camp 29. Trees thinned and pruned. Test to be conducted summer 1966. (SH)</p> <p>27 November - Camp 23 crew refused to go to work because a tractor-skidding gang had been assigned to the camp. Returned to work 29 November. (SH)</p> <p>11 December – Bunkhouse at Camp 20 burned. (SH)</p> <p>Forestry</p> <p>First forest industry greenhouse in Alberta opened at Hinton, and first containerized seedling production - used 1/2" and 3/4" "Ontario" tubes (RU/JCW)</p> <p>CFI crew switched to using 80-column key-punched cards (using IBM Model 001 key punch -- on display at Forest Resource office - switching from Mark-Sensed cards used in field since 1956. (JCW)</p>
1966	HC	SH	DIC	<p>National</p> <p>Federally supported National Forestry Conference held in Montebello, Quebec -- first national conference since 1906. Chief Forester Des Crossley plays a pivotal role.</p> <p>Alberta</p> <p>Province-wide Quota System put into effect for non-FMA forest industries. Provides volume-based tenures with timber on non-competitive basis. Operators become responsible for forest regeneration on their operating areas.</p>

				<p>Company/Community</p> <p>Amendment to FMA Agreement by O/C 381/66 dated 7 March 1966 – authority given to cut other forest products and sets dues rates for them..</p> <p>19 October - Owen Bradwell re-elected Mayor of Hinton – served to 1968. (SH, T of H)</p> <p>30 December - H.K. Collinge, Vice-President and Resident Manager, died. (SH) The Resident Manager, Harry Collinge, died on the job in 30 December and was highly recognized at the funeral by attendees from all over North America and some offshore friends. It was a noticeable feature of the man's worth to see public buildings in the community of Hinton named in his honour. (JDC)</p> <p>Pulp production in 1966: 177313 tonnes. Published price (Pulp and Paper North American Fact Book) US\$163/ metric tonne</p> <p>Woodlands</p> <p>The Assistant Woodlands Manager (Jim Clark) left the Company and was replaced by Norman Denmark by external hire. (JDC)</p> <p>Capital budget approved for logging mechanization – to be achieved over several years. (JDC)</p> <p>Operational trial of mechanized long logging and skidding started. (JCW)</p> <p>The mechanization program of logging continued with difficulty in the loading/hauling in the summer period. Otherwise the program continued with some horse logging ongoing. (JDC)</p> <p>Bradwell's project finalized into a plan for changeover to a mechanized tree-length product/delivery system with a slashing system incorporated for millsite processing of the tree lengths for feed into the drum barkers. This was the changeover solution to a modern logging and delivery system. (JDC/JCW)</p> <p>13 January - Man killed by falling tree, felled by his brother, at Camp 22. (SH)</p> <p>13 April – Start of training courses for mechanical logging crews. (SH)</p>
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				<p>16 August – 50 Tons TNT set off in block 107A, Athabasca 13 - near Camp 29 by Canadian Army from Suffield, AB base, at noon. (See 23 November 1965 item above). (SH)</p> <p>16 September - Camp 27 bunkhouses burned during the night. Subsequently replaced by ATCO complex. (SH)</p> <p>Forestry</p> <p>First revision of the Forest Management Plan - (Second FMP completed). Lead author Jack Wright.</p> <p>The AAC in the 1966 Management Plan was 323,000 cunits (380,000 cords). (JCW)</p> <p>Initiated container planting program. (DIC2)</p> <p>Scarification backlog initiated. (DIC2)</p> <p>Des Crossley elected President of the national Canadian Institute of Forestry.</p> <p>Des Crossley presented a paper at the World Forestry Congress. (RU)</p> <p>May 17, 1966. Bob Udell, a new graduate from University of Toronto, hired to work in inventories, production layout and silviculture</p> <p>Bill Hanington diagnosed as having MS. (JCW)</p> <p>Philip Gimbarzevsky leaves at end May</p> <p>Hank Somers leaves to go to Saskatchewan to work for Jim Clark.</p>
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Year	V-P Mill	Woods Mgr	For.	Events	1967
1967	IKS	SH	DIC	<p>Company/Community</p> <p>Ivan Sutherland, then Manager of Production at Hinton, was appointed Resident Manager 1 January 1967, replacing Harry Collinge upon his death on 30 December 1966.</p> <p>28 August - Six men accidentally killed on construction site of Alberta Resources Railway north of Hinton. (SH)</p> <p>Bill Switzer re-elected as MLA in the general provincial election.</p> <p>May 4, 1967. NWP&P announced relocation of head office from Calgary to the mill at Hinton. New Board of Directors: F.E. Ruben, Chairman of Board; W.R. Adams, President; Vice Presidents J. E. Cowles, R.L. Vayo, H.F. Stevens, I.K. Sutherland, G.J. Kneeland; Treasurer T.C. Davis, Secretary H. Crawford; Comptroller C.E. Olson; Asst. Secretary/Ass't Treasurer R.F. Ruben, A.H. French; Ass't Treasurer L.P. Pelletier; Ass't Controller H. Duhl.</p> <p>August 15. Premier E.C. Manning attends Hinton to present NWPP with a "Certificate of Merit" on behalf of the province in recognition of its "outstanding contribution to the development, progress and prosperity" of the province. The certificate was present to President W.R. Adams of St. Regis and Vice President Ivan Sutherland of NWPP.</p> <p>Pulp production in 1967: 166447 tonnes. Published price (Pulp and Paper North American Fact Book) US\$165/ metric tonne</p> <p>Woodlands</p> <p>1 February – Approval received for full implementation of tree-length mechanical logging, including construction of multiple-saw slasher at millsite. (SH)</p> <p>55 Timberjack skidders were delivered in a two-week period in 1967 by R. Angus of Edmonton as the successful bidder for this supply. It was an impressive picture to see a line-up of 55 red skidder machines sitting in the Woodlands garage property one Monday morning. (JDC/SH). At the time this was the largest single order for skidders that had ever been placed in Canada according to</p>	

				<p>Timberjack representatives. (SH)</p> <p>Start of logging tree-length with skidders – horses phased out within 2-3 years (JCW)</p> <p>Forest Engineering responsibility goes to Woodlands 19 June 1967. Owen Bradwell with Eric Marrison – planning, designing and construction of roads, and engineering standards. (RU)</p> <p>Initiation of road improvement program. (DIC2)</p> <p>Forest Protection goes to Forestry under Russ Powell. Dexter Champion transfers to Mill Safety and Protection. (RU)</p> <p>17 August - Road Foreman Lloyd Bernard accidentally killed at Edson Motors garage. (SH)</p> <p>Forestry</p> <p>AAC increased to 335,384 cunits (from 317,291) as a result of reduction in allowable burn. (DIC2) Approved by government after lengthy discussion. (JCW)</p> <p>Reorganization traded responsibility for Engineering to Woodlands and Forest Protection to forestry (Crown fire guarding charges included). (DIC2/RU) – see notes above.</p>
1968	IKS	SH/ JDC	DIC	<p>Company/Community</p> <p>New FMA – passed by O/C 1647/98 dated 30 August 1968 -- included commitment to expand pulp mill and build a sawmill – expansion to start by 1 January 1971. Lease area would become 6000 square miles (1,554,000 ha) when expansion confirmed. (RU/PJM)</p> <p>note also December 1968 - Procter and Gamble Cellulose FMA announced for pulp mill at Grande Prairie.</p> <p>Owen Bradwell ends second term as Mayor of Hinton.</p> <p>Pulp production in 1968: 166198 tonnes. Published price (Pulp and Paper North American Fact Book) US\$160/ metric tonne</p>

Woodlands

The Woodlands Manager, Stanton Hart, was offered and accepted the position of Northern Regional Logging Engineer for St. Regis. (SH) Left Hinton 31 July 1968.

The Resident General Woodlands Manager for St. Regis, Canada made inquiries for a Resident Woodlands Manager for Hinton, and filled the position with a former employee, Jim Clark, in August 1968. (JDC)

An Information Bulletin from Ivan Sutherland advised that Clark was responsible for all phases of Woodland operations, and Crossley was to have full charge of Forestry. Both were to report to Adrien Provencher of Northern Woodlands, and to Sutherland for the NWPP Corporation. Inf. Bull. 575 - 29 July 1968.

17 June – IWA started legal strike (SH) At this time the IWA was on strike and the action was only terminated by the action of Woodlands in acquiring a sufficient volume of purchased chips on a continuous basis to avert production shutdown. (JDC)

The current trucking contractors on site at the time of strike finish made refusal overtures to the Company for a massive rate increase or they would withdraw service. The Company countered this action by advising the haul group (1) they would receive an immediate rate increase and (2) the Company would advertise for contract proposals in the immediate new year from interested truckers. (JDC)

The last two independent logging contractors at Camps 7 and 20 (Nick Tomkiw and Harry Anker) were terminated in 1968 after 11 years of continuous employment. (JDC/SH) (Tomkiw was at Camp 27, Anker at Camp 20 – JCW/SH)

Forestry

IWA strike – Planting program curtailed, Forestry staff finished planting some blocks that had been started, seedlings sold or given away. (RU/RUStF)

Shtabsky legal firm employed to ensure the right of the Company to the compensation for logs and damage to timber arising from other industrial uses -- settled in 1970. (JCW)

Company planting crew turned back from going to Berland by IWA strikers. Salaried staff went up

				<p>and planted the seedlings stockpiled at Camp 23 over two days -- staying in the abandoned camp. (JCW)</p> <p>Steve Ferdinand becomes Forester i/c Silviculture on 1 June 1968. (Carman returns to Ontario 31 May, eventually becomes top civil servant, later gets Order of Canada) (RU)</p> <p>Ray Ranger seconded to Ferdinand to head up planting program. (RUSTF)</p> <p>Bob Udell appointed Forester i/c Protection and Development -- Protection and Production Layout combined into one when Russ Powell leaves. (RU)</p> <p>February – Investigation of possible sources of jack pine in Lac La Biche area, to meet pulp specifications of potential pulpmill customer. (SH)</p> <p>A study by Ken Smith on the accuracy of photo point samples vs. detailed fine type inventories is conducted on a large compartment in the Embarras working circle. The result showed virtually identical results, leading to a conversion of operational inventories from a fine type system to a photo point sample, with interpreted points on a 20-chain grid. Substantial savings in manpower for inventories resulted. This system continued until the late 1980s when the Company reverted to a fine type mapping system for more detailed information on sawlog volumes. (RU)</p>	
Year	V-P Mill	Woods Mgr	For.	Events	1969
1969	IKS	JDC	DIC	<p>Alberta</p> <p>Procter and Gamble Cellulose sign FMA for a kraft pulpmill at Grande Prairie, becoming the second FMA holder in Alberta 15 years after the 1954 NWPP Agreement.</p> <p>Canfor also obtains an FMA for an expanded sawmill complex in Grande Prairie.</p> <p>Cardinal River Coals Ltd. open a large open-pit mine in the Luscar area during the summer. A new commuter highway to the mine for mine workers in Hinton was constructed from Highway 16 just west of Hinton -- becomes part of Highway 40. First train of coal shipped March 1970.</p> <p>Pulp production in 1969: 176702 tonnes. Published price (Pulp and Paper North American Fact</p>	

Book) US\$160/ metric tonne

Company/Community

St. Regis paper Co. Ltd. purchases the 49% shares from North Canadian Oils Ltd. in January, becoming sole owner of NWPP. Company name remains the same.

Bill Switzer dies in office, by-election results in election of Bob Dowling, PC, druggist in Jasper who serves until 1979.

Entrance Provincial Park re-named William A. Switzer Provincial Park in his honour.

Domtar builds a pole treatment plant on site to utilize selected trees - Stu Allen, Manager. (RU)

ARR – Alberta Resources Railway reaches Grande Prairie (Gadd)

Heavy rain, flooding destroy Company roads and bridges. Cadomin cut off. (RU)

Woodlands

Early in the new year of 1969 the Company advertised for interested parties to submit proposals for the loading and hauling of the yearly volume of Company timber from the FMA. The successful bidder was Hearsey Transport of Duncan, BC. This contract continued into 1972. (JDC)

The first Woodlands employee retires on Feb. 28, Herb Bohning – a mechanic in the woodlands garage.(RU)

The wooden framed Woodlands garage burned to the ground on Halloween night--1969. It was replaced with a new metal clad building that stands today. (JDC)

Norman Denmark leaves position as Assistant Woodlands Manager. (JDC)

Jim Bocking replaces Denmark -- comes from Brown Corporation at Espanola, Ontario. (JCW)

Two independent timber companies operated on the FMA at this time, one harvesting small diameter pine for fence posts manufacture, and the other harvesting 750,000 fbm of sawlogs each year. Neither had their timber secured by government authority. The Forest Service through the deputy minister proposed to the Company that letters of intent be issued by the Company to these

				<p>two operators indicating the Company's good intent of continuing to make the timber supply available. Alternately the government was prepared to issue Quota certificates to the two operators for timber supply. Both operators preferred the Company's letters, which were tendered. (JDC) The operators were Don Terris at Camp 2 and David Benbow's Bighorn Forest Products at Camp 33. (JCW)</p> <p>Forestry</p> <p>AAC reduced to 322,975 cunits (from 335,384) as a result of revision of Ground Rules. (DIC2)</p> <p>New aerial photography in 1969 - revealed an unexpected amount of oil and gas activity on the FMA, with much loss of timber.</p> <p>Timber reconnaissance related to expansion. (DIC2)</p> <p>Bill Mattes hired to supervise the planting program in summer (4 months) and assist Wright on Forest Management program in winter (8 months). (RUSTF/JCW)</p>	
Year	V-P Mill	Woods Mgr	For.	Events	1970
1970	IKS	JDC	DIC	<p>National</p> <p>Des Crossly was awarded the Canadian Forestry Achievement Award by the Canadian Institute of Forestry. He later (1979) made a Fellow of the Institute.</p> <p>Company/Community</p> <p>Amendment to FMA Agreement by O/C 267/70 dated 16 February 1970 – minor boundary wording change.</p> <p>The Fox Creek-Whitecourt Timber Development Area (TDA) hearings were held, in which NWPP was interested from a potential chip supply opportunity. Three small companies made a joint proposal for a sawmill development west of Whitecourt; Simpson Timber Company from Washington state made a proposal for a sawmill development at Blue Ridge. The three sawmillers' joint proposal was awarded Timber Quota, and Simpson's proposal was accepted as a joint-venture with the provincial</p>	

government. Simpson reluctantly accepted their award; they sold out to the government partner several years later and returned totally to their US operations. (JDC) The TDA included much of the former Albertawest/MacMillan-Bloedel FMA initially negotiated by Gordon McNab, sold to MB but never fulfilled. (RU/PJM)

Pulp production in 1970: 179151 tonnes. Published price (Pulp and Paper North American Fact Book) US\$188/ metric tonne

Woodlands

Woodlands assumes responsibility for preparation of their portion of the Annual Operating Plan(AOP) dealing with harvest design and layout -- overall coordination by Ray Ranger. (JCW)

Joint development begins on Emerson Lakes Campground – cooperative project with Company, Forest Technology School and AFS. Planning done by students and staff at FTS, includes campground, walking trail and interpretive signage. (RU/PM)

Forestry

Agreement with government confirms right of Company to compensation for timber damage and loss from activities of other industries - as argued by Shtabsky. (RUStF)

Introduction of Photo-Point Sampling in management inventory, on a 40-chain grid, operational inventory on a 20-chain grid. (DIC/RU)

Commenced management development of FMA. (DIC2)

Crossley writes Intensive Silviculture report -- First Intensive Forest Management proposal -- not accepted since AAC still exceeded needs. (RU)

Second complete measurement of the original CFI plots completed. Program changed to Permanent Growth Sampling - PGS. (RUStF/JCW) -- emphasis on Growth and Yield rather than forest inventory. (JCW)

Commenced removal of residuals. (DIC2)

Creation of Land Use Section Ray Ranger first section head. (DIC2)

				<p>Ray Ranger takes over Development from Udell, including coordination of the AOP preparation – in addition to his land use duties. (RU/JCW)</p> <p>Brenton Simmonds in charge of Protection and Scarification. (RU)</p> <p>Bob Udell resigns to return to Ontario. (RU)</p> <p>Crossley advises Udell that there had been discussions with Procter and Gamble Cellulose about the possibility of NWPP doing the forest management planning for the Procter & Gamble Cellulose FMA in Grande Prairie. It did not happen, but it was an interesting proposition. (RU)</p>	
Year	V-P Mill	Woods Mgr	For.	Events	1971
1971	IKS	JDC	DIC	<p>Alberta</p> <p>New 1971 Forests Act. Conveys ownership of timber on FMAs to FMA holder.</p> <p>Pulp production in 1971: 174667 tonnes. Published price (Pulp and Paper North American Fact Book) US\$165/ metric tonne</p> <p>Company/Community</p> <p>Peter Lougheed's PCs elected government August 1971, ending 30+ years of Social Credit; new Cabinet, review of policies and agreements. PJM</p> <p>The Alberta Minister of Forestry had been pressuring the Company for some time to build and operate a sawmill to utilize the larger FMA timber for lumber and wood chips. The Company Woodlands Manager had been elected to seek St. Regis' approval to build a 50 million fbm studmill at Hinton on two occasions -- to W.R. Haselton in Tacoma, and to W.R. Haselton in New York. He gave verbal approval both times. The request for capital funding was finally submitted in the 1971 budget document. (JDC) The sawmill commenced production in 1972.</p> <p>Crossley and Clark met with Director of Forestry Steele and McDougall on 11 August 1971 on the</p>	

subject of the Minister's suggested revisions to the Agreement. Noted in Crossley's journal: "This turned out to be a rather shocking experience, particularly when the Director advised us that the Company was in default as of July 1st and we no longer had an operating Agreement. After ten hours of work the subject under discussion had not been fully resolved and another meeting will be necessary."

NWPP had retained a provisional reserve area of timber adjacent to the north, east and southern boundaries of the FMA for seventeen (17) years. The Minister of Forestry called a meeting of the Hinton management staff and advised NWPP he was withdrawing the reserve timber from the Company due to its lack of development to utilize this timber. (JDC) Note: believe this meeting was on 15 October 1971 in Minister's office at 9:00 am (as suggested in 6 October letter to I.K. Sutherland from Allan A. Warrack) The formal letter of cancellation from Minister Warrack was dated 4 February 1972. (PJM)

Woodlands

Helge Nelson Bridge over the Athabasca River officially opened by J.D. Ross, Minister of Lands and Forests 25 June 1971. Inf. Bull. 694 - 16 June 1971.

First concrete poured for the new Stud Mill poured 25 June 1971. Inf. Bull. 694 - 16 June 1971.

Woodlands produced 240,000 ties for the CNR – profit negligible, never made ties again. (JDC) The tie operation was an adjunct to the stud mill -- suitable cants were identified at the end of the quad saw and diverted through a chute through the wall to a simple mill outside. Elmer Schmidek ran this operation. (JCW)

During the summer of this year a woods foreman, Rosaire Lacroix, was attacked by a sow black bear with two cubs and had his shoulder blade flesh area torn. The employee escaped further damage by the bear by feigning dead and retreated to the access road where he was picked up by Dick Smith and driven to hospital in Hinton. This was the only known bear attack to an employee in 17 years of Woodlands' activity (to that point). (JDC) And 40 years to present. (RU)

				<p>Forestry</p> <p>Save Tomorrow Stop Pollution (STOP) -- member Arnim Zimmer prepares damaging report on company – alleges erosion problems and lack of regeneration. Company and AFS investigation negates its findings (RU)</p> <p>The STOP report created much stir in Alberta. Des Crossley went around the province rebutting the report. Kare Hellum, head of Silviculture for the AFS relocated all of Zimmer’s photo points. He staked all the regeneration and re-took the picture from the same perspective, providing a much different view of the reforestation situation and effectively discrediting the STOP report. (RUSfF) Photo points were re-photographed in 1998 by Steve Ferdinand and Bob Stevenson. (RU)</p> <p>Start of 5-year Periodic cut. (DIC2)</p> <p>Air reconnaissance for management development. (DIC2)</p>	
Year	V-P Mill	Woods Mgr	For.	Events	1972
1972	IKS	JDC	DIC	<p>Company/Community</p> <p>Letter from Minister A. A. Warrack dated February 4, 1972 advises that the Company had defaulted on the August 30, 1968 agreement to expand, the period of grace having expired on June 30, 1971, the expansion parts of the 1988 Agreement are cancelled. (AAW)</p> <p>FMA area reverts to original 800,000 ha of pre-1968 with loss of Provisional Reserve Area.</p> <p>First sawmill integrated with pulp operation in Alberta opened (RU) -- \$50 million Stud Mill started production.</p> <p>Pulp production in 1972: 179684 tonnes. Published price (Pulp and Paper North American Fact Book) US\$179/ metric tonne. Lumber production: 20,078 M fbm</p> <p>Woodlands</p> <p>The Rhinelander Division of St. Regis Corporation requested Hinton's help in obtaining fire-killed</p>	

				<p>timber out of Alberta. Woodlands accepted to investigate this need and determined it's availability. A contractor-manager was the difficult element to obtain; a former employee was contacted in Borneo (Kalimantan) and he accepted the job and located at Manola, Alberta where the firekilled wood was loaded onto railcars and railed by CNR. to Wisconsin for several years. (JDC)</p> <p>During this year Forestal Consulting representative, Ian McQueen, visited the Hinton logging operations to determine the applicability of the total system to a client's needs (Usutu Pulp) in Swaziland, South Africa. Two(2) Company employees of Usutu visited the Hinton operation (Robert Wood and Jack Enwright) in 1972/1973 and reported some time later they had married the Hinton copy to their needs, successfully. (JDC)</p> <p>Woodlands staff help to set up the Fox Creek Development Association. -- first venture with Aboriginal community group to do contract logging, later leading to other successful business ventures. Jim Clark working with Sam Sinclair initially. (JDC/RU/LMat) Initial project cutting 8' pulpwood at Camp on Fox Creek. (LMat)</p> <p>Forestry</p> <p>Steve Ferdinand working with Hank Spencer designs the Ferdinand Roottrainer containers for seedlings, replacing the Ontario tubes. (RU)</p> <p>Crossley talks to Canadian Society of Wildlife Biologists at Prairie Habitat Conference 18 February – describes relationships between forest management for fibre productivity and the preservation of a healthy forest environment. Refers to “environmental forest management”.</p> <p>Application for a Recreation Reservation on the Wild Sculpture Trail.</p>	
Year	V-P Mill	Woods Mgr	For.	Events	1973
1973	IKS	JDC	DIC	<p>Alberta</p> <p>Alberta Grande Cache Commission established, chaired by N.R. Crump to inquire into the financial difficulties of Grande Cache, reported November 1973. Suggested, among other steps, that a new forest industry be established there.</p>	

				<p>Company/Community</p> <p>Lands and Forests Minister Allan Warrack and Deputy Minister Fred McDougall travel to New York to meet with St. Regis head office people on 9 November 1973 to discuss expansion and attendant environmental improvements. (AAW -personal communication) Evidently nothing resulted from the discussions.</p> <p>“Shulco Report” by C.D. Schultz & Company Ltd. for the Minister of Lands and Forests <i>The environmental Effects of Timber Harvesting Operations in the Edson and Grande Prairie Forests of Alberta</i>. September 1973. Conclusions include statement that “Timber harvesting can remain as a principal and highly legitimate use of the project area.” Detailed recommendations provided.</p> <p>The remaining 792 acres of company-owned land south of Edson were sold (original millsite property). (RU)</p> <p>Pulp production in 1973: 177459 tonnes. Published price (Pulp and Paper North American Fact Book) US\$269/ metric tonne. Lumber production: 50,856M fbm</p> <p>Woodlands</p> <p>First feller-bunchers arrive, tested on a block in Berland 3. Hand limbing slows production.</p> <p>Forestry</p> <p>Ferdinand was allowed to recruit women as tree planters. In 1973 these women planters were fired without warning (and against Steve’s advice) and replaced with male planters -- a band of so-called “hippies” were recruited from BC to take over the planting but a late spring snowfall sent them scurrying back from whence they came.</p> <p>Start of Wild Sculpture hiking trail program--- built by four former women planters who had been let go by Crossley – the planters were re-hired by Wright ,who had an approved budget for the purpose, to build the first phase of the Wild Sculpture Trail. (RU/JCW) The earlier firing prompted a subsequent visit to Crossley by Muriel Venne of the Labour Board, who accused the company of sexual discrimination in the firing. By this time the crew was already working on the W.S. Trail.. (JCW) In early 1970s Company had also assisted the Junior Forest wardens to reconstruct a 12 mile</p>
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				(20 km) portion of the Bighorn Trail, the former Dominion Forestry trail to the Gregg River. (JCW) Department (Lands and Forests) pressure to regenerate backlog. (DIC2)
Year	V-P	Woods	For.	Events
1974	IKS	JDC	DIC	1974 Company/Community Signing of the “Warrack-Sutherland” accord -- requires Agreement changes to be approved by o/c. (Cabinet) rather than unilaterally by administration – distinguishing feature, strengthens integrity of the FMA agreements. (RU) This forces principled negotiation instead of the “command and control” mindset which prevailed at the time in other parts of the country, and still does. (RU) Pulp production in 1974: 176371 tonnes. Published price (Pulp and Paper North American Fact Book) US\$386/ metric tonne. Lumber production: 43,679M fbm Woodlands Part of Camp 54 area near Brule was converted to a community pasture for horses. In negotiating the new FMA area landbase in the 1988 Agreement, 900 ha was removed from the FMA area due to the “single use” nature of the area. (RU) Forestry Bill Mattes takes over Silviculture from Steve Ferdinand who resigns (74-02-28) to go with AFS. Mattes assisted by Neil Holder. (RU) Paul Atfield, a new U of T graduate forester, hired to assist Wright in Forest management and PGS replacing Bill Mattes -- one of his other assignments was to computerize the silviculture records - done successfully. (RUSf) Decision made to hire mixed crews of University students - led to long period of relative peace on labour front. (RUSf) Several familiar names on the 1974 Student Crew of 45 housed in the last occupied Canada Catering Bunkhouse -- e.g. Warren Kehr and Larry Matwie, John Frank, Neil Stevens, Rick Quinlan. Tree Planting supervisors -- John Garner, Rick Holmes, Craig Neeser, Jim

				<p>Darwish, and others. (JCW)</p> <p>Brian Kirstein and Mike Castonguay conducted trials of various techniques to thin overstocked stands of fire origin pine in the Gregg Burn, and in the 1956/57 cutovers in the Quigley Creek area of McLeod IX. They used combinations of brush axes, clearing saws and small chain saws. Brush axes worked best in the fire origin stands due to difficulty and safety concerns using saws among the tangled deadfall Brule in the burn area. A trail using a D8 cat in the Gregg burn proved unsuccessful because of the downed material (JCW)</p>	
Year	V-P Mill	Woods Mgr	For.	Events	1975
1975	IKS	JDC	DIC/ JCW	<p>Alberta</p> <p>Simpson Timber awarded an FMA in the Whitecourt area, mill to be located at Blue Ridge.</p> <p>Company/Community</p> <p>Pulp production in 1975: 166696 tonnes. Published price (Pulp and Paper North American Fact Book) US\$410/ metric tonne. Lumber production: 46,533M fbm</p> <p>Woodlands</p> <p>The Woodlands safety program was totally reorganized to make each supervisor accountable for actions to effectively interface with all employees on a daily basis. This was a tie-in with the short interval scheduling program introduced in 1973 to achieve a controlled and maximized manpower use. (JDC)</p> <p>Forestry</p> <p>Des Crossley retires 31 October 1975 – accorded a warm send-off in recognition of his substantial contributions,</p> <p>Jack Wright named new Chief Forester effective 1 November 1975.</p> <p>Bob Udell hired back (from Ontario) to replace Wright in Inventory and Management. (RU)</p>	

				<p>Progressive Clearcut project on Berland Working Circle begins – goes to 1977. (RU)</p> <p>Commenced thinning program. (DIC2) Work began in the Gregg 1956 burn. Tree planters with brush axes spent 2-4 weeks on this project. (JCW)</p> <p>Wildlife corridor dispute. The Company had been advised by the AFS that the F&W division no longer required wildlife corridors to be retained within the Berland 5 Progressive Clearcut. At a subsequent AOP meeting, the wildlife biologist accused the Company of wilfully cutting the corridors. When confronted with the letter. He refused to apologize saying in his opinion the Company would have cut them anyway. (RU)</p>	
Year	V-P	Woods	For.	Events	1976
1976	Mill IKS/ JB	Mgr JDC	JCW	Company/Community <p>In April, Executive Vice-President Bill Hazelton, tours logging operations and met with woodlands, mill and forestry senior management.(JDC)</p> <p>Ivan Sutherland removed from position of Vice-President and Resident Manager 1976-05.</p> <p>Jim Bowersock, who left NWPP in 1971, returned to become Vice President and General Manager. He originally joined NWPP as shift chemist but had advanced through the mill and was general pulpmill superintendent between 1967 and 1971 when left the Company's employ. (RU)Pulp production in 1976: 174860 tonnes. Published price (Pulp and Paper North American Fact Book) US\$410/ metric tonne. Lumber production: 52,712M fbm</p> Woodlands <p>The self-loading truck program was introduced and proved to be an efficient system to assure wood delivery during inclement weather conditions. It was a copy-program emulated after the system in vogue in Washington-Oregon in the US. (JDC)</p>	

				<p>Forestry</p> <p>Peter Sziklai hired as Tree Improvement Forester -- took over thinning program which switched to pre-commercial thinning of regenerated cutover stands. (RUSTF)</p> <p>Operational thinning of young fire origin stands discontinued -- costs approached \$500 per acre. (RUSTF)</p> <p>Planning to replace the 1965 greenhouses - task later completed 1981.</p> <p>The Bracke scarifier was introduced as a SIP tool to address continuing problems with site preparation for planting in Camp 1. The scalps produced by the machine proved very effective in preparing planting sites, a major step towards the reforestation of second-pass cuts in the wind-parched compartment. (RU/JCW2)</p>	
Year	V-P Mill	Woods Mgr	For.	Events	1977
1977	JB/ KH	JDC	JCW	<p>National</p> <p>Forest Regeneration Conference in Quebec City sponsored by Canadian Forestry Association and Canadian Institute of Forestry highlights nation-wide problem with inadequate forest regeneration. NWPP noted for its successes, (PM) although nobody from the Company was able to attend the conference. (JCW)</p> <p>Alberta</p> <p>A series of forest land use studies along the foothills leads to publication of <i>A policy for resource management of the Eastern Slopes</i>. Eight zones were described and maps showed their locations. Parts of the northern areas affected the Hinton FMA area.</p> <p>Environment Council of Alberta begins hearings on the Environmental Effects of Forestry Operations in Alberta. Retired Chief Forester Des Crossley appointed one of four panel members, along with Bruce Dancik (chair), J.F. Reynolds and Alistair Crerar (ECA <i>ex officio</i>).</p>	

				<p>Company/Community</p> <p>The Resident Manager (J. Bowersock) was promoted in October 1977 to General Manager of the Kraft Division of St. Regis, then became V.P. and General Manger in Jan. 1978. (JDC/ RU)</p> <p>Kenneth Hall appointed new Resident Manager - 14 November 1977. (KH) Envisaged exciting opportunity to initiate and achieve the unrealized potential of the Company. Note six strengths listed: resource base, FMA, AAC under-utilized, social climate favourable for integrated operation, relatively small mill size, global competition and cost competitiveness concern.</p> <p>Pulp production: 169679 tonnes. Published price (Pulp and Paper North American Fact Book) US\$342/ metric tonne. Lumber production: 56,066M fbm</p> <p>Woodlands</p> <p>On October 17,1977 at 12:30 p.m., crew foreman Jim Bushner was shot and gravely wounded in his office trailer by one of his employees. It was several months before he was able to return to the job.</p> <p>Forestry</p> <p>Second revision of the Forest Management Plan - (Third Forest Management Plan submitted) Lead author Bob Udell.</p> <p>FMP incorporates AAC increase to 371,650 m3 (from 322,975) in the 1977 FMP revision. (JCW2) The increase was due to two factors: 1) compartments were re-formatted to more closely represent age class and topographic boundaries. Sizes became quite variable and number increased from 65 to 120. The need for a 20-year supply of wood at 25,000 cords per year for an operating camp in one compartment was no longer there with mechanized commuter operations, and 2) accumulated undercut with a fixed termination date for the first rotation. (RU)</p> <p>Inventory based on photo point sample system (PPS) system developed by Jack Wright. Interpreted points on a 40-chain grid. This quadrupled the intensity of sample – previously used the CFI plots on a 1-mile grid (RU)</p>
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Year	V-P	Woods	For.	Events	
1978	KH	JDC	JCW	<p>Company/Community</p> <p>NWPP renamed St. Regis (Alberta) Ltd. NWPP had been a wholly-owned subsidiary of St. Regis since purchase in 1969 of the 49% share held by North Canadian Oils. (RU)</p> <p>Ken Hall explores opportunities to expand and diversify operations at Hinton. Develops proposal for major expansion of pulp mill, addition of a two-machine light weight coated paper mill, and an expanded and modernized sawmill, all to increase value-added to best utilize an expanded FMA area. Hall believes his enquiries and proposal trigger Alberta government to initiate the Berland TDA. (KH)</p> <p>Jack Wright believes it was Canfor's request for an FMA in the northern part of MU E8 to support a new sawmill to be built in their present FMA (replacing their mill in Grande Prairie) that was the trigger. Both St. Regis and Simpson Timber were interested in all or parts of the area. None of the them received any allocation. (JCW)</p> <p>Pulp production: 167476 tonnes. Published price (Pulp and Paper North American Fact Book) US\$375/ metric tonne. Lumber production: 59,357 M fbm</p> <p>Forestry</p> <p>Jack Wright makes strong submission for the Berland proposal on behalf of the Company. (RUStF)</p>	1978
1979	KH	JDC	JCW	<p>National</p>	1979

			<p>The F.L.C. Reed Report <i>Forest Management In Canada</i> commissioned by the Canadian Forestry Service released. NWPP operations described and commended as a case study. (RU)</p> <p>Alberta</p> <p>The Environment Council of Alberta (ECA) Report on Forestry was released, dated February 1979. Des Crossley was a member of the forestry panel. (RU)</p> <p>Dr. Ian C. Reid, PC, physician from Hinton, elected MLA for Yellowhead, replacing Bob Dowling who chose not to run again. Reid later becomes a member of Cabinet as Minister of Highways.</p> <p>Company/Community</p> <p>Feb. 1, 1979. St. Regis announced the promotion of Jim Bowersock to Senior Vice President, Kraft and Recycled Products (RU)</p> <p>The Berland Timber Development Area announced by the Province, inviting proposals for development. The government interest involved the communities of Grande Cache, Hinton, Whitecourt and Fox Creek. St. Regis made a proposal for installation of a light-weight coated paper machine at Hinton, a 40 million fbm sawmill and a log home manufacturing plant at Grande Cache. This community was the favoured locale for economic improvement. In a competing proposal the company British Columbia Forest Products of BC proposed a newsprint plant and sawmill at Knight, Alberta near Whitecourt (original proposal location at Obed site (PJM), as well as a 100 million fbm sawmill at Grande Cache. (JDC/RU)</p> <p>May 15. St. Regis president W.R. Hazelton announced that the company had selected Hinton as the site for its new lightweight coated paper machine, whose capital funds had been approved April 26. The announced cost was \$180,000,000 U.S. This was in addition to previously announced expansion plans of a 78,000 ton thermomechanical pulp plant, and expansion of lumber production by 140 million fbm/ yr. The installation was contingent on St. Regis (Alberta) Ltd.'s ability to secure additional wood to supply the new projects.</p> <p>Field reconnaissance indicated that on the proposed Berland TDA, the timber would only support a 40 mm fbm mill at Grande Cache in the opinion of the Forestry Department. (RU)</p> <p>Company submits proposal for the Berland TDA on 1 May 1979, the deadline for submissions. Staff involved in public hearings, submits a second proposal in response to hearings in Fox Creek and</p>
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				<p>Grande Cache. (KH)</p> <p>On 23 November 1979 Alberta Government announced award of the Berland TDA to BC Forest products. Hall writes regrets to staff and thanked them for their contributions and support. Contract with Calgary Power for new transmission line from Wabamun cancelled with penalty payment.</p> <p>Minister of Energy and Natural Resources, Merv Leitch, contacts St. Regis Paper to discuss potential alternatives for wood supply to support the Hinton expansion proposal. The province was convinced the company was overestimating its wood supply needs, and offered a reduced landbase (50-60% of original proposal). St. Regis declines the offer. The proposal at Hinton was already considered by St. Regis to be a challenge and the company had alternatives for its investment dollars. (FWMcD, JB, PM)</p> <p>St. Regis announces that the LWC paper mill on order for Hinton to be constructed instead at Sartell, Minnesota, where it operates still. (RU)</p> <p>St. Regis concern that the BCFP proposal was based on an exaggerated assessment of the wood resource, and unfulfillable commitments. (KH)</p> <p>BCFP won the proposal award (the Alberta government owned 28% of BCFP stocks at the time) and built a sawmill at Grande Cache immediately. About 10 years later, BCFP relinquished the proposal intent and abandoned development in Alberta. It was a horrendous loss to Alberta. (JDC) They never did fulfill the terms of their agreement - they only built the sawmill at Grande cache. Their FMA was subsequently cancelled and replaced with a Volume Allocation in MU E-8 and E-10. (JCW)</p> <p>Note Ken Hall expressed concerns about apparently ill-advised political policies affecting the decision, and loss to Alberta of an opportunity to build a paper mill in the province. (KH)</p> <p>Hall determined to find a new solution to address the future survival of St. Regis Alberta Ltd. (KH)</p> <p>Pulp production: 173163 tonnes. Published price (Pulp and Paper North American Fact Book) US\$460/ metric tonne. Lumber production: 53,038M fbm</p>
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				<p>Forestry</p> <p>Cazes & Hepner (C & H) plough was introduced to address problems with excessive vegetative competition, especially poplar. (JCW2/RU) On about 10 per cent of planting sites, the rapid growth of hardwoods (aspen) created too much competition for the conifer seedlings. A C&H plough was acquired in 1979 and mounted on a modified Komatsu tractor in an attempt to deal with this problem.</p>	
Year	V-P	Woods	For.	Events	1980
1980	Mill KH	Mgr JDC	JCW	<p>Company/Community</p> <p>A fire consumed the main stack of the pulpmill, forcing an extended fall maintenance shutdown until it could be replaced. (RU)</p> <p>Pulp production: 167873 tonnes. Published price (Pulp and Paper North American Fact Book) US\$530/ metric tonne. Lumber production: 46,152M fbm</p> <p>Forestry</p> <p>Craig-Simpson (C & S) rear-mounted ripper plough was introduced for SIP in areas of deep duff, supplementing winter blading, which was the practice up until then. (JCW2/RU) This system was used in early winter when there was enough frost to support the tractor but before the snow was too deep. Exposing sufficient mineral soil continued to be a challenge on some sites.</p> <p>New Greenhouse under construction – 2.5 M seedlings produced. (JCW2/RU))</p> <p>The first St. Regis Ski Marathon was held from Beaver Lake (former Audubon Pond) in McLeod IX to Robb, traversing 60 km of highly variable terrain including the Bighorn Ridge. Overall winner was Rocky Notnes of Hinton Nordic Skiers who received his award from Vice President Ken Hall at the finish line. (RU)</p>	

Year	V-P Mill	Woods Mgr	For.	Events	1981
1981	KH	JDC	JCW	<p>National</p> <p>Jack Wright appointed member of the Forest Research Advisory Council of Canada (FRACC) (RU) He later served as Chairman in 1988 and 1989. (JCW).</p> <p>Alberta</p> <p>Union Oil Co. of Canada Ltd. and Rescon Holdings announce new coal mine in the Obed Mountain field northeast of Hinton. Company very concerned over loss of several thousand acres of well-established reforestation. (RU)</p> <p>Company/Community</p> <p>Stud mill expanded to produce 70 million fbm (RU)</p> <p>Pulp production: 171095 tonnes. Published price (Pulp and Paper North American Fact Book) US\$545/ metric tonne. Lumber production: 54,469M fbm</p> <p>Forestry</p> <p>New Forest Nursery and Greenhouse opened (RU)</p> <p>3 M seedlings produced. (JCW2)</p>	
Year	V-P Mill	Woods Mgr	For.	Events	1982
1982	KH	JDC	JCW	<p>National</p> <p>Des Crossley, retired Chief Forester, awarded honorary doctorate at University of Toronto for his pioneering work in industrial forest management.</p>	

Alberta

In April 1982 the Alberta Forest Service and the Fish and Wildlife Division of the Alberta Department of Forestry, Lands and Wildlife co-hosted a workshop in Jasper to address the theme: "Timber Harvesting in the Boreal Forest: Capitalizing for Wildlife"

Dr. Jack Ward Thomas was the facilitator who led the attendees through an appreciation of the "how" to do it. Jim Clark, St. Regis Woodlands Manager, gave the summary address to the conference and offered its FMA as the testing grounds for the future. An industry-government committee spent three years determining the means to bring this integration management of resources into fruition. (JDC)

Company/Community

Amendment to FMA Agreement by O/C 1046/82 dated 6 October 1982 – recorded official name change from NWPP to St. Regis (Alberta) Ltd.

Serious economic downturn in the pulp industry (KH)

Hall continues to propose to St. Regis modernization and expansion at Hinton' (KH)

On 30 November 1982 BC Forest Products asks Alberta government for permission to delay construction of pulp mill and sawmill near Whitecourt for two years. (Edm. J.)

Pulp production: 173276 tonnes. Published price (Pulp and Paper North American Fact Book) US\$440/ metric tonne. \$105 reduction from 1981 Lumber production: 60,764M fbm

Woodlands

Task Force on Forestry/Wildlife program for FMA: On Nov. 2, 1982, ADMs D. Surrendi (F&W) and J. A. Brennan (AFS) directed a task force be struck to develop an integrated management approach. Members included: Alberta Forest Service: Don Fregren (Chair), Ed. Gillespie, Norm Rodseth; Fish and Wildlife: Dave Neave, Bruce Stubbs, Gerry Thompson; St. Regis (Alberta) Limited: J. D. Clark, J.C. Wright, J. C. Bocking. Their final report, prepared by Wright, Rodseth, Kirby Smith and Richard Quinlin was presented in 1986. It, along with a Dec. 1987 report by Beth

				<p>McCallum and Rainer Abel, set the stage for the ensuing programs on the FMA area.</p> <p>Fox Creek Development Association becomes Incorporated in 1982.</p> <p>Forestry</p> <p>Reforestation program reduced for a year – especially scarification for natural regeneration (done for backlog treatments and blocks in the second year after harvest in order to stay within the regulation requirements - JCW)– due to poor market conditions, some staff layoffs. (RU) The full cost of the delay was recognized later as NSR areas came due for planting. (DP)</p>	
Year	V-P Mill	Woods Mgr	For.	Events	1983
1983	KH	JDC	JCW	<p>Alberta</p> <p>Pelican Mills constructs Alberta’s first oriented strand board (OSB) mill at Edson. Its success leads to increased markets for hardwood timber.</p> <p>The Gregg River mine, adjacent to the FMA area, was opened in 1983 to provide bituminous coal for steel-making. The mine was proposed for 15 years, and closed 17 years later in 2000. (JCW)</p> <p>Company/Community</p> <p>St. Regis affected by take-over attempts, “Greenmail”. (KH) -- by Sir James Goldsmith and then by Rupert Murdoch. (DP/KH) Goldsmith was bought off, but St. Regis could not continue this type of practice and approached Champion Corporation with a view to a friendly takeover. (RUSTF)</p> <p>Pulp production: 181150 tonnes. Published price (Pulp and Paper North American Fact Book) US\$440/ metric tonne. Lumber production: 67,603M fbm</p> <p>Woodlands</p> <p>Jim Clark, Woodlands Manager, elected President of the Alberta Forest Products Association</p>	

Year	V-P Mill	Woods Mgr	For.	Events	1984
1984	KH	JDC	JCW	<p>Alberta</p> <p>New Forest Industry Development Division (FIDD) created in 1984 to promote and negotiate new forest industry agreements. Headed by former ADM for Forestry Al Brennan.</p> <p><i>Policy for resource Management of the Eastern Slopes</i> was revised in 1984, refining the land use zoning approach to sensitive areas.</p> <p>Obed Mountain mine 30 km northeast of Hinton opens. Company loses 3200 ha of productive forest land. Commuter access provided by new access road and utility corridor north from Obed Hills on Highway 16 east of Hinton.</p> <p>Government of Alberta White Paper on Economic Development - "Proposal for an Industry and Science Strategy for Alberta 1985-1990". Forest industry to be a major player in economic diversification.</p> <p>Company/Community</p> <p>St. Regis Paper Co. Ltd purchased by Champion International November 1984 (KH) The take-over bids were attempted due to undervalued stock, relative to value of assets. First attempt by Goldsmith was bought off, the second by Murdoch resolved by friendly merger with Champion. (DP)</p> <p>There was no negative impact on the Hinton operation – only the name changed from St. Regis (Alberta) Ltd. to Champion Forest Products (Alberta) Limited in 1985. (JCW)</p> <p>Pulp production: 186963 tonnes. Published price (Pulp and Paper North American Fact Book) US\$510/ metric tonne. Lumber production: 72,167M fbm</p> <p>Woodlands</p> <p>The Hinton Division became heavily involved with the Alberta Forest Products Association while the Woodlands Manager was President of AFPA. It was a heavy involvement with workers</p>	

				<p>compensation matters, countervail action by the US forest industry, product marketing, membership expansion with the pulp/paper producers, and environment problems associated with the mountain pine beetle infestation, and salvage programs to utilize dead timber and eradicate the infestation. (JDC)</p> <p>Jim Clark, Woodlands Manager, is President of the Canadian Institute of Forestry 1984-85 (RWU)</p>	
Year	V-P Mill	Woods Mgr	For.	Events	1985
1985	KH	JDC/ JCW	JCW	<p>Company/Community</p> <p>Company renamed Champion Forest Products (Alberta) Ltd.</p> <p>Hall prepares 1985 Strategic Plan for viable expansion if additional FMA area could be obtained. Champion approves the plan in October 1985. (KH)</p> <p>Hinton success-story written in Donald Mackay's <i>Heritage Lost</i> (RU)</p> <p>Pulp production: 183568 tonnes. Published price (Pulp and Paper North American Fact Book) US\$400/ metric tonne. Lumber production: 73,713Mfbm</p> <p>Woodlands</p> <p>Before retiring, Clark and Jack Wright collaborated on a proposal to merge the old Forestry and Woodlands departments under one Manager (initially proposed by Bryon Muhly). (RU). This proposal was accepted by Ken Hall and Don Laishley was hired to head up this new Department in 1996. (KH)</p> <p>Jim Clark retires end November 1985 and given warm send-off and recognition of his contributions.</p> <p>(RUSTF)</p> <p>Jack Wright supervised Bob MacKellar as Woodlands Production Superintendent and Jim Bocking as Planning Superintendent until Laishley arrived.</p>	

				<p>Forestry</p> <p>Major Growth and Yield advances – in-depth analysis of PSP data combined with destructive research in growth and yield -- analysis on “paired plots” reveals dramatic information on growth and yield of both fire-origin and regenerated pine. Collaborative effort by Bob Udell and consultant Dick Dempster. This confirms and expands on earlier investigations by Wright. (RU)</p> <p>New inventory for 1986 forest management plan revision -- based on Photo Point Samples (ref. Reg Loomis c.1951).</p>	
Year	V-P Mill	Forest Resour	For.	Events	1986
1986	KH	DL	JCW	<p>Company/Community</p> <p>Initiation of discussions with the Province about expansion on 1 April 1986. (KH) Successful resolution of proposals takes 33 months . (KH) Note start of negotiating involved meeting with Don Getty and Don Sparrow with Whitey Heist of Champion outline proposal and ask for a one-window approach. (KH)</p> <p>Strategic Plan for expansion approved by Champion (KH)</p> <p>On 5 May 1986 Champion Forest Products (Alberta) Ltd. announces it will commence a \$3 million feasibility study to modernize and expand the Hinton operations. Background presented to Minister of Forestry Lands and Wildlife 1 May. (KH)</p> <p>Status report meeting on the Feasibility Study held 7 November 1986 with Hon. Don Sparrow to try to find a way to expedite the flow of approved government decisions. Note the numerous agencies and decisions needed, both provincial and federal, and time constraints. (KH)</p> <p>Note also: PC government re-elected, Premier Don Getty, “forestry” becomes part of new Department. of Forestry Lands and Wildlife, and Forest Industry Development Division established in Department of Economic Development.</p>	

February 8. A horrendous train crash just east of town near the Carldale Subdivision killed over 30 passengers of an east-bound train. A freight train with 114 cars and three diesel locomotives, heading west entered the single track rail line from the double track section, failing to stop to allow the passenger train to pass. (RU)

Pulp production: 187,132 tonnes. Published price (Pulp and Paper North American Fact Book) US\$480/ metric tonne. Lumber production: 74,244M fbm

Forest Resources

Des Crossley dies Nov. 30, 1986.

Major Department restructuring – Forestry and Woodlands amalgamate into one Forest Resources Department. (DL/RU)

Don Laishley starts as Forest Resources Manager in January 1986. One of major assignments to negotiate a new FMA agreement to expand the area sufficiently to support an expanded mill capacity. (DL)

Operational responsibility for Silviculture assigned to the Districts. Planning remains in Forestry. (RU)

Bob MacKellar becomes Superintendent of Wood Supply, retires 1987.

Third revision of Forest Management Plan submitted (Previous 1961, 1966, 1977) Lead author Bob Udell. PGS analysis used to support major AAC increase, noted next. (RU)

AAC rises about 25% from 371,650 to c. 460,000 m³ largely based on an analysis of growth performance of PSP data. {Previous yield projections were based on empirical yield curves. (RU)

Wildlife Task Force Report: The final report of the 1982 task force, prepared by Wright, Norm Rodseth (AFS), Kirby Smith and Richard Quinlin (F&W) was presented in 1986, setting the stage for the subsequent wildlife program.

Year	V-P Mill	Forest Resour	For.	Events	1987
1987	KH/ HK	DL	JCW/ RU	<p>National</p> <p>Canadian Council of Forest Ministers sponsors national workshop in St. John NB to develop A <i>Forest Sector Strategy for Canada</i> to guide national forestry programs. Its recommendations were overshadowed by release of the Brundtland Commission on Economy and Environment <i>Our Common Future</i> that encouraged “sustainable development”. NWPP staff involved in the national strategy. Both to influence forest management.</p> <p>Company/Community</p> <p>March 19. Board of Directors, Champion International Corporation approved the expansion of the company’s mill at Hinton, at a projected cost of \$285,000,000. (RU)</p> <p>Ken Hall retires as VP and Resident Manager March 1987 to become Project Leader for mill expansion project.</p> <p>Note substantial agreements by June 1987 - CN freight, Federal corporate tax, Provincial loan guarantee, provincial roads assistance, wood resources identified, FMA concepts, Utilities agreement for Hinton, sales tax protection, agreement on environmental standards. Pending: EIA and permit to construct, Bill C-18 “Freedom to Move”, details of roads, silvicultural, water and sewer, FMA aspects. Negotiations continue into 1988. (KH)</p> <p>Completes detailed plans and funding proposal before transferring, ongoing resolution of problems with federal and provincial authorities. (KH)</p> <p>Harry Karasiuk, hired from Ontario, becomes new Vice-President Operations 15 May 1987. (KH). he was previously with NWPP at Hinton as a chemical engineer starting in 1956.</p> <p>Dennis Hawksworth, Weldwood’s general manager at 100 Mile House, visits Hinton to evaluate new sawmill proposal.</p> <p>Pulp production: 192230 tonnes. Published price (Pulp and Paper North American Fact Book)</p>	

				<p>US\$550/ metric tonne. Lumber production: 77,032M fbm</p> <p>Forest Resources</p> <p>Dempster/Udell paper “Predicting the Growth and Yield of Regenerated Lodgepole Pine” wins the Domtar Award for “most meritorious work in the current year for forest conservation in Canada” at the March CPPA Convention in Montreal. Pioneering work is later emulated in BC with major contribution to maintaining or enhancing AAC in face of shrinking resource base. (RU)</p> <p>Jack Wright retires 1987-07-31, Bob Udell named to replace him as new Central Planning Superintendent – then becomes Strategic Planning Superintendent. (RU)</p> <p>FMA Negotiating Team includes Don Laishley, Bob Udell and Ray Ranger. (DL)</p> <p>New bridge over McLeod River (DL)</p> <p>December - Rainer/McCallum Wildlife Report. This report, along with the 1986 task force report, set the stage for 1988 announcement by Company of a new wildlife program and joint company/government committee to oversee integration of wildlife and forest management.</p>	
Year	V-P Mill	Forest Resour	For.	Events	1988
1988	HK	DL	RU	<p>Alberta</p> <p>Assistant Deputy Minister Ken Higginbotham summoned Alberta FMA holders to a meeting where he discussed growing public and ENGO concern over forest management planning in Alberta. He proposed that the FMA holders develop formal public involvement programs for their forest management plans. In return, he offered to do the same for management plans prepared by the province, covering crown management units and affecting quota operators. Alternatively, if the FMA holders decided to reject his proposal, he announced his willingness to develop a process for them and impose it on them. The FMA holders resolved to take him up on the first proposal, and all subsequently did. Weldwood was the first out of the blocks with a public advisory committee in January 1989. (RWU)</p>	

Company/Community

Weldwood of Canada, the majority owner of which was Champion International, was asked by Champion to purchase the Hinton company shares to consolidate Champion's holdings in Canada under the Weldwood name. Hinton Operation became Weldwood of Canada, Hinton Division. (RU)

Final draft FMA Agreement received from government 27 January - still details, concerns about delays. (KH)

Permit to construct the new mill was issued by the province 28 January 1988 (KH)

Many details remain unresolved until late May. Formal signing of FMA 16 June 1988. (KH)

Pulpmill expansion begins

New Forest Management Agreement – passed by O/C 290/88 dated 26 May 1988. Major change enlarged FMA Area upon committed expansion – respectively for expanded pulp mill and new sawmill.

FMA Area increased from 800,000 ha to 1,012,000 ha

Dennis Hawksworth moves to Hinton in November 1988 as project manager for new sawmill - to start design details and negotiations with union.. (DH)

Pulp production: 192558 tonnes. Published price (Pulp and Paper North American Fact Book) US\$655/ metric tonne. Lumber production: 74,020M fbm

Forest Resources

Sean Curry starts in January - to take charge of the Inventory for the expansion area and for preparation of the 1991 Forest Management Plan -- Growth and Yield program. (SC)

First Forest Industry Wildlife Program in Alberta -- Rick Bonar hired as Wildlife/Recreation Coordinator starts in May – beginning of wildlife and biodiversity program. (RB/JCW)

. A new government-industry committee was formed called the Integrated Resource Management Steering Committee (IRMSC) comprising Bonar and Doug Walker from the Company, Richard

				<p>Quinlan from Alberta Fish and Wildlife and Tony Sikora from the Alberta Forest Service. The premise of IRMSC for wildlife was that Weldwood would manage habitat and the Department would manage populations. (RB) This premise was the same as recommended by the joint committee in 1986. (JCW)</p> <p>Doug Walker hired from Lakehead University staff as Forest Management Coordinator. (JCW)</p> <p>Growth & Yield coop with Grande Prairie (P&G) and BC Forest Service - focus is SPS & TASS model development and calibration for company operations. (RU)</p> <p>PSP establishment in the expansion area begins -- at 1/8th intensity - 1990 complete (SC)</p> <p>Begin 4-year focus on new Forest Management Plan</p>	
Year	V-P	Forest Resour	For.	Events	1989
1989	Mill HK/ RS	DL	RU	<p>Alberta</p> <p>Expert Panel on Forestry set up, chaired by Dr. Bruce Dancik of the University of Alberta. Bob Udell a member, along with Lorne Brace of CFS and Dr. John Stelfox of CWS.</p> <p>Company/Community</p> <p>Final details of Forest Management Agreement resolved in January 1989 - elapsed time from initiation of discussions with the Province on 1 April 1986 to conclusion 33 months. (KH) (But O.C. signed in 1988)</p> <p>Mill manager Harry Karasiuk leaves 12 October 1989. Replaced by Ron Staples in December .</p> <p>Pulp production: 167624 tonnes. Transition year for pulp mill expansion reduces output. Published price (Pulp and Paper North American Fact Book) US\$800/ metric tonne. Lumber production: 82,386M fbm</p>	

				<p>Forest Resources</p> <p>Weldwood Forest Management Liaison Committee (FMLC) - January 1989 - first meeting, formative - "to provide input to the Company's forest management plan". First Public Advisory Committee in forest management in Alberta. (RU)</p> <p>Wildlife strategy – focus on habitat - 16 wildlife community associations, identify representative species</p>	
Year	V-P Mill	Forest Resour	For.	Events	1990
1990	RS	DL	RU	<p>Alberta</p> <p>Expert Panel on Forestry reports. Some of its recommendations will affect the Hinton operations. One recommendation leads to Alberta Forest Conservation Strategy program in 1994.</p> <p>Ken Hall named Resource Person of the Year by the Alberta Chamber of Resources. (RU)</p> <p>Company/Community</p> <p>March 14, 1990 – last Project Management meeting with Ken Hall – expansion project complete. Hall retires end December. (KH)</p> <p><u>NOTE: Ken Hall retired to British Columbia, where he died on June 16, 2012 at age 88</u></p> <p>Opening of expanded Kraft Pulpmill (385,000 tonnes) (RU)</p> <p>Saw mill development to replace the existing stud mill was proceeding at the study level under the direction of Weldwood of Canada personnel and consultants. (KH)</p> <p>Capital commitment to new sawmill postponed in response to market conditions. (DH)</p> <p>Pulp production: 232283 tonnes. Published price (Pulp and Paper North American Fact Book) US\$830/ metric tonne. Lumber production: 81,628M fbm</p>	

				<p>Forest Resources</p> <p>Log Profile study -- contributes to SAWSIM for design of new sawmill (DH)</p> <p>Tree seedlings -- start of transition from Spencer-Lemaire to styrobloc containers. Initial focus on 2/11 plugs (container base 2 cm diameter by 11 cm length. (DR)</p>	
Year	V-P Mill	Forest Resour	For.	Events	1991
1991	RS	DL	RU	<p>National</p> <p>Government of Canada announces a nation-wide competition for "Model Forests" to be developed in each of the major forest regions of Canada. This program, the brainchild of Director General Fred Pollack, was part of the federal government's "Green Plan", and one of the few programs begun under this plan which continue (2001), another being Tree Plan Canada. Each model forest was to include an industrial partner and a working forest, and would be a working example of sustainable forest management. Almost 100 preliminary proposals submitted, around 50 detailed submissions. (RU)</p> <p>Alberta</p> <p>Free-to-grow legislation passed by Alberta government in 1991 -- terms had been negotiated with forest industry of which Weldwood was a part. New standards took effect in March 1991. (RU)</p> <p>Feb. 28-March 1. Forestry and Natural Resources Caucus Committee visited Hinton forest resources operations.</p> <p>Company/Community</p> <p>Pulp production: 346683 tonnes. Published price (Pulp and Paper North American Fact Book) US\$665/ metric tonne. Lumber production: 83,534M fbm</p> <p>Construction of new sawmill begins. Dennis Hawksworth responsible for construction project and</p>	

				<p>will operate it when completed. (RU)</p> <p>Forest Resources</p> <p>New Forest Management Plan for the expanded FMA completed (Fourth revision of FMP) - submitted 1961, 1966, 1977, 1986, 1991). Lead author Douglas Walker. (RU)</p> <p>Minor increase in AAC due to change to FORMAN model and elimination of the concept of "rotation". (RU)</p> <p>FMP data based on Fine-Type Inventories and Photo Points. First to show 200-year projection. (RU)</p> <p>AAC determination -- noted need for Silviculture focus (DP)</p> <p>Geographic Information System (GIS) installed – Brian Maier in charge.</p> <p>50 millionth seedling planted (RU)</p> <p>Major Department restructuring led to the loss of several positions and staff. (RU)</p> <p>Draft wildlife strategy in hand -- not a part of the '91 FMP (RB)</p> <p>Company was approached by Dennis Quintilio/ Ross Risvold of the Forest Technology School suggesting joint venture for a model forest at Hinton. Udell and Laishley agreed to partner. Forestry, Lands and Wildlife also signed on to the venture. Working committee established to develop preliminary and detailed proposals, which resulted in Foothills Model Forest. Bonar and Walker from Weldwood were on the working committee, Udell and Laishley on the steering committee. The proposed program included a major emphasis on wildlife. (RU/ RB)</p>	
Year	V-P Mill	Forest Resour	For.	Events	1992
1992	RS	DL	RU	National	
				National Forest Strategy and National Forest Accord approved at Ottawa convention. Total of 64 commitments among multi-stakeholder group to work towards sustainable forest management	

			<p>(SFM). Weldwood participates and endorses through the AFPA. Laishley and Udell attend ratification at National Forest Congress in Ottawa.</p> <p>National Forestry Round Table reports with set of principles for achieving SFM. Don Laishley a major player on this round table.</p> <p>Canada announces its intention to support an international network of Model Forests at the UNCED summit at Rio de Janeiro. (RU)</p> <p>Alberta</p> <p>Alberta Forest Service becomes part of the new Department of Environmental Protection -- combined with part of former Lands Division, AFS becomes Alberta Land and Forest Service (ALFS).</p> <p>Hon. Justice D.C. McDonald rules against plaintiffs in the Daishowa Peace River trial in their charge that their FMA was not designed to provide “perpetual sustained yield” -- that no perpetual sustained yield was possible under terms of their agreement. Ruling on 23 January 1992.</p> <p>Foothills Forest Agreement signed – successful application by Company with Alberta Forest Service and Forest Technology School. Model Forest submission was the best of the national competition and Foothills Forest became one of ten across Canada. (RU)</p> <p>Foothills Forest incorporated as a non-profit company on November 2, 1992. Two shares issued, one each at \$1.00 to Weldwood of Canada and the Alberta Government Department of Forestry, Lands and Wildlife. The Board of Directors consisted of Weldwood: Robert Udell (president), Don Laishley (Chairman of Board), Ron Staple Alberta Gov’t: Dennis Quintilio, Frank Cardinal, William Fairless, Ross Risvold Jasper National Park: Gaby Fortin CAPP: Colin Edey UofA: James Beck</p> <p>Company/Community</p> <p>Two letters from ADM Forestry in December raise issues of deciduous timber for which a utilization plan is required, and cancellation or changes to chip direction Agreement.</p> <p>Pulp production: 371288 tonnes. Published price (Pulp and Paper North American Fact Book)</p>
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				<p>US\$520/ metric tonne. Lumber production: 90,815M fbm</p> <p>Forest Resources</p> <p>Forest Management Liaison Committee (FMLC). Public and FMLC concerns led to Workshop in fall 1992 to review public involvement process to Company. New Forest Resources Advisory Group emerges in the new year with a new mandate and terms of reference. FRAG now free to choose and examine issues of its choice, making recommendations to the Company. (RWU)</p> <p>Hamish Kimmins hired to review forestry practices. –Resulting report shows need for a major review of forestry practices. (RU)</p> <p>Hugh Lougheed starts October 1992, replacing Doug Walker as management forester. – (RU)</p> <p>David Presslee starts November 1992 as a silviculture forester.</p> <p>New wildlife studies begun - FMF, U of A modelling.</p> <p>Linked Planning Process initiated at end of year. Task force to study linking Woodlands and Forestry concerns -- included Bob Udell, Rick Bonar and Hugh Lougheed from the Company and Tony Sikora and Dan Wilkinson from the government. (HL)</p> <p>Diane Renaud hired as a silviculturist.</p>	
Year	V-P	Forest Resour	For.	Events	1993
1993	RS/ DMacD	DL	RU	<p>Company/Community</p> <p>D. MacDonald appointed Vice-President and Resident Manager upon Staples' resignation.</p> <p>Minister Brian Evans writes 10 November 1993 letter to Graham Bender, Weldwood President and CEO to request Company voluntarily provide for all seedlings and pay for seed services. Company in response expresses concerns and requests industry-government meeting to discuss.</p> <p>New Hi-Atha sawmill completed 30 August 1993 - operations begin on 215 million fbm sawmill. (DH) Cost \$72 million, \$5 million under budget. (DH) Dennis Hawksworth supervised</p>	

construction start-up and operation.

Log profile data used to inform and advise on harvesting sequence (DH)

Pulp production: 364279 tonnes. Published price (Pulp and Paper North American Fact Book) US\$490/ metric tonne. Lumber production: 62,323 M fbm (Studmill) and 31,949Mfbm (Hi-Atha) during decommissioning of old Studmill, startup of new Hi-Atha mill.

Mill changed to ECF bleaching using Chlorine Dioxide

Forest Resources

Silviculture office trailer in mill yard burned on 13 May -- all computers, paper records and work in process destroyed. Fortunately Diane Renaud had saved a backup copy of the computer files that she had taken home with her, thereby saving a major part of the historical record. Unfortunately, several research reports from early forestry department days were also lost. The GIS group were temporarily established in a classroom at the Forest Technology School, with new equipment to replace that destroyed by the fire. (RU)

Kimmins-Brace Report on Silviculture. Following a preliminary report by Dr. Hamish Kimmins in 1992, he was joined by Lorne Brace in a more comprehensive review of the forestry program. They reported that, unless significant changes were implemented, the company's management plan assumptions would not be achieved and allowable cuts and sustainability would suffer. The results included a major expansion of Silviculture effort and concentration of silviculture effort -- and the silviculture planners - under one manager, David Presslee.. This report led to three further internal reports and significant changes in the organization. (RU)

Report led to systematic regeneration program monitoring program. (DR)

Planning and implementation operations changed to put silviculture planning and operations under one manager. (DP)

Side-by-side seedling planting trials started in Berland block 140 -- comparison of performance of seedling types, sizes and sources -- 100 of each planted. Report in 1994 indicated Styrobloc plugs performed best. (DR)

Crossroads Report 1 November 1993 -- The first report arising from the Kimmins- Brace review, it

				<p>advocated focus on silviculture in operations, led to additional \$1 million in silviculture budget. (HL, RU, DP)</p> <p>Forest Resource Advisory Group (FRAG) February 1993 - replaces FMLC with new terms of reference – representative of regional community interests (DP)</p> <p>FRAG looks at biodiversity, requests Company to develop plan to address biodiversity in FM Plan (DP)</p> <p>Forest Resource Information System (FRIS) need identified, started – including wildlife/habitat aspects</p> <p>Ecological Mapping -- based on Ian Corns work -- first trial (DP)</p> <p>Weldwood joins Huallen Seed Orchard</p> <p>Wildlife Studies – two more Company biologists hired -- Chris Spytz and Gordon Stenhouse, both with masters degrees. Rick Bonar approaches Udell and Laishley with a proposal to work on a PhD with Company support. Research will be done through Foothills Model Forest, studying Pileated woodpecker. Dr. Jim Beck, U of A to be his supervisor. Proposal was approved by Hinton Division and Weldwood corporate. This began a seven year journey culminating in his successful completion of the program in the fall of 2000. (RB, RU)</p>	
Year	V-P Mill	Forest Resour	For.	Events	1994
1994	DMacD	DL	RU	<p>Alberta</p> <p>Industry-government negotiations for sawlog stumpage resulted in a portion of dues to be directed to a dedicated fund to support approved forest management activities such as research above regulatory obligations. Fund named Forest Resource Improvement Program (FRIP). (RU)</p> <p>Alberta Forest Conservation Strategy -- public consultation group formed to develop strategy -- re[ports in 1997.</p> <p>Company/Community</p>	

			<p>R. Udell attends a meeting of FMA holders with government of Alberta 11 January 1994 to discuss their intent to transfer seed and seedling costs -- sets stage for Company-government negotiations for a year to develop and agree on a package of amendments to the FMA.</p> <p>Pulp production: 377888 tonnes. Published price (Pulp and Paper North American Fact Book) US\$455/ metric tonne. Lumber production: 190,568Mfbm Hi-Atha.</p> <p>Forest Resources</p> <p>Woodlands-Forestry reorganization and integration</p> <p>Jan 31, 1994 Linked Planning Process report presented to ADM Ken Higginbotham, and Forest Resource Manager Don Laishley. Prepared by joint company/ AFS task force co/chaired by Bob Udell (Weldwood) and Dan Wilkinson (AFS) (RU) Based on Baskerville's 6 steps to Sustainable Forest Management, designed to ensure compatibility and consistency in all levels of planning. Included built-in feedback and control mechanism through the Stewardship Report. Report later reflected in various policy documents in Alberta, including the forest management planning guidelines. (RU)</p> <p>Also reflected in FMF Decision Support System, CSA/SFM process, and report of Forest Management Science Council. (DP)</p> <p>Joint Venture company formed to manage Huallen Seed Orchard (RU)</p> <p>Feb. 24, 1994. David Presslee promoted to Forest Operations Area Superintendent with responsibility for all silviculture operations on the FMA. Direct result of "Crossroads" Report, with the goal of getting silviculture practices back into line and supporting forest management plan assumptions. (RU).</p> <p>Ecological Mapping –prototype 1 and trial c 74,000 ha GIS work split - Curry strategic, Lougheed operational</p> <p>Paul Hostin leaves AFS, hired as Inventory Forester for Forest Planning group.</p> <p>Aspen Analysis during summer -- lower AAC than expected - action deferred to next FMP. Aspen calculated at c. 120,000 m³. Conifer AAC was 1.9 million m³. (HL)</p> <p>Stump-side processing re-introduced as part of Crossroads.</p> <p>Last year of production of Spencer-Lemaire container seedlings -- continued shift to 2/11</p>
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				<p>styroblock container stock. (DR)</p> <p>Nursery - re-evaluation showed that the value derived from the nursery was marginal as the quality of seedlings produced at private facilities was improving as was their cost competitiveness. But there were no compelling reasons to close it down, and some good PR value in keeping it open. (RU)</p> <p>Don Laishley transfers to Vancouver; Dennis Hawksworth appointed General Manager of Forest Resources and Hi-Atha.</p>	
Year	V-P Mill	Forest Resour	For.	Events	1995
1995	DMacD	DL/BM	RU	<p>Alberta</p> <p>Sept. 15. Jasper National Park added its landbase to Foothills Model Forest. Authorized share capital increased to 20,000 shares, one more share issued to Jasper National Park , bringing total shares issued to three. Signing Ceremony in Jasper well attended, greetings and speeches included Michel Audy (Jasper NP Superintendent), Dennis Quintilio (FMF Chair), Bob Udell (FMF President), George Richards (President and CEO Weldwood), Ty Lund (Alberta Minister of Environmental Protection, Anne McLellan (Minister of Natural Resources, Canada).</p> <p>Company/Community</p> <p>Weldwood president Graham Bender writes to Ministers of Environmental Protection and Economic Development on 9 March 1995 to review negotiations following the request to withdraw free seedlings and seed services, and to confirm the Company agreed with the negotiated changes. Seven major points included: deciduous timber rights fully granted to Company, limited grazing enabled with caveats, small timber permits limited, Stewardship agreements enabled, minimum harvest levels set, defined responsibilities for inventories, seedling supply agreement cancelled.</p> <p>The FMA was amended by O.C. 610/95 on 6 September 1995 to remove free seedling provision, provide offsetting benefits to Company.</p> <p>Price of pulp in October 1995 was US\$985.00 per metric tonne -- the highest in the Company history. (RW)</p>	

Pulp production: 395241 tonnes. Published price (Pulp and Paper North American Fact Book) US\$765/ metric tonne. Lumber production: 207,256 Mfbm

Forest Resources

Tree Improvement report January 1995-- major step forward. Fourth in a series of reports advocating increasing levels of silviculture performance on the FMA to increase AAC and offset landbase losses arising from other activities and land use priorities (RU)

Diane Renaud appointed Tree Improvement Coordinator. (RU)

Ecological Mapping -- prototype 2 and expanded trials c 100,00 ha

Ortho photos -- full coverage, blended with GIS for planning and operational use

FM Project -- Coordinating major plan components: Wildlife. G&Y, Inventory, Analysis, Landscape for aesthetics, Recreation and culture inventory, Riparian corridors.

Threat and Opportunities Study re AAC

Natural Disturbance model chosen as template for forest management planning.

Nursery - improvements introduced

Completed transition to styroblock container seedlings, 2/11 plugs. (DR)

FRAG reviews Operating Ground Rules (OGR) - FRAG requests Company to commit to visual and recreational and cultural inventories. (DP)

In April, Don Laishley, Bob Udell, Brian Quick and Rod Beaumont visited Champion operations in North and South Carolina, hosted by VP Don Taylor. As a result of this visit, a cooperative agreement was reached whereby Champion technical experts would visit the Hinton operation and offer guidance and advice on silviculture and enhanced forest management programs. Thus began a long-term relationship involving Jim Gent, soils and nutrition specialist, David Todd, tree improvement specialist, and Dr. Bob Kellison, special advisor. This continued right up to the sale of Champion to International Paper, hearkening back to the early days of St. Regis/ NWPP exchanges. (RU)

May 4, 1995. Bob Udell gave a paper "Building AAC on a Tenured FMA" at the Northern Alberta Forestry Show in Grande Prairie. At the end of the paper, Les Reed congratulated him on the paper and demanded to know why no one had bothered to write down the fascinating

				<p>history of the Hinton forestry operation and its contribution to the sustainable forestry field. This question was not lost on Udell, who returned to Hinton and began working on the process that culminated in the multi-faceted "Case Study of Policies and Practices Leading to Sustainable Forest Management" project at Foothills Model Forest. (RU)</p> <p>When Donald McKay was in Hinton doing research for his book "Heritage Lost" (1985) he had also recommended that the Company conduct taped interviews with those still involved in the operation who were here in the early stages of the Company's operations. This project was discussed with Karen Anderson in Human Resources at the time, but there was no support for the idea (JCW).</p> <p>Fifth Measurement of the Stelfox plots. - longest standing wildlife and forestry study in western Canada. John Stelfox re-measures vegetation and wildlife study plots for Camps 1, 5 and 9, representing over 40 years of data - with Brad Stelfox and one other. (RU)</p> <p>October 1995. A technical tour of enhanced forest management in the South was organized by David Todd and Jim Gent for the committee working on enhanced forest management in Alberta. This included Presslee, Udell, Muhly and Paul Hostin from Weldwood, Daryl Price (AFS) Ricard Krygier (Millar).</p>	
Year	V-P Mill	Forest Res.	For.	Events	1996
1996	DMacD	DL/DH	RU/ DP	<p>Alberta</p> <p>"Jacques Report" of the government's Standing Committee on Natural Resources and Sustainable Development, chaired by Wayne Jacques, MLA. Following review of policies covering FMAs, recommendations made for increasing government expectations for new and renewed FMAs. Also proposes a form of 'evergreen' renewal negotiations at ten year intervals.</p> <p>Alberta Forest Management Science Council formed in March 1996 to advise LFS on science needed to achieve sustainable forest management – Weldwood team led by Bob Udell later makes a comprehensive presentation to the Council.</p> <p>Company/Community</p> <p>Pete Murphy and Bob Stevenson are approached by Udell, and agree to work with him on</p>	

			<p>a comprehensive history project for Hinton Forest Resources, to be completed by 1998. This subsequently becomes a model forest project with the terms of reference expanded to include the rest of the model forest. A graduate student, Michael den Otter works on the latter project under Prof. Marty Luckert. (RU)</p> <p>Pulp production: 406543 tonnes. Published price (Pulp and Paper North American Fact Book) US\$685/ metric tonne. Lumber production: 223,402 Mfbm</p> <p>Forest Resources</p> <p>Forest Planning and Forest Operations merged under one manager (Bryon Muhly) – frees Bob Udell to head Policy and Government Affairs -- enabling him to focus on forest policy and relationships with government as well as serving as President of Foothills Model Forest. (RU)</p> <p>Full integration of harvesting and silvicultural planning -- with Ecological Classification as the basis. (RU)</p> <p>Initial Planning begins for Athabasca 4, an operating compartment which will become very controversial., as noted in subsequent references. (RU)</p> <p>Ecological Site Classification and Mapping -- Beckingham guide published - full launch of program c. 270,000 ha - target 2005 completion</p> <p>January 1996. Enhanced Forest Management (EFM) Report presented to Dennis Hawksworth by internal team, outlining and recommending possibilities available through intensification of management on the FMA. Very similar to Crossley's earlier (1970) report. The wood supply situation was much more restricted in the 1990's and the EFM report was accepted and activities begun to capture the benefits. (RU).</p> <p>Enhanced Forest Management (EFM) program started. Major commitment to increase production of wood on the FMA area through a comprehensive program including cultural and utilization approaches. (RU, DP)</p> <p>Stan Navratil, CFS researcher takes leave of absence and accepts contract with Company -- review of literature, CFS agreement to relocate lodgepole pine trials, data, remeasure, reanalyze. Nursery - computer controls installed Seedling container sizes increased to 3/10 plugs, up to 3/13 for more difficult sites. (DR)</p>
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				<p>Visual Landscape Inventory</p> <p>Riparian Corridor Inventory</p> <p>Recreation and Heritage resource inventory</p> <p>Dennis Hawksworth elected President of Alberta Forest Products Association (RU)</p> <p>Don Laishley selected to receive the CIF national Forestry Achievement Award (RU)</p> <p>New Forest Harvesting and Operating Ground Rules -- first ones developed with major public involvement through FRAG. New edition greatly expanded and refined. (DP, RU)</p> <p>Weldwood was advised by the Province that it was considering the withdrawal of 60,000 ha from the FMA area for protection under the Special Places 2000 program. A strong response from the company showed that the Provincial Coordinating Committee, in accepting the recommendation, had ignored the Minister's instructions (no reimbursement, honour existing commitments). Weldwood offered to investigate and recommend alternative areas. This offer was accepted, and work began under Udell, Presslee and Bonar.(RU)</p> <p>June 9-16, 1996. Minister of Environment Ty Lund, his executive assistant Jim Rivait, and Assistant Deputy Minister Cliff Henderson accompanied Dennis Hawksworth, Bob Udell, Dave Presslee, Terry Nilson and other industry Woodlands Managers John Huey (Sundance), Murray Summers (Blue Ridge Lumber) and Trevor Wakelin (Millar Western) on a tour of Champion's southern operations intensive management program. The tour was led by Jim Gent and David Todd of the research unit at Greenville, S.C. The trip included a meeting between Minister Lund and the Dean of North Carolina State University's forestry faculty. On June 13, Hawksworth, Udell, Lund, Rivait and Henderson split away from the rest of the group and travelled on to the Chihuahua Model Forest for meetings and tours led by CMF president Oscar Estrada Murrieta.</p> <p>Oct. 20, 1996. Bob Udell presented an invited paper - Developing Practical Tools for Sustainable Forest Management - at the IUCN conference in Montreal.</p> <p>Oct. 24, 1996. Bob Udell was a plenary session speaker at the Model Forest Network conference in Chihuahua, Mexico. Title of the speech was "Foothills Model Forest Contribution to Sustainable Forest Management".</p> <p>Peter Murphy agrees to work with Udell on a Case Study of Adaptive Forest Management dealing with the Hinton forestry program. This is later expanded to include the full landbase of</p>
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				Foothills Model Forest in five volumes.	
Year	V-P Mill	Forest Resour	For.	Events	1997
1997	DMacD	DH/ BM	DP	<p>Alberta Alberta Forest Conservation Strategy announced on May 8, 1997 -- describes a triad approach to SFM comprising ecosystem, economic and social considerations. Leads, in part, to government's 1998 action strategy: Alberta Forest Legacy.</p> <p>A joint AFPA/LFS Task Force on Enhanced Forest Management, co-chaired by Trevor Wakelin and Bob Udell, backed up by technical experts including Paul Hostin and Hugh Loughheed of Weldwood, Daryl Price of the LFS, developed a comprehensive report recommending a direction in which the province should proceed in responding to these two reports.⁴¹⁹ Udell and Wakelin presented the recommendations to Minister of Environment Ty Lund on April 30, and gave it strong support. Joint AFPA/ LFS task forces were struck on Dec. 22 to move the process forward. FRIP transferred to Forest Resources Improvement Association of Alberta (FRIAA), an arms-length organization to administer funds.</p> <p>Dr. Jim Butler of the Department of Forest Science, U of A conducts the first class in environmental advocacy at U of A.</p> <p>Department of Fisheries and Oceans. On May 9, a federal court judge ruled that DFO contravened its own regulations by failing to conduct an EIA on a controversial Sunpine road and bridge over the Ram River.</p> <p>Sept. 19. The CPPA Woodlands Section and the American Pulpwood Association, attending a joint meeting in Jasper, toured the Weldwood FMA. At a brief ceremony in the 50 millionth tree plantation, the ashes of Ken Rolston, past APA President were scattered over the plantation. A cedar post commemorating Rolston was erected on the site. Rolston had a long and distinguished career (29 years with APA) and his wish to have his ashes scattered on a historic Canadian forest were honoured with this ceremony. (RU)</p> <p>In November, 1997 the Alberta government announced it was writing off \$131 millions in interest on a \$250 millions loan to Alberta Pacific Forest Industries Ltd. This announcement</p>	

sparked a general round of criticism of government subsidies to the forest industry.

On Oct 3-7, a major conference in Waterton kicked off the **Yellowstone to Yukon** conservation initiative in Alberta. Originally conceived in 1993 by Calgary lawyer and environmentalist Harvey Locke (who later in 2000 moved to the USA to manage the PEW foundation grants) and supported by the American –based Wilderness Society, the Y to Y initiative sparked major concerns in resource industries and communities in the foothills of Alberta and British Columbia.

Company/Community

Aug 13-15. Visit from Champion VPs Tom Hart, Michele Keneg, and David Lieser, accompanied by Board Directors Allan Gotlieb and Alice Emerson. Company Officials included President George Richards, VPs Sandy Gray, Jeff Hearn, Paul Richards, Dave MacDonald. Forest Resources reps included GM Dennis Hawksworth, Bryon Muhly and Bob Udell.

Sawmill producing 230 million fbm. (DH)

March 20, company president **George Richards presented the FILS lecture** at the University of Alberta, and announced a **Weldwood donation to the U of A of \$500,000.**

May 16. Minister Ty Lund (Envir. Protection), accompanied by ADMs Ron Hicks, Jim Nichols and Cliff Henderson, along with Ivan Strang MLA toured the HI-ATHA sawmill and attended a dinner hosted by Weldwood.

Willmore Wilderness Park added to Model Forest landbase bringing total to 2.75 million ha.

Price of pulp in September, Anniversary Year, was \$610 per metric tonne. (RW)

Further negotiations about the 1988 Forest Management Agreement related to chip supply and direction. FMA revised via Order in Council.

A joint federal/provincial panel approves (June 17) the development of a new coal mine (Cheviot Mine) at Mountain Park, to replace the depleting resources at Cardinal River Coal. The company began acquiring permits and planning. Environmentalists challenged the decision.. (RU)

September 15-17. The International Forestry Industry Round Table held its annual meeting in Hinton, including a field tour, sawmill and presentations on Weldwood operations. Delegates attended from Canada, Australia, Brazil, Chile, Mexico, New Zealand, Finland, Sweden, Norway, Brussels, and the Confederation of European Paper Industries (CEPI)

40th Anniversary of First Pulp Production. Gala celebration Sept. 19, 20.

October 8. Champion International Chairman and COO Richard E. Olson announced a plan to maximize shareholder value, with a three-pronged focus: divesting some non-core businesses, increasing profitability and improving financial discipline.

Dec. 10. The company announced that Hinton Pulp had lost its biggest customer – **Sartelle** - accounting for 40% of its product, due to continuing problems with plastic in the pulp, and tear strength.

Dec. 16. President George Richards announces new executive appointments. **Jeff Hearn** – executive vice president and COO; **Sandy Gray** – senior VP, wood products; **Dennis Hawksworth**- VP Hinton Forest and Wood Products; **Jim Gorsline**- VP Cariboo operations. Intent with Hawksworth appointment was to consolidate all solid wood manufacturing in Alberta under one Vice President, considering the pending purchase of Sunpine Forest Products.

Pulp production: 414130 tonnes. Published price (Pulp and Paper North American Fact Book) US\$610/ metric tonne. Lumber production: 233,410 Mfbm

Forest Resources

Celebration of 90 millionth seedling planted (RU)

Forest Resource Advisory Group (FRAG) – FRAG accepted the challenge to work with the company in developing a harvest plan for McLeod 8 – a controversial harvesting area south of Hwy 16. Several local residents including representatives of Seabolt Estates and Aspen Heights joined FRAG as ad hoc members for the project. (RWU)

Continuing plans for Athabasca 4, while controversy led by the Black Cat Ranch and the Athabasca Bioregional Society continues. Public meetings and open houses held by both sides. HBRS asks FRAG to consider the Athabasca 4 project, but FRAG over-committed at the time.

Navratil Report received, with recommendations for activities to enhance the AAC. (RU)

EFM trials begin - focus on increased wood production - thinning, spacing, fertilization (RU)

Intensive Forest Management Task Force struck within the Department, chaired by Presslee. (RU)

Ecological Mapping -- entire Caribou range to be mapped this year - demonstrate tie to wildlife

Nursery - shelter houses constructed – program 2 lots per year

Wildlife program c \$600,000 per year - Weld. FMF, FRIP

				<p>Caribou study -- northern area. First cooperative approach among FMA holders. -- Weldwood, Weyerhaeuser and Alberta Newsprint partners, with Canfor -- negotiations in process</p> <p>Recreation/Cultural Resources Inventory conducted in preparation for the management plan.</p> <p>ForestCare Certification – company forestry and mill operations were certified under the AFPA system.</p> <p>Paul Hostin, inventory forester, was awarded a Masters degree in Forestry from the University of Alberta. Sean Curry, growth and yield forester resigns to take position with Weyerhaeuser in Merrit (August).</p> <p>Planning began for possible future CSA certification</p> <p>G&Y – focus on C-level production – historic natural; start B-level study in lodgepole pine</p> <p>Forest History/Case Study project begun. <i>Living Legacy</i>, a booklet based on initial investigations, produced as part of the 40th anniversary celebration.</p> <p>May 13. A group of 10 media people from Germany visited and toured the FMA. Very complimentary of Weldwood’s forestry practices.</p> <p>Crossley and Loomis Forests announced Sept 19th, in conjunction with the 40th anniversary celebrations. These represent, respectively, the southern and northern halves of the FMA. Members of the Crossley and Loomis families were on hand for the celebration. (RU)</p> <p>Sept. 30, 1997. Forest Resources and its contractors staged a “mini-demo” for Weldwood managers who were holding their annual meeting in Hinton. Several millions of logging and reforestation equipment were on hand and operating in one block in McLeod 5.</p> <p>December 14, 1997. Two fires started the same night. One just north of Hinton, burning out Rocky Notnes, the other from highway clearing in the Gregg River Valley, burning about 3,000 ha including some of the 1956 Gregg Burn.</p>	
Year	V-P Mill	Forest Resour	For.	Events	1998
1998	DM/ NB	DH	DP	<p>National Forest Strategy – R. Udell at ratification of 5-year extension at National Forest Congress in Ottawa.</p>	

			<p>Alberta</p> <p>Alberta Forest Legacy printed in February 1998. An implementation strategy for SFM, it addresses the 17 recommendations of the <i>Alberta Forest Conservation Strategy</i> and includes the protocol of the <i>Forest Management Science Council</i> which concluded its mandate in February 1998.</p> <p>On Nov. 25, 10 carefully placed bombs destroyed 10 logging machines valued at \$5 millions in the Burnt Timber district south of Sundre. They were owned by Schuurman Enterprises Ltd., a logging contractor for Spray Lakes Sawmills of Cochrane. The eco-terrorists were never found.</p> <p>Company/Community</p> <p>Weldwood of Canada purchases Sunpine Forest Products Co. Ltd. based in Sundre, Alberta from owner Bruce Buchanan. Buchanan stays on with Weldwood as Vice President in charge of Sunpine operations for less than a year, to be replaced by Dan Madlung who returned to Weldwood from his position with Champion in Florida. Madlung cuts a deal with company president George Richards to report directly to Sr. Vice President Sandy Gray, thereby pre-empting plans to have all Alberta solid wood operations consolidated under Dennis Hawksworth.</p> <p>Further amendment to 1988 FMA on 21 January 1998 -- culmination of about two years of negotiations to address government commitment to Quota holders to end chip direction agreements with FMAs. Result was Memorandum-of-Agreement leading to an O.C. amendment: chip direction from some FMAs and Quotas retained, but not if Company refuses purchase, to stand to June 2008. Also M-o-A deals with assurance of wood supply from Grande Cache area, return of reclaimed coal mine lease areas, caveats on timber permits in E-4 and Cache Percotte Forest, Company undertaking to balance harvest and AAC by 2008.</p> <p>Amendment further addresses chip supply arrangements and direction, and provides for possible addition of reclaimed coal mine areas outside the FMA when mines are abandoned.</p> <p>In February, Dave MacDonald resigns as Vice President and Resident Manager of Hinton Pulp, citing "irreconcilable differences" with the company. Norman Bush appointed to replace him, joining the Company in May.</p> <p>March 31. Bob Udell, president of Foothills Model Forest presented highlights of its research program to the Standing Policy Committee. Also present were Chairman Ross Risvold, Board</p>
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				<p>member Dennis Quintilio and Ecologist Dan Farr.</p> <p>Pulp production: 371122 tonnes. Published price (Pulp and Paper North American Fact Book) US\$500/ metric tonne. Lumber production: 216,370M fbm</p> <p>Forest Resources</p> <p>Forest Management Plan – fifth revision nears completion</p> <p>FMP data based on Alberta Vegetation Inventory</p> <p>The Athabasca 4 controversy continues. Letters to the editor, public meetings, letters to politicians and ministers. A road is built partway in to the area. FRAG provides input. CBC television and CFRN send camera crews. FRAG finishes work on another plan, and agrees to work with the Company and public on developing a plan for Athabasca 4. (RU)</p> <p>Solomon Creek access plan – FRAG review</p> <p>McLeod 8 – harvesting plan and public review complete. FRAG endorses plan.</p> <p>The 1971 Zimmer photo points were re-photographed in 1998 by Steve Ferdinand and Bob Stevenson. (RU)</p> <p>Weldwood responds to the Special Places initiative with a multi-faceted approach, <i>Weldwood's Special Places in the Forest</i> proposes that sites with unique and special values be given unique and special management considerations. The concept and recommendations for protected areas were embraced by Minister Ty Lund and most members of the Provincial Coordinating Committee for Special Places 2000. (RU)</p>	
Year	V-P Mill	Forest Resour	For.	Events	1999
1999	NB	DH/JL	DP	<p>Alberta</p> <p>Premier Ralph Klein unveiled <i>Alberta's Commitment to Sustainable Resource and Environmental Management</i>. This led to some major changes in government departmental organization and structure.</p> <p>A new Department of Resource Development took over the Forest Industry Development Division (FIDD) of Alberta Environment. For a brief time (1999-2000), the new department had an Associate Minister of Forestry, Mike Cardinal, but this position was phased out.</p>	

				<p>A new Ecological Landscape Division was added to LFS and Dennis Quintilio was appointed the new Director to advance the development of integrated resource management in Alberta.</p> <p>Dennis Hawksworth appointed to lead the Softwood Lumber Agreement negotiating team for Alberta's forest industry.</p> <p>Company/Community</p> <p>Jim LeLacheur became General Manager of Forest Resources and Lumber. Mike Westergard becomes the Manager of Hi-Atha replacing and reporting to LeLacheur. Formerly with Northwood Prince George (RU)</p> <p>Bryon Muhly appointed Manager, Resources Optimization, Alberta – focussing on optimization of fibre exchanges for Weldwood's facilities throughout Alberta. (RU)</p> <p>Rick E. Ksiezolposki hired from Tolko Manitoba operations to replace Muhly as head of Forest Resources. (RU)</p> <p>In August, Rick Blackwood, General Manager of Foothills Model Forest, returned to active duty with the Alberta LFS as Area Manager for the Bow Forest. (RU)</p> <p>On June 14th, Aaron Jones joined the Department as Public Affairs Forester, reporting to Udell.(RU)</p> <p>On March 22, 1999 a short-lived CEP strike closed both mills for about two weeks. Company proposed to introduce flexibility into the workforce through multiple-tasking among certified trades. On April 5, workers voted to accept a contract with job security and more labour flexibility included for the 680 workers. (RU)</p> <p>Town Hall burned to the ground. Town offices moved to temporary accommodation in the valley shopping centre, while a new town hall is to be built at the junction of the Robb Road and Switzer Drive. Mayor Ross Risvold seeks and acquires support and external resources to feature use of wood in design and construction.(RU)</p> <p>On April 8, 1999 the Federal Court of Canada, Justice Douglas R. Campbell agreed with some aspects of the ENGO challenge to the Cheviot mine approval, including the view that planned forestry activities in the area had not be effectively addressed by the proponents. Cardinal River Coal approached Weldwood to cooperate with them in addressing deficiencies. Dick Dempster hired by CRC as a forestry consultant to the project, and works with Hugh Loughheed on gathering</p>
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				<p>and interpreting information.(RU)</p> <p>Pulp production: 376318 tonnes. Published price (Pulp and Paper North American Fact Book) US\$610/ metric tonne. Lumber production: 242,531M fbm</p> <p>Forest Resources</p> <p>Forest Management Plan – fifth revision completed (submissions 1961, 1966, 1977, 1986, 1991, 1999). Lead author Hugh Lougheed. Entirely new approach based on commitment to sustainable forest management with ecosystem approach, tailored to fit with Canadian Standards Association SFM format and CCFM Criteria. First FMP in Canada to include an explicit analysis forests, wildlife and hydrological interdependencies. (RU)</p> <p>FMP prepared with major input of FRAG.</p> <p>On Feb.1, the 10th anniversary of FRAG was celebrated with the honoring of charter members Dr. Peggy Allan (Hinton Medical Association) and Eugene Wilson (IWA).</p> <p>In February, the Alberta Wilderness Association accused the Province and Weldwood of logging in Willmore Wilderness Park. The “logging” consisted of Weldwood’s participation in the felling and destruction of 38 pheromone trap trees infested with mountain pine beetles.</p> <p>Company successful in renewing ForestCare certification through AFPA. (RU)</p> <p>100 millionth tree planted June 19. Ceremonies surrounding the planting of the 100 millionth tree were held at Hinton, and at the Gregg Cabin where another 1-hectare children’s tree plantation was established. Hon. Mike Cardinal, MLA Ivan Strang, VP Sandy Gray and VP Dennis Hawksworth co-operated in the tree planting. Assisting them at the Gregg Cabin was Jacey Stordock, daughter of Forest Resources employee Larry Stordock. Director General Boyd Case of the CFS also unveiled a plaque at the Gregg Cabin celebrating the 100th anniversary of the Canadian Forest Service. (RU)</p> <p>Ritchard Laboucane establishes an Aboriginal Roundtable to provide input to company plans from local aboriginal interest groups.(RU)</p> <p>Joint LFS/AFPA task force completes work on technical protocols for Enhanced Forest Management (Co-chairs Doug Sklar and Bob Udell). Protocols accepted by AFPA. (RU)</p> <p>Foothills Growth and Yield Association formed by Foothills Model Forest championed by Udell. W.R. Dempster first Director. Nine companies sign on. (RU)</p> <p>Closure of the Company Greenhouse. On June 8, the company announced it would close the</p>
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				<p>container seedling greenhouse upon completion of the current year's crop. Privatization of the nursery business in Alberta, combined with the loss of government support for seedling production costs, had resulted in a very competitive business environment with high quality seedlings available from private growers at costs the company greenhouse could not begin to meet. At the time, the company greenhouse could only provide about 30% of the company's seedling needs. All workers were given alternative employment in the company workforce.</p> <p>Growth and Yield Tour. In August, the interim members of the Growth and Yield Association took part in a field tour of historic Alberta growth and yield installations from Hinton all the way to Kananaskis Country. Led by Thomas Braun, Stan Navratil and Stan Lux, this was to be the last field tour for David Presslee.(RU).</p> <p>Foothills Growth and Yield Association Established with nine industrial members, plus the LFS and Foothills Model Forest. Notice by W. R. Dempster, Director, Dec. 15.</p> <p>Handbook of Forest Stewardship printed as part of Forest Stewardship program to train field workers to understand the science behind forest practices. Handbook is profusely illustrated to convey concepts and acceptable practices. (RU)</p> <p>Wildlife Habitat Canada Stewardship Award presented to Glen Davies by Jamie Fortune of WHC, during the 100 millionth tree planting ceremonies. Davies, a faller operator on the Company Crew, earned the award for protecting a goshawk nest he observed during tree felling operations.</p> <p>Weldwood's nomination of the Sundance Valley Special Places approved as Sundance Provincial Park by O.C. 186/99 dated 28 April 1999. (JCW)</p> <p>MLA Ivan Strang brought new Minister of Environment Gary Mar to tour Weldwood forest resources on Sept. 2. Weldwood hosted a lunch at the Gregg Cabin, followed by a tour of forestry highlights in the area.</p>	
Year	V-P Mill	Forest Resour	For.	Events	2000
2000	NB	JL	DP/HL	<p>Alberta</p> <p>In early 2000, FIDD was given the lead role in forest management agreement negotiations under the <i>Forests Act</i> for the province. The LFS remains at the negotiating table, dealing with the</p>	

			<p>management and administrative sections of the negotiations.</p> <p>On June 19th, Foothills Model Forest was granted a Premiers Award for the exemplary work in public, regulatory and industrial cooperation in scientific advancement and cost savings. Team members cited included Rick Blackwood (team leader), Doug Hodgins (Jasper NP), Bob Newstead (CFS), Dennis Quintilio (ALFS) and Bob Udell (Weldwood). Udell and Quintilio accepted the award from the Premier at a ceremony in the Jubilee Auditorium in Edmonton.</p> <p>In the spring, the ALFS announced the new regeneration standard for Alberta. Due to the inability of the AFPA membership to agree on a standard, this was a unilateral choice by ALFS. The standard appeared to have a deciduous bias, and the ADM agreed that industry members could elect to continue to use the 1991 standard, or develop an FMA-specific standard (Model 2).</p> <p>Enhanced forest management protocols for Alberta were released along with the new regen standards.</p> <p>The ALFS announced a new tree-free powerline policy, to the consternation of AFPA members. Major concern to forest industry due to the amount of area involved. Senior policy group struck to work with ALFS on an alternative approach.</p> <p>Bob Udell accepted the Chair of the Forest Management Committee of the AFPA at the annual meeting in September. Hugh Lougheed was appointed Chair of the Planning subcommittee.(RU)</p> <p>Announcement at AFPA meeting in Jasper that FERIC was supporting a Centre for Research in Forest Fire Management at the Hinton Training Centre. (RU)</p> <p>Company/Community</p> <p>Hinton is named Alberta's Forestry Capital for 2000. The major legacy will be an interpretive park adjacent to Parks West Mall. Work began in July. (RU)</p> <p>Hugh Lougheed is promoted to Forestry Manager, replacing David Presslee. Roger Hayward is promoted to Silviculture Co-ordinator. Sharon Meredith is hired to begin the process for the next management plan (2008). (RU)</p> <p>Kevin Land is appointed Stewardship Forester, replacing Roger Hayward. (RU)</p> <p>Rick Bonar completes his PhD in the fall.</p> <p>In April, cracks were detected in the steam boilers in the mill, resulting in an unplanned shutdown</p>
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			<p>lasting almost three weeks. (RU)</p> <p>Dennis Hawksworth is appointed to an interim committee led by MLA Ivan Strang to design a new Alberta Forestry Research Institute under the Alberta Science, Research and Technology Amendment Act 2000. (RU)</p> <p>FRAG completed work and on April 26, endorsed (one abstention, two opposed) the proposed plan for Athabasca 4. Open houses were held in Hinton and Brule, not a strong turnout and general support for the plan. The plan was submitted for approval. (RU)</p> <p>Mark Storie was seconded by Alberta Environment to Foothills Model Forest, replacing Rick Blackwood as General Manager. (RU)</p> <p>On May 29, 2000 FRAG endorsed Weldwood's sustainable forest management plan for CSA certification. (RU)</p> <p>Champion International Corp. (almost) purchased by Finnish paper giant, UPM-Kymmene Corp. in a stock deal valued at \$60.57 a share, or \$5.81 billion, extending the paper industry's rapid consolidation across the Atlantic. The combination, which brings together one of Europe's leading paper producers with an American company long known for stubbornly independent behaviour, will result in the world's third-largest paper company, with sales of about \$14 billion, papermaking capacity of 12.1 million tons and about 49 000 employees. (Wall Street Journal February 18, 2000)</p> <p>On May 1, 2000 one of the Champion/ UPM Integration teams visited Hinton Division for presentations and a field tour led by Stauffer, Hawksworth and Udell. Dennis Hawksworth was a member of the team. (RU)</p> <p>Announcement of purchase by UPM premature – Champion subsequently purchased by International Paper Company which offered a higher price per share.</p> <p>International Paper Co. Ltd. purchased Champion International and Weldwood of Canada effective 19 June 2000. International Paper Co. Ltd. stated their intent was to continue operating the companies as separate entities. Company name of Weldwood of Canada, Hinton Division not changed.</p> <p>President of International Paper, John Dillon, visited the Hinton operation on July 18. At a dinner attended by senior managers he expressed the confidence of International Paper in the Alberta operations. He also noted that IP is a supporter of the American Forest and Paper</p>
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			<p>Association's (AF&PA) Sustainable Forestry Initiative (SFI) program, and are not interested in the FSC certification movement. (RU)</p> <p>Hearings reconvened in Hinton on the Cheviot Mine proposal. Much of the discussion centred around forestry impacts and cumulative effects. Hinton Forest Resources agreed to present a panel to respond to questions around its planning from interveners, including Bob Udell, Rob Stauffer and Hugh Lougheed. (RU)</p> <p>In August 2000 the joint EUB/ CEAA panel issued its decision confirming that the mine had adequately addressed the deficiencies identified by Justice Campbell and could proceed. On October 24, Luscar announced that the contracts which would have assured the mine's future had expired in the time since the mine was originally announced (1994). Accordingly, the company would proceed with the necessary permitting, but would not proceed with the mine itself. Further, Cardinal River Coal would be closed by March 2002. This would affect 321 union, 68 salaried staff. CPAWS representative Sam Gunsch denies that ENGO court challenges had anything to do with the mine closure. (RU)</p> <p>Gregg River mine closed on 21 August 2000 with a loss of 300 jobs.</p> <p>Dec. 4. Weldwood of Canada was presented with The Home Depot's 1999 Environmental Partner of the Year Award – accepted by Bob Udell, Hinton and Rod Beaumont, Vancouver head office along with manager of sales and marketing John Cowan.</p> <p>Pulp production: 375603 tonnes. Published price (Pulp and Paper North American Fact Book) US\$710/ metric tonne. Lumber production: 245,317 M fbm</p> <p>Forest Resources</p> <p>David Presslee passed away 29 January from post-operative infections. Weldwood establishes a scholarship for a second year NAIT student, announces it at the ETC/FTC 40th Anniversary in Hinton, Oct. 2000. First \$1500 winner is Ed King. Friends of Presslee establish a scholarship fund for Presslee children. On Sept 23, a plaque and memorial were unveiled at the Gregg Cabin, at the site of the 100 millionth tree plantation in September 2000. (RU)</p> <p>ISO 14001 Certification – Awarded March 28</p> <p>June 2000: Canadian Standards Association – Sustainable Forest Management Certification under Z809. Registration of FMA area was as a sustainably managed forest under the demanding</p>
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			<p>CSA standard.</p> <p>Weldwood (Hinton) receives Forest Stewardship Award from Wildlife Habitat Canada for its Forest Stewardship program. Kevin Land accepts the award at the NCE conference in Thunder Bay.</p> <p>In May, Weldwood was approached by Alberta Environment and agreed to take over the management of an additional 8 Provincial Recreation Areas in the Coal Branch (Whitehorse Creek, Lovett River, McLeod Group site, McLeod River, Watson Creek, Fairfax Lake, Coalspur, Pembina Forks) for the balance of the 2000 operating year. The existing operators had abandoned their contracts. Cardinal River Coal agreed to help support the Whitehorse Creek site with a financial contribution. Two Conservation Officers were hired to patrol the sites, and a modest fee charged to cover that cost. Fox Creek Development was given the contract for site maintenance. Later in the fall, the company bid on a longer term contract for the same sites, successfully. (RU)</p> <p>Weldwood and Weyerhaeuser jointly support a new Centre of Enhanced Forest Management at University of Alberta. Centre is headed by Dr. Vic Lieffers who had been awarded the Weldwood/Weyerhaeuser NSERC Professorship.</p> <p>July 2000. Dave Kmet joins Forest Resource Department as Land Use Coordinator.</p> <p>In early September, David Todd returned to Hinton for a final visit on its tree improvement program. He had not been retained by IP, and brought Gregg Leach (former Champion, now IP tree improvement specialist) and also the head of tree improvement for IP, Dr. Siroos Jahromi. A farewell dinner was held at the Overlander Sept. 9.</p> <p>Special Places: Yellowhead Suite. The report of Local Committee, reviewing Weldwood (Hinton) Special Places proposals was submitted to the Minister. Amended by Alberta Environment, the proposed sites were presented to Standing Policy Committee and Cabinet in December and publicly announced on December 20. (RU)</p> <p>1999 Forest Management Plan formally approved by government (Forest Management Division) 13 December 2000. (RU)</p> <p>Negotiations for renewal of the 1988 Forest Management Agreement under the mid-term “evergreen” clause began in 2000</p> <p>Aug. 29,30. MLA Ivan Strang brought the new Ministers of Resource Development (Mike Cardinal) and Environment (Halvar Johnston) to visit Weldwood and Foothills Model Forest. Weldwood hosted a dinner at the ETC, with presentations the next morning and a woods tour.</p>
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Year	V-P Mill	Forest Resour	For.	Events	2001
2001	NB/ DL	JL	HL	<p>National</p> <p>February 1,2. At the CPPA Annual meeting, plans were announced to change the name to the Forest Products Association of Canada (FPAC) and move its operations to Ottawa where it could more effectively represent the interests of a national industry association.</p> <p>Aug. 10. The US Department of Commerce, in a preliminary determination, imposed a 19.3 % countervailing duty on Canadian Lumber Imports. In addition, it found "critical circumstances", i.e. an increase in Canadian imports in excess of 15% between the expiry of the old Softwood Lumber Agreement (March 31st) and the end of the second quarter. The final determination on both was expected by year end. Cedar production on Coastal B.C. ceased shortly thereafter, amid howls of protest from buyers on both sides of the border.</p> <p>Sept. 11. Terrorist attacks on the World Trade Centre and the Pentagon resulted in the loss of thousands of lives, and were expected to set back any trade issues for some time.</p> <p>Sept. 27. Canadian Woodlands Forum (Formerly CPPA Working Group) announced its decision to close its office in Montreal effective Dec. 31. After 84 years, the Forum will continue in three regions east of Manitoba. Three regional coordinators will be hired as needed.</p> <p>Oct. 31. The U.S. Department of Commerce made a preliminary determination to impose an anti-dumping duty of 12.6% on Canadian softwood lumber imports. The duty will be applied on top of the existing 19.3% countervailing duty.</p> <p>Nov. 1. The CFS announced at the model forest network that they have decided to renew the</p>	

			<p>model forest program to Phase 3, at the same level of funding. This is subject to Treasury Board approval in December.</p> <p>Alberta March 2001. A provincial election returns an overwhelming Tory Majority. A new Department of Sustainable Resource Development established under minister Mike Cardinal. New Deputy Minister is forester Bob Fessenden. Department includes Forest Service (under ADM Cliff Henderson), Forest Industry Development Division (Howard Grey), Fish and Wildlife (Morley Barrett), and Public Lands . Dennis Quintilio’s Integrated Resource Management Division remains in Alberta Environment. Quintilio announces his intention to retire as of May 31.</p> <p>May 6. An early morning fire destroyed part of the woodyard at Sunpine’s mill in Sundre. Crews, bombers and helicopters fought the fire until it was declared out on 6 pm May 7. The fire started in the woodyard compost pile and destroyed 40,000 m3 of roundwood in the log decks.</p> <p>July 13. Deputy Minister announces new organization effective July 16. Cliff Henderson becomes ADM Forest Protection Division; Howard Gray is new ADM for Land and Forest Division (formerly Cliff H.); Morley Barrett remains ADM Fish and Wildlife Division; Public Lands Division to be filled, Cliff Henderson in acting position until then.</p> <p>Company/Community March 9. Norm Bush resigns as VP and GM Hinton Pulp. Bush is accepting position with Weyerhaeuser in Dryden, Ontario. Dean Lawrence, production manager, was appointed to replace Bush</p> <p>June 7,8. Company president Jeff Hearn visited Hinton operations to meet rank and file employees, talking about the company’s business plan and strategies to achieve it.</p> <p>June 5. Don Wright, Vice President of Forestry, Environment and Corporate Affairs for Weldwood, resigned from the company and took over as Deputy Minister for the British Columbia Ministry of Forests.</p> <p>June 27. The Hinton Forest Capital 2000 Society opened the town’s Natural Resources Interpretive Park and Exploratrail, adjacent to Parkswest Mall on land provided by the Town of</p>
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			<p>Hinton.</p> <p>August 30. Weldwood announced its intention to seek the American Forest & Paper Association's SFI certification for all of its operations in Canada. Plans are to complete this in 2002.</p> <p>Sept. 24. Hi-Atha announces five days of downtime to be taken in September and October, due to excessive inventories, a slowing US economy and uncertainty over the countervail issue. All these combined are depressing lumber prices.</p> <p>Sept. 26. Weldwood announced production curtailments at all B.C. and Alberta lumber operations, for October and November – removing 25 to 30 million fbm from production.</p> <p>Forest Resources</p> <p>In January, 2001 the company received the 1995 measurement review of the 1956 Stelfox study. The original plots were remeasured by retired biologist Dr. John G. Stelfox and his son Dr. J. Brad Stelfox (Forem Technologies) with cooperation from Wayne C. Bessie (Foothills Model Forest) and Calvin R. Clark (Clark Ecodynamics). Study plots have been measured in 1956 (establishment), 1959,1960, 1961, 1982, 1988, 1995.</p> <p>On Jan. 12, 2001 Weldwood's David Presslee scholarship for a second year mature NAIT forestry student was presented to Ed King (\$1500 value). The presentation was made by Rosanne Presslee, widow of David, and her daughter Kerri. Also attending were Bob Udell and Hugh Lougheed.</p> <p>On Jan 30, Weldwood announced that Hinton Forest Resources won the 2000 President's Safety Award with a score of 93.6 out of a possible 100. The division's dedication to raising safety awareness resulted in no time-loss injuries and only two medical-aid incidents during all of 2000. This was the eighth win for HFR since joining Weldwood in 1988.</p> <p>In January, the company received preliminary approval for the controversial harvest plan for Athabasca 4, a planning process which began in 1996.</p> <p>January. Foothills Model Forest hired Jimmy O'Chiese to develop a protocol for traditional studies on the model forest landbase. O'Chiese and Ritchard Laboucane embark on consultation with local and other relevant elders on the elements of the protocol and support for such a study.</p> <p>May 9. Dennis Hawksworth and David MacPhee (President of Aseniwuche Winewak Nation, Grande Cache) signed a Memorandum of Agreement between Weldwood and the AWN. The agreement covered areas of training, capacity building, consultation and information sharing. The</p>
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				<p>Wilderness Association lodge a complaint against Weldwood's CSA Z809 sustainable forest management certification. Weldwood not consulted, Company responds to CSA rebutting assertions.</p> <p>Oct. 19, 20. An elders gathering of about 150 people convened in Hinton to consider the FMF traditional studies protocol – basically the same protocol developed by the AWN group. After two days of consultation, the protocol was unanimously endorsed and the elders individually pledged their willingness to support the gathering of the information.</p> <p>Dec. 4. Complainants against CSA certification write letter to Company demanding further details on Company response to CSA complaint. Having found out that the groups were also targetting customers, Weldwood refuses to cooperate.</p> <p>Dec. 10. Rick Bonar went to Vancouver and met with Rod Beaumont and IKEA's Manager of Forest Trading for the Americas – Hans Djurberg. Issues had been raised by CPAWS, the AWA and Albertans for a Wild Chinchaga about Weldwood's certification, particularly as regards to the protection of "intact natural forests" and "high conservation value forests". Groups demanded IKEA refuse to do business with Weldwood. The issue arose from their review of the 1994 Environmentally Significant Areas report of Foothills Model Forest – coincidentally written by the past president of the AWA at the time.</p> <p>Dec. 12, 13. Dorthy Majewski, Director of Habitat, Prairie Region for the Department of Fisheries and Oceans visited Hinton for a two day visit with Weldwood and Foothills Model Forest. She was accompanied by two DFO biologists out of the Edmonton office – Bruce McCollough and Ryan Sherman. The visit helped clarify the approval process relative to stream crossings and fish habitat management in Weldwood's operations.</p>	
Year	V-P Mill	Forest Res.	For.	Events	2002
2002	DL	JL	HL	<p>National</p> <p>At a press conference in Montreal, Jan. 30, Weldwood President Jeff Hearn, representing the Forest Products Association of Canada announced that all members of FPAC, as a condition of membership, must be certified to one or more of three certification systems (CSA, FSC, SFI) by 2006.</p> <p>The US Department of Commerce announced on Friday March 22 that it found Canada guilty of</p>	

			<p>subsidizing its lumber industry and dumping products into the USA below their production cost. Final countervailing duty was set at 19.3%, to take effect in mid-May. Anti-dumping duty was set at a weighted average of 9.7%, down from the 12.6% preliminary figure. Total duties will be 29%. Canadian officials decried the ruling, International Trade Minister Pierre Pettigrew terming it “obscene”. The six largest Canadian producers had individual dumping rates set at varying rates. Weyerhaeuser 15.8%; Abitibi 14.6%; Tembec 12%; Slocan 7.6%; Canfor 6%; West Fraser 2.3%. On April 26, the US Dept of Commerce adjusted the rate to 27.2% with individual rates adjusted accordingly.</p> <p>May 7. Cornerbrook, Newfoundland. The Canadian Model Forest Network met in the 2002 National Forest Capital to discuss Phase 3 of the program. The Long Beach Model Forest was not invited to participate, and the Nova Alliance Model Forest (formerly adjunct to Fundy Model Forest) joined the network as a full member.</p> <p>December 10. After invoking closure on Dec. 9, the liberal government of Canada called a vote on ratification of the Kyoto Accord on Climate Change. With the support of the NDP and the Bloc Quebecois, the vote passed easily. The impacts of this decision on Canadian employment and competitiveness is uncertain.</p> <p>Alberta</p> <p>The Regulated Forestry Profession Act came into effect on April 25th after approvals of the Regulations by the Standing Policy Committee on Learning and Employment, Cabinet and the Lieutenant Governor in Council.</p> <p>Company/Community</p> <p>April 18. Bob Udell, president of Foothills Model Forest, signed the new five year contribution agreement for the Foothills Model Forest with Natural Resources Canada.</p> <p>July 2. Mark Storie steps down as General Manager, Foothills Model Forest to assume duties as Area Manager, Foothills Area, Alberta Sustainable Resource Development, stationed in Hinton. He is replaced by Don Podlubny, until then Director of the Hinton Training Centre for Alberta Sustainable Resource Development since 1998. Prior to that, Don was with the Land and Forest Division for 27 years with his last position as the Area Manager for the Athabasca Forest Area.</p>
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			<p>September 20. The carcass of Grizzly Bear G20 (Mary), the popular icon of the model forest grizzly bear research program, was found near Highway 40 where local residents often traveled to view her and her cubs feeding. She was killed by poachers.</p> <p>November 18. The mill watertower, long a Hinton landmark was blown up. Cathy Reese, wife of retired security guard Mike Reese, won the United Way draw and triggered the explosion. Many residents and employees gathered at vantage points to observe the demolition.</p> <p>Dec. 4. IP Sr. Vice-president George O'Brien announced that Jeff Hearn would be leaving as president and CEO of Weldwood to become VP and general manager of IP's bleached board business. His replacement was Tim Nicholls formerly director of finance – Industrial Packaging for IP. He was with Union Camp for 8 years prior to the IP takeover of Union Camp in 2000.</p> <p>Dec. 12. Bob Phillips, a Métis consultant from Calgary, agrees to an offer from Foothills Model Forest for the position of Aboriginal Coordinator. Start date January 6, 2003.</p> <p>Ottawa, December 12, 2002 - The Species at Risk Act (SARA) received Royal Assent today, bringing to a close a nine-year legislative process to protect Canada's species at risk and their critical habitat. The new legislation will come into force in 2003.</p> <p>December 19. President Tim Nichols announces the promotion of Sandy Gray to the position of Executive Vice President</p> <p>Forest Resources</p> <p>Jan. 6. Ritchard Laboucane transfers to Sunpine's Strachan operation as assistant HR Manager.</p> <p>Jan. 8. Weldwood announces that, for the second year in a row, Hinton Forest Resources (HFR) has won Weldwood's President's Safety Award with an impressive Medical Incident Rate (MIR) of .9. First runner-up was Quesnel Plywood, second runner up was Caribou Pulp and Paper</p> <p>Feb 1. Rick Kziesolposki, Forest Resource Manager, announced a major reorganization of the Forest Resource department: Kelly Carpenter becomes the Operations Manager. In this role Kelly will be responsible for all operational harvest and delivery activities. Warren Kehr maintains his current responsibilities as Purchase Fibre Manager. Hugh Loughheed, Forestry Manager, will assume all silviculture responsibilities on the FMA along with his current responsibilities. Terry Nilson becomes the Operations Development Manager responsible for the advancement of our benchmarked competitiveness initiatives throughout the organization. Rob Stauffer becomes the Planning Manager. Rob will be responsible for all harvest operations planning and capital</p>
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			<p>development on the FMA.</p> <p>Feb. 12. The Natural Disturbance Team (Bonar, Lougheed, Meredith, Stauffer, Spytz, Archibald, Hayward, Shipka) presented their recommendations to the Management Team (Lelacheur, Kziesolposki, Udell) re implementing a Natural Forest Management System on the FMA. This decision was fully endorsed and recommended as a demonstration or pilot project initiative under the Model Forest program. This was a historic decision involving fundamental change in forest planning and operations and the next logical step forward from the working circle/ Compartment system envisioned and implemented by Crossley and his staff in the late 1950s.</p> <p>March 25. International Paper Senior Vice President George O'Brien visited Hinton operations to meet local officials and preview an upcoming Board of Directors tour set for June 10.</p> <p>On April 14-18, Hinton Division hosted a three-member team from IKEA, The team was led by Hans Djurberg – IKEA Manager of Forest Trading Americas, other members included Dr. Steve Jennings ProForest (UK consultant) and Dr. Jim Strittholt Conservation Biology Institute (Oregon - mainly a consultant). IKEA, the Swedish home furnishing company, purchases wood from Adwood, an Edmonton company that is a Hi-Atha customer. IKEA has a procurement policy that says they will not buy wood from forests that have HCVF unless those forests are certified by the Forest Stewardship Council. In October 2001, a coalition of 3 Alberta environmental groups (Alberta Wilderness Association, Sierra Club of Canada – Alberta Chapter, and the Rainforest Action Network) sent a letter to IKEA claiming that we had HCVF on our FMA and demanding that IKEA follow their procurement policy. The two experts were hired by World Wildlife International (funded by IKEA) to assess the High Conservation Value Forests (HCVF) issue at Hinton. Dr. Peter Duinker from Dalhousie University, who was under contract to Weldwood to address the same issue, also participated in the visit. In addition to reviewing the complaint, the experts tested a draft version of a new HCVF "toolkit" that is being developed to help forest managers determine if they have HCVF. They also assessed whether or not there were HCVF on the FMA. This was the first test of the "toolkit" anywhere in the world. IKEA advised that international environmental groups were watching this issue very closely. They received an email from Greenpeace International asking about the status of the Alberta groups complaint just before their visit.</p> <p>April 30. Weldwood announces that Rick Ksiezopolski will be moving to HI-ATHA in a training position to prepare him for future opportunities in the Weldwood organization.</p> <p>June 6. Jim Lelacheur announced the return of Dan Rollert to Hinton as Forest Resource Manager, effective July 2, 2002. Rollert had over 26 years experience in the forest industry, 22 of them with Weldwood, most recently as Woods Manager, Quesnel. He previously worked for Hinton Forest Resources as Area Superintendent from 1989 to 1994.</p>
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				<p>June 10. IP President John Dillon and the International Paper Company Board of Directors visited Hinton operations. A helicopter tour from Edson to the Gregg Cabin, presentations at the cabin, a logging and reforestation demo in McLeod 7 and a HI ATHA sawmill tour were highlights. Public Affairs forester Aaron Jones chaired the organizing committee.</p> <p>Weldwood is a finalist in the Emerald Awards competition, for its forest hydrology and stream crossing remediation program.</p> <p>July. Hugh Lougheed assigned responsibility for GIS group</p> <p>August. Paul Hostin promoted to Company Logging Operations Manager</p> <p>Nov. 13. Company advised by NAIT that the third winner of the David J. Presslee Memorial Award (\$1500) is Maury Simoneau, 11936 104 St Edmonton. Achieved an 89.54% average in his first year program.</p> <p>November 15. Rob Stauffer, Company Operations Planning Manager leaves Hinton division for Quesnel woodlands operations.</p> <p>Nov 21, 22. ADM Howard Gray along with Dan Wilkinson, Pat Guidera, Jim Skrenek and John Shires of SRD visited Hinton Forest Resources for meetings and a field tour on natural forest management.</p> <p>Dec. 13. Hugh Lougheed given expanded role in Forest Resource Department, assuming role formerly held by Rob Stauffer while retaining his existing responsibilities as Forestry Manager. To assist Lougheed, Roger Hayward is promoted to Silviculture/GIS Co-ordinator; Rick Bonar promoted to co-ordinate all planning activities. Dave Kmet remained as Lands/Aboriginal Co-ordinator; Kevin Land as Stewardship Forester.</p> <p>Dec. 19. Forest Resource Department agreed to accept the contract to manage the Rock Lake Campground and Wildhay Group Campsite, which, when added with the newly constructed Gregg Cabin Campground, brings the managed campsite program to 17. The only site on the FMA not currently in the company program is the Big Berland</p>	
Year	V-P Mill	Forest Res.	For.	Events	2003
2003	DL	JL	HL	<p>National</p> <p>Jan. 6. Grant Aldonas, Undersecretary of Trade for the U.S. Department of Commerce sends Canada a 33 page proposal aimed at ending the softwood lumber dispute. Addressing most of the issues put forward by the Coalition for Fair Lumber Imports (market-based timber pricing, end minimum cutting requirements, end appurtenance, remove ban on log exports, etc) the proposal</p>	

			<p>was given lukewarm response by Canada, but opened the door to a new round of discussions during February. V.P. Dennis Hawksworth rejoined the Alberta industry delegation.</p> <p>Feb. 13. Bob Udell presents paper to the National Roundtable on the Environment and the Economy entitled “Sustainable Forest Management – Common Challenges, Collaborative Solutions”.</p> <p>Feb. 18. Finance Minister John Manley unveils the new federal budget with massive spending increases of 20% over three years. Considered Prime Minister Chretien’s “legacy budget” it includes funding for 10 new national parks.</p> <p>March 27. The British Columbia government announced sweeping changes to forest tenure and allocations in response to the ongoing softwood lumber dispute. The major changes: Reallocating 20% of logging rights from major licensees to open market sales; Establishing a new market-based timber pricing system; Adjusting cut control regulations so companies can decide when to log, based on market conditions; Allowing forest tenure holders the ability to subdivide or transfer all or part of their cutting rights to other BC operators without penalty; and; Doubling the share of the province’s annual allowable cut available to First Nations, creating new partnerships and job opportunities.</p> <p>June 1, 2. National Forest Congress held in Ottawa, Ontario. Canadian Forest Association chair Barry Waito oversaw the proceedings of the National Forest Congress. National Forest Strategy Coalition chair Mike Apsey presided over the signing of a new National Forest Accord, announcing some last minute changes to the Accord arising from intense 11th hour lobbying by National Aboriginal Forestry Association president Harry Bombay and Alberta aboriginal lobbyist Jim Webb. Industry associations and provincial governments, already tentative on the accord – some not having even seen it before the congress, e.g. AFPA – declined to sign it due to explicit and problematic wording around the aboriginal elements. Only Nova Scotia signed as a province. Dave Neave, president of the Eastern Ontario Model Forest signed the Accord on behalf of the Model Forest Network.</p> <p>September 21-28. XII World Forestry Congress held at Quebec City. Theme “Forests, Source of Life”. Weldwood delegates Rod Beaumont and Bob Udell each presented papers at the Congress, the only two Canadian industry foresters to be invited to do so based on the papers submitted for consideration. Udell’s paper outlined the evolution of adaptive management on the Hinton Forest.</p> <p>December. An agreement-in-principle was reached between Canada and the United States on</p>
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			<p>the protracted Softwood Lumber dispute. The deal eliminates the 27% US tariff on Canadian lumber, but reduces the allowable exports to the USA to 31.5% of the US market, with a \$200 per Mfbm tariff on exports above assigned quotas. Just over half (52%) of the duties paid would be returned, with US companies party to the dispute (including International Paper) keeping the rest. After three years, if provinces can demonstrate changed circumstance acceptable to the USA, the borders would be opened to them without penalty. Canada also would drop its complaints to trade tribunals, where it had been winning decisions against the US duties (including a ruling by the WTO that the so-called Bird Amendment giving duties collected at the border to the companies involved in the Coalition for Fair Lumber Imports. By year end, most of the major producing provinces including Alberta had rejected the deal.</p> <p>December 12. John Chretien resigns as Prime Minister and Paul Martin becomes the new Prime Minister. The new Minister of Natural Resources Canada is announced as John Efford, replacing Herb Dahliwahl who chose to bet on the wrong horse in the race for leadership of the Liberal Party.</p> <p>Alberta</p> <p>Feb. 1. CBC airs a TV documentary “Who Killed Mary?” on Country Canada. In the show, FMF researcher Gordon Stenhouse describes research findings on roads and bears that are later contradicted by the Minister of Sustainable Resource Development Mike Cardinal.</p> <p>Feb. 13. DM Bob Fessenden announced that Howard Gray would step down as ADM in charge of the Land and Forest Division to devote his full time attention to the softwood lumber file. ADM of Public Lands Craig Quintilio would assume Howard’s duties in addition to his own.</p> <p>May 2003. Gary Leithead, Executive Director of the Alberta Forest Products Association, announces his decision to step down as a result of his continuing struggle with cancer. He will continue as a special advisor as time and his health allows. Ed Greenberg, Director of Communications resigns his position at the Alberta Forest Products Association to take a job with the Edmonton Capital Health Authority. Bob Demulder, Director of Forestry and Transportation announces his resignation effective June 27. He takes a position with the Alberta Chamber of Resources heading up the Chamber’s integrated land management initiative (position earlier vacated by Peter Koenig).</p>
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				<p>July 9, 2003. President Gord Lehn of the AFPA announces that Neil Shelley, formerly Director of Environment at AFPA for eight years, has been selected as new Executive Director.</p> <p>November 4, 2003. Weyerhaeuser Company announced plans to close its lumber mill at Grande Cache, Alberta on Feb. 8. Approximately 156 hourly and salaried jobs were affected by the closure. Fred Rowson, Weyerhaeuser's vice president, Alberta, said the decision was part of the company's overall strategy to make its softwood lumber business competitive. "The forest industry faces serious challenges," said Rowson. "Our people in Grande Cache have done an excellent job under very difficult circumstances. Unfortunately, the mill's small size and high cost structure, along with a shortage of timber, make it uncompetitive for the longer term in today's global marketplace. Expansion is not an option because there is not enough good-quality fibre available to support increased production." Rowson said Weyerhaeuser was unsuccessful in its search for alternatives to a closure, including attempting to sell the mill to other forest companies in the region.</p> <p>Company/Community</p> <p>Feb. 19,20. New Weldwood President Tim Nicholls visits HI-ATHA and Hinton Forest Resources in a quick tour.</p> <p>Feb. 21. IP president and CEO John Dillon announced the promotion of John Faraci to the position of president and member of the Board of Directors, immediately assuming responsibility for the operations of the company.</p> <p>March 12. General Manager Dan Madlung resigns from Sunpine Forest Products. Gordon Gray announced as new Vice President of Human Resources replacing Dave Milligan who retires effective May 1</p> <p>March 25. Obed Marsh Coal Company announced it was shutting down indefinitely due to market conditions, 95 people to be laid off.</p> <p>April 2. Fording Coal announced that it was not proceeding with the Cheviot Mine due to poor markets for metallurgical coal. Cardinal River Coal will close when existing resources are depleted, April 2004. Immediate loss of 190 jobs at Cardinal River Coal, remaining 100 to be laid off upon closure. Infrastructure to remain pending improved markets.</p> <p>April 15. Weldwood president Tim Nicholls announces a major restructuring of the woods products business team, effective May 1. Dennis Hawksworth becomes Vice President,</p>
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			<p>Manufacturing Excellence for the overall wood products business. Dave Lehane, formerly Director of Customer Supply Management becomes Vice President, Wood Products, Alberta. This appointment brings to fruition the consolidation of solid wood operations in Alberta under one Vice President as originally envisaged with the 1997 reorganization. Jim Lelacheur becomes Alberta Woodlands General Manager, with Dan Rollert, Keith Branter and Bryon Muhly reporting to him. Mike Westergard leaves HI-ATHA to become General Manager of the Quesnel sawmill, Laurie Cerenzie from Quesnel trades jobs with Mike.</p> <p>April 24. International Paper issued a travel restriction from Canada to the United States and vice versa, in a knee-jerk reaction to a World Health travel advisory on travel to Toronto because of concerns over Severe Acute Respiratory Syndrome (SARS). At the time, the USA was dealing with 239 probable or suspected cases of SARS, Canada with 330 – all but 63 in Ontario.</p> <p>March 17. Bob Udell speaks to Standing Policy Committee on Energy and Sustainable Development on progress to date on the model forest program and plans for Phase 3 2002-07. Similar presentation to members of the Western Legislators Forestry Task Force in Calgary on July 15.</p> <p>April 25. New director Rob Thorburn hosted a ceremony to unveil the new name of the Hinton Training Centre, the new sign being unveiled by MLA Ivan Strang and ADS Cliff Henderson.</p> <p>June 11. Sunpine Forest Products won a prestigious Emerald Award for the Des Crossley Demonstration Forest Education Project (Category: Education: Other Organization).</p> <p>June 16. Company president Tim Nicholls announces amalgamation of certain staff and administrative functions with International Paper, leading to the elimination of 30 positions in the Vancouver office. Continuing hard times in the industry, and a \$0.74 Canadian dollar had degraded Weldwood and International Paper's economic performance.</p> <p>June 27. Company president Tim Nicholls announces International Paper's three year strategy to reduce costs and improve profitability. Overhead costs (S,G&A) will be reduced by \$500 millions from the 2003 budget levels. This news was supplemented by an IP news bulletin to all employees, confirming that more reductions in staffing would follow through the IP world.</p> <p>June 15. Company president Tim Nicholls announces the resignation of Tom Sitar, Vice President of Finance since 1998.</p> <p>July 25 to 28. Two prescribed burns in Jasper National Park provoked some controversy. Burns</p>
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			<p>at Syncline Ridge and the Rock Lake area were designed to reduce threats from Mountain Pine Beetle as well as return the Park to a more “natural” distribution of age classes. The Rock Lake burn remained controlled but the Syncline Ridge fire blew up quickly to over 26,000 ha before being brought under control</p> <p>July 27. A major fire in the HI-ATHA barker building at 5:30 p.m. was extinguished by 11:00 p.m. Production in the sawmill was curtailed in response. One employee treated for smoke inhalation.</p> <p>Sept. 10. John Dillon, International Paper Chairman and CEO announces he will be stepping down on October 31, and his replacement as Chairman and CEO will be John Faraci, who had previously succeeded Dillon as President in February 2003. Dillon, 65, served International Paper for 38 years and held executive roles in the company’s pulp, packaging, and forest products businesses. He became a director in 1991, was named president and chief operating officer in 1995, and has served as chairman and CEO since 1996. John Faraci, 53, as International Paper’s president, had responsibility for the company’s businesses. He was previously executive vice president and chief financial officer, having responsibility for all finance functions, xpedx (International Paper’s distribution business), and corporate responsibility for Carter Holt Harvey, International Paper’s 50.5 percent owned subsidiary in New Zealand.</p> <p>Sept. 11. Weldwood president Tim Nicholls announces that Sandy Gray, Executive Vice President will retire on December 31, 2003</p> <p>November 22. Tom Buell, retired Company president died. Sandy Gray’s tribute follows:</p> <p style="text-align: center;">Weldwood Mourns The Passing Of Thomas A. Buell <i>Saying goodbye to a pioneer and visionary</i></p> <p>It is with deep regret and sadness that I announce the passing of Tom Buell - a Weldwood pioneer and visionary.</p> <p>Tom had a long and exceptional career at Weldwood. After completing a forestry degree at the University of Toronto, he joined the company in 1964 as a Vancouver plywood plant manager. In 1971, he was appointed vice president, manufacturing, with responsibility for Weldwood’s logging and manufacturing operations in both eastern and western Canada. Four years later, Tom was appointed president and chief executive officer, overseeing Weldwood’s continued growth and development as a major forest products company. In 1979, Tom was appointed chairman of the</p>
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			<p>board, a position he held until 1996.</p> <p>Those who knew Tom best describe him as an extraordinarily talented and intelligent leader with the unique ability to quickly understand complex issues and make excellent business decisions. He was also recognized as a genuine, caring leader who was open to new ideas and opportunities, and who knew most employees by name.</p> <p>In 1996, Tom’s significant business achievements and contribution to the forest sector were recognized with an Honorary Doctor of Science granted by the University of Toronto. In his acceptance speech Tom said, <i>“the most important ingredient of a successful life and career is to ensure that you are in an environment that allows you to have fun...and don’t put having fun off into sometime in the future.”</i></p> <p>As a former colleague, personal friend and someone who admired his many qualities and significant successes, I can tell you that Tom did enjoy his life, and took particular satisfaction in the success of our business, which he helped build over a dedicated 30-year career.</p> <p>Forest Resources</p> <p>March 14. Pat Wearmouth, president of the Huallen Seed Orchard Company, signs an agreement with Doug Sklar of Sustainable Resource Development, completing the purchase of the land for the seed orchard, the culmination of a multi-year negotiation.</p> <p>April 7. Ray Ranger retired after 46 years, 8 months service with the forest resources group. On sick leave/ disability for several years, Ray and his wife Sarah live near Marshall, Saskatchewan.</p> <p>July “Learning from the Forest – A Fifty-year Journey Towards Sustainable Forest Management” is published by Fifth House Publishers and Foothills Model Forest. Authors Bob Bott, Pete Murphy and Bob Udell. Covers the history of adaptive and sustainable forest management at the Hinton forest.</p> <p>Special Places in the Forest program was furthered refined and rolled out publicly. Four main components included Protected Areas; Educational Areas; Cultural and Historical Sites; and Special Management Areas and Special Features.</p> <p>Rock Lake and Wildhay Group Recreation Areas were added to Weldwood’s roster of recreation sites within and adjacent to the Forest Management Area, bringing the total suite of sites maintained to 16 campgrounds and 8 trails. This addition was a positive response to the request of Alberta Community Development when the existing operators were unable to propose an</p>
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			<p>acceptable formula for a continuing contract.</p> <p>The Forest Management Area was successfully re-registered to the CSA/Z809 standard for Sustainable Forest Management.</p> <p>August 1. Amid continuing dry conditions a lightning strike in Athabasca 31 initiated a fire (Fire 61). Quick action by the company resulted in a cat line around the fire by the next morning, fire was declared “under control” by Aug. 9. Don Harrison of LFD was fire boss, final area burned was 421.6 ha.</p> <p>September 4. Significant reorganization of the Hinton Forest Resource Department, with Hugh Lougheed, Sharon Meredith and Bob Held (Sunpine) now reporting the Bryon Muhly and dealing with forest resources issues and opportunities of a company-wide and strategic nature. Roger Hayward moves from Silviculture Coordinator to Area Coordinator, the Silviculture and Tree Improvement specialists become a self-directed team reporting the Dan Rollert. Included in the reorganization was the elimination of 11 positions in Alberta Woodlands, most through retirement or eliminating vacant positions. Among those retiring from Hinton Forest Resources on March 31, 2004 were Wayne Mayan, Vern Koch and Daryl Farquharson.</p> <p><i>Wayne Mayan started as a Junior Compassman with the Company in 1964, soon after graduating from high school. Over the subsequent 40 years, Wayne held a number of positions in Weldwood’s forestry department including Timber Cruiser, Forest Inventory Supervisor, Forest Protection Superintendent, Harvest Production Supervisor, Planning Supervisor, and Area Coordinator.</i></p> <p><i>Vern Koch began work for Weldwood in 1972 working for the IWA as a truck driver. In 1981, Vern was transferred to staff taking the position of Haul Dispatcher until the early 90’s where he moved to the weigh scale eventually becoming the Yard Scale Supervisor.</i></p> <p><i>Deryl Farquharson also started with the Company in 1972 as an Assistant Crew Foreman until 1979 when Deryl was promoted to Road Construction Foreman. Over the next 24 years, Deryl broadened his experience taking on the challenge of a number of different jobs including Haul Production Supervisor, District Manager, Area Coordinator and Company Harvest Supervisor.</i></p> <p>Sept. 26. Brian Craig, a member of the Company Logging Crew since 1969 died of a heart attack on the job</p> <p>Nov. 18. NAIT advises that the David J. Presslee Memorial Award winner (\$1500) for 2003/04 was Ashley Williscroft, a second year student in the Forest Technology program.</p>
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				<p>Dec. 16. Dave Lehane and Dennis Hawksworth announce the retirement of Bob Udell, effective Feb 29, 2004. Udell will remain as Weldwood board member and president of Foothills Model Forest for a year, and will carry out his duties as program chair/operations chief for the 2004 CIF/SAF joint conference and annual general meeting in Edmonton Oct 2-6.</p> <p><i>Bob Udell, who first started with the Company in 1966 upon graduation from the University of Toronto held a number of progressively senior positions in the Forest Resource Department, ending up as a member of the senior management team in charge of forest policy and external affairs. Among his accomplishments were two management plans, service on a number of senior level committees and external task forces including the Alberta 1991 Expert Panel on Forest Management, and the Board of Foothills Model Forest where he served as President.</i></p>	
Year	V-P Mill	Forest Res.	For.	Events	2004
2004	DL	DR	RB	<p>March 20/04 . Warren Kehr announces that Bryan Allan will be taking early retirement effective March 31, 2004. Bryan started his career in February, 1970 as a Junior Technician in Woodlands Forestry and progressed into a variety of jobs including logging planner and crew foreman for crew 8. In 1985 he became Chip Quality Supervisor and shortly thereafter moved into chip and log procurement, progressing to his present position of Purchase Fibre Coordinator.</p> <p>Throughout Bryan's career, he has demonstrated a natural ability for treating people with fairness and respect and he always provided a common sense approach to problem solving which has served the company well over the years. Bryan has a number of interests off the job such as trail riding, exploring the back country and trapping. Maintaining these interests plus a substantial herd of horses will certainly keep him busy in the years ahead.</p> <p>March 5, 2004: Dennis Hawksworth Announces Retirement From Weldwood</p> <p>Following a distinguished 32-year career, 28 of which were dedicated to building the success of Weldwood, Dennis Hawksworth has decided to take an early retirement from Weldwood effective June 30, 2004.</p> <p>Dennis – known as ‘The Hawk’ - graduated from the University of British Columbia with a forestry degree in 1972. He joined Weldwood in 1976 as Operations Superintendent in the Woods Division at Babine Forest Products shortly after the operations started-up. He rose quickly through various</p>	

			<p>operational roles assuming the positions of Woods Manager, Production Manager and General Manager. In 1986, he was appointed General Manager of the 100 Mile House operations.</p> <p>In 1988, shortly after Weldwood acquired the Hinton operations, Dennis was appointed Sawmill Manager in Hinton and was given responsibility for the design, construction and start-up of the new HI-ATHA sawmill. Building on the success of HI-ATHA, Dennis was appointed first General Manager, and then Vice President of Forest Resources and Lumber. Dennis and his team were actively involved in the Sunpine acquisition in 1998. In May 2003, Dennis was appointed Vice President of Manufacturing Excellence, Wood Products.</p> <p>Most recently, Dennis has been the leader of the North American Wood Products Manufacturing Council, responsible for creating a manufacturing approach for the entire North American Wood Products business.</p> <p>In his roles, Dennis has continuously used his strength in identifying and managing major capital projects and process improvement opportunities, coupled with his passion for optimizing efficiencies in all aspects of the business.</p> <p>In addition to playing a key role in Weldwood's success, Dennis has also been very active in a number of forest industry associations, including COFI's Northern Interior Lumber Association and the Cariboo Lumber Manufacturer's Association. As past president, and current board member of the Alberta Forest Products Association, he has played a key role in its vitalization. He is past Chairperson and current member of the Alberta Softwood Lumber Advisory Committee. He has also been active at a national level as current Chairperson of the Canadian Lumber Standards Accreditation Board.</p> <p>Never one to turn down a challenge, Dennis has enjoyed working in a team environment to capitalize on the many issues and opportunities that he has encountered throughout the years. He has always been able to effectively communicate the need to balance environmental stewardship with operations, to affect the leveraging of excellence in forest management with overall business success.</p> <p>Dennis looks forward to spending more time with Stephanie and their children. They plan to spend more time traveling, enjoying back-country adventures, motor-cycling and hobby-farming. Please</p>
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			<p>join me in thanking Dennis for his contributions to Weldwood’s success and wishing he, Stephanie and their children well in the future.</p> <p>Tim Nicholls President & CEO</p> <p><u>NOTE: Dennis Hawksworth died Aug 30, 2013 after a long battle with cancer. He was 65.</u></p> <p>July 7, 2004 Official day when all Weldwood Hinton FMA harvest operations now subscribe to Natural Forest Management principles – emulating natural disturbance. This now drives our new requirements of planning, inventory and TSA/FMP process moving ahead</p> <p>July Weldwood Hinton receives Emerald Award for “Special Places In The Forest Program “ as well as finalist nomination for its Log Chip Van program. FtMF forest receives Emerald Award for its Grizzly Bear Research Program. For the grizzly bear project</p> <p>July 21, 2004 Announcement of the Sale of Weldwood to West Fraser Timber Co. Ltd.</p> <p><i>STAMFORD, Conn. – July 21, 2004</i> -- International Paper (NYSE: IP) today announced it has reached a definitive agreement to sell the capital stock of its Weldwood of Canada, Ltd. subsidiary to West Fraser Timber Co., Ltd. (TSE:WFT) of Vancouver, Canada for approximately C. \$1.26 billion (approximately U.S. \$950 million), subject to certain adjustments at closing. The transaction is subject to completion of due diligence and financing to be completed by the end of September, as well as applicable regulatory approvals.</p> <p>International Paper and West Fraser expect to complete the all-cash transaction in the fall, subject to various closing conditions.</p> <p>“Weldwood is a solid company with outstanding, dedicated people and a proven track record of sustainable forest management. The sale of this business is about making choices regarding how we compete in our core businesses going forward,” said International Paper Chairman and Chief Executive Officer John Faraci.</p>
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**Dec.19,
2004:**

**WEST FRASER ACQUISITION OF WELDWOOD
RECEIVES INVESTMENT CANADA APPROVAL**

TRANSACTION TO CLOSE DECEMBER 31, 2004

Not for distribution to U.S. news wire services or dissemination in the United States.

Vancouver, December 19, 2004 - West Fraser Timber Co. Ltd. ("West Fraser") (TSX : WFT) announced today that it had received notification under the *Investment Canada Act* that satisfies the final condition outstanding in respect of its proposed acquisition of Weldwood of Canada Limited from International Paper Company. West Fraser confirmed that completion of the acquisition will occur on December 31, 2004. West Fraser and International Paper have settled certain outstanding issues relating to the proposed sale including a reduction of the purchase price by \$30 million.

West Fraser is an integrated forest products company that produces lumber, wood chips, MDF, plywood, pulp, linerboard, kraft paper and newsprint. West Fraser has manufacturing operations in British Columbia, Alberta and the southern United States. West Fraser is headquartered in Vancouver, British Columbia. Currently, West Fraser has approximately 4,000 employees.

Nov. 21, 2004, Klein and PC's win election handily although some rural seats moved to Alliance and city seats were lost to Liberals in both Edmonton and Calgary. Steve West fired as premier's executive asst. and Rod Love re-hired, who will bring back the DM Executive Asst model and it's strictly managed communications and issues management protocol. Ivan Strang is re-elected and appointed to Rural Caucus once again, as well as to the prestigious Treasury Board.

Bob Fessenden moves to DM of Innovation and Science and Mike Cardinal moves to Minister of Social Services. Dave Coutts is the new SRD Minister and Brad Pickering moves into DM/SRD.

LEGEND: NAMES FOR INITIALS USED – COMPANY OFFICIALS AND REFERENCE SOURCES.

Initials	Name - alphabetical by last name
NB	Norman Bush - starts April 1998
RB	Rick Bonar
BB	Bob Bott
JB	James (Jim) Bowersock
JDC	James (Jim) D. Clark
DIC	Desmond (Des) I. Crossley
DIC2	Crossley bar chart of Forestry Dept. Costs as related to Annual Drain and Allowable Cut – 1958-59 to 1975
HK	Harry Collinge
SC	Sean Curry
TE	Thomas Easley
Gadd	Ben Gadd -- <i>Handbook of the Canadian Rockies</i> 1995
HH	Hazel Hart -- <i>History of Hinton</i> 1980
KH	Kenneth (Ken) Hall
SH	Stanton G.V. Hart
DH	Dennis Hawksworth
T of H	Town of Hinton
HK	Harry Karasiuk
RK	Rick Ksiezolposki
DL	Donald (Don) Laishley
JL	Jim LeLacheur
RL	Reg Loomis – interview
HL	Hugh Lougheed
DMacD	David MacDonald
LMat	Larry Matwie (Fox Creek)
FWMcD	Fred McDougall, retired Deputy Minister

GMcN	Gordon McNab
BM	Bryon Muhly
PM	Peter J. Murphy
DP	David Presslee
AP	Adrien Provencher
PP	<i>Pulp & Paper Magazine of Canada – June 1957</i>
RR	Raymond Ranger
DR	Diane Reynaud
RS	Ron Staples
IKS	Ivan K. Sutherland
RU	Robert (Bob) Udell
RUSfF	Bob Udell - <i>Gospel according to St. Fernow</i> (The Companion Reader)
AAW	Allan A. Warrack, Minister of Lands and Forests - letter February 4, 1972
JCW	John (Jack) C. Wright
JCW2	Wright bar chart of Forestry Dept. Costs as related to Annual Drain and Allowable Cut – 1976 to 1982
RW	Ralph Wehmhoff - talk at 40 th Anniversary

APPENDIX TWO: NORTH WESTERN PULP & POWER LTD. LOGGING CAMPS, LOCATIONS AND OPERATORS 1956-1971

Based on Silviculture Records and Personal Recollections of Jack Wright, Chief Forester (retired) March 28, 1998

Camp Number	W.C. / Compart.	Contractor	Years Of Operation	Comments
1	McL. I	Nick Tomkiw	1956-61	Tomkiw moved to Camp 27
2	McL. I	Webb Frizzell	1956-59	
		Don Terris	1962-83	Terris ran the camp as a Sale Unit, keeping the sawlogs for his own mill at Camp 2 and selling the pulp to the company
3	McL 9	Harvey Usinek	1956-58	Usinek moved to Camp 22
4	McL 9	Pierre Guimond	1956-58	Guimond moved to Camp 7
5	McL 9	Harry Anker	1956-57	Anker moved to Camp 20
		Joe Schwing	1966	No camp
6	Ath. 13	Joe Drapeau	1956-59	Drapeau moved to Camp 29
7	Ath 16	Claude Eccles	1956-57	
		Pierre Guimond	1959-1970	NWP&P took over operations 1965 +/-
7a	Ath 10 & 16	Ed Stevens	1956	
8	Berl 8	? Arnoldussen	1956-58	Absentee Contractor!!
9	McL 15	H. Schnur	1956-57	Schnur moved to Camp 16
10	Berl 4	Harvey Wright	1956-59	
11	McL 10	Felix Plante	1956	Never signed contract or cut wood
12	Cache Percotte Forest	Jock Hart	1956-57	
13	Ath 14	John Kapestinsky	1956-57	

14	McL 1	Carl Lugar	1957	Never signed contract or cut wood
15	Emb 9	E.B. Johnson	1957-63	(good Social Credit supporter)
16	McL 9	Rosaire Morin	1956-57	Contract terminated
		H. Schnur	1957-58	
		Joe Schwing	1966	No Camp
17	McL 9	Art Allen	1957	Never signed contract or cut wood
18	McL 12	Tim Eaton	1957	Never signed contract or cut wood
19	Marl 16	Albert Garneau	1957	Never signed contract or cut wood
20	Marl 7	Harvey Usinek	1959-70	Company took over operations in 1967 +/-
21	Emb 1	NWP&P	1965	Campsite cut 1958, never used. Camp on new site along Pembina River in 1965
22	McL 6	Harvey Usinek	1959-70	Company took over operations 1965 +/-
23	Berl 3	NWP&P	1959-71	Company operation, Rosaire LaCroix was camp foreman
24	Marl 3	NWP&P	1964-70	2 campsites cleared 1957 and 1958. Never used. Kurt and Betty Schmidt were the caretakers
25	Emb 3	Dick Corser	1960-69	Pulp, Ties, Fab-a-logs (Crossley patent)
26				No Record
27	Ath 19	Nick Tomkiw	1961-67	Company took over operations 1967 +/- Tomkiw continued to run it
28				No record
29	Ath 13 & 14	Joe Drapeau	1959-70	Company took over operations 1967+/- Drapeau continued as camp foreman
30	Emb 9	E. B. Johnson	1960-63	A Hail Damage Salvage operation
31	McL 7	Bill Makal	1959-63	Formerly an Imperial Lumber L.T.B.
32	Ath 14	Albert Garneau	1959	
33	McL 2	NWP&P	1959-70	Helge Nelson was camp foreman
34	Ath 14	NWP&P	1962-64 & 1970	

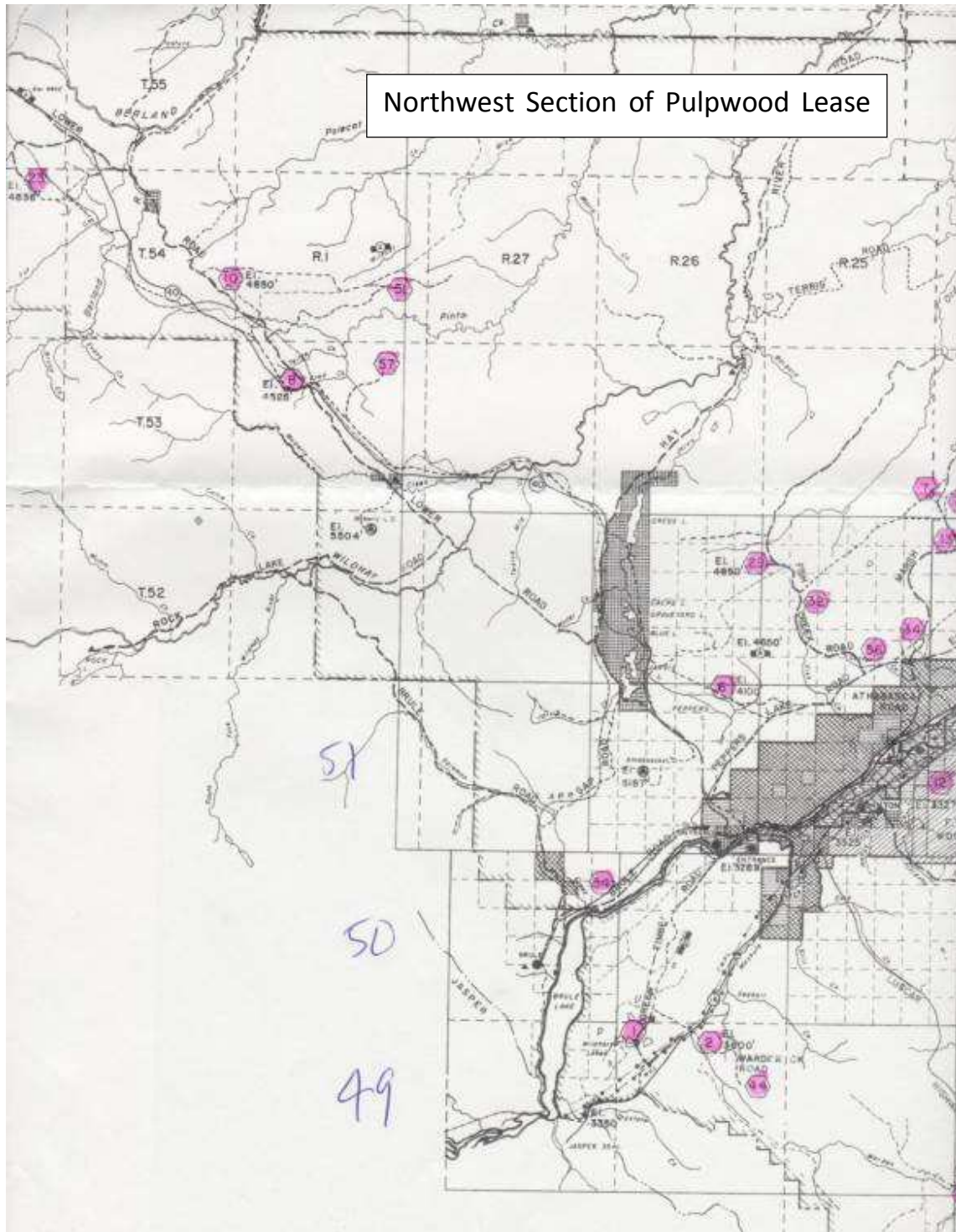
35	Marl 5	Chris Spreen	1960-61	
36	McL 9	Ben Schaning	1959	
37				No Record
38	Marl 19	? Bilton	1959-60	
39				No Record
40				No Record
41	Emb 1	Ellis Anthony	1959	
42	McL 2	Claude Eccles	1959	Sawlogs for Obed Mill
43	Marl 13	? Bassaraba	1960-61	
44	McL 1	Ben Schaning or Don Terris		No records, some sawlogs were taken
45	Marl 6	? Hopkins?	1960-61	
46	Marl 5	George Shand	1960	
47	Marl 5	? Paschuk	1960	
48	Marl 17	? Hopkins?	1961	Only one block cut – 46 acres
49	Ath 10	W. Schmidek	1962-67	
50	Marl 7	?NWP&P?	1962-64	
51	Berl 4	Harvey Kennedy	1962-66	
52	McL 9	Bill Makal	1963-65	
53	Emb 3	E. B. Johnson	1965-66	
54	Ath 2, 9, 12	NWP&P	1965-66	Now the Brule Horse Pasture
55	Marl 3	Harvey Kennedy	1966-72	
56	Ath 14	NWP&P	1966-67	
57	Berl 10	Harvey Kennedy	1966-67	

Other Notes by Wright:

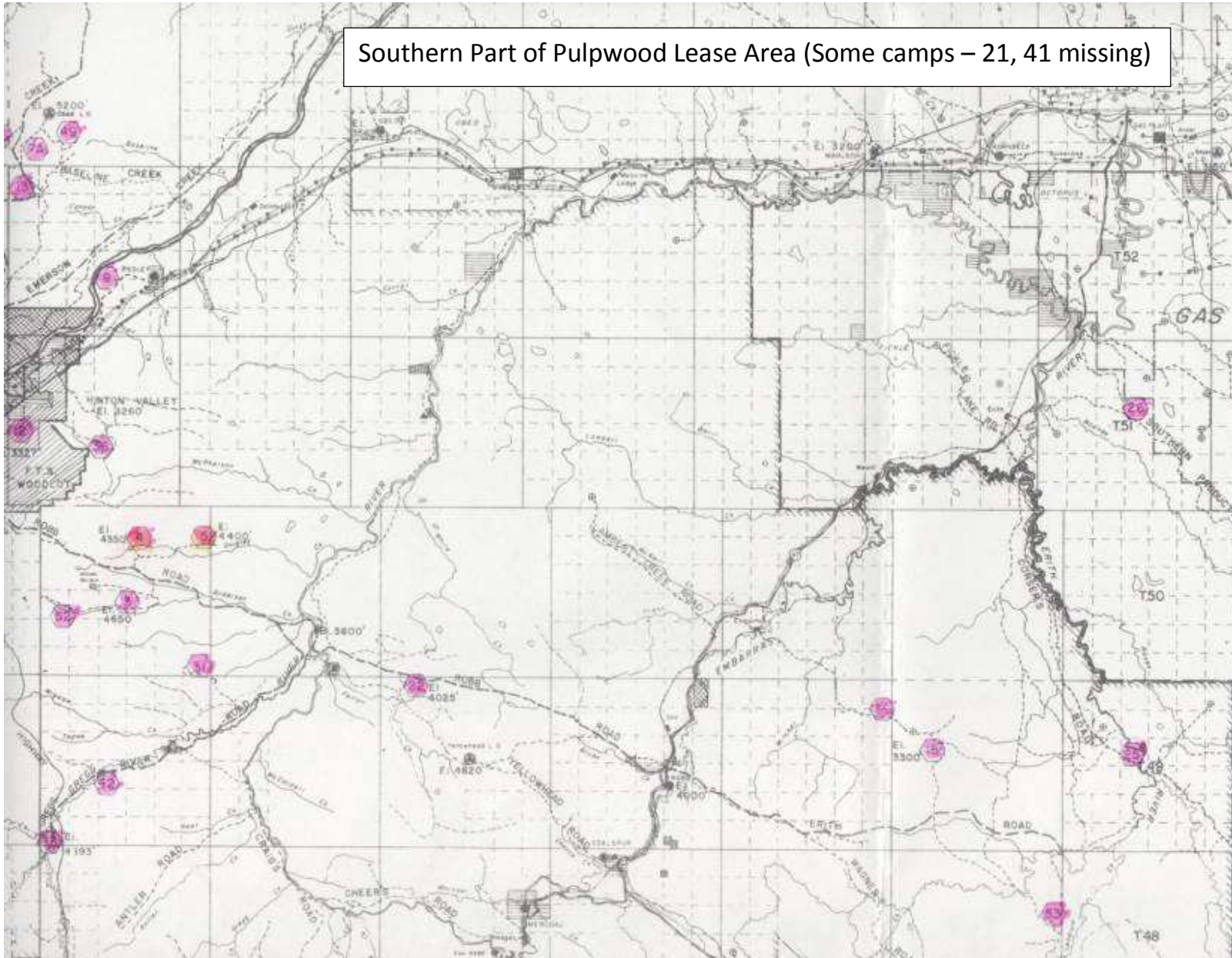
1. Some of the people still operating camps for Hett and Sibald and Swanson Lumber in the Marlboro W.C. were Chopko and Assinger on the Swanson Road

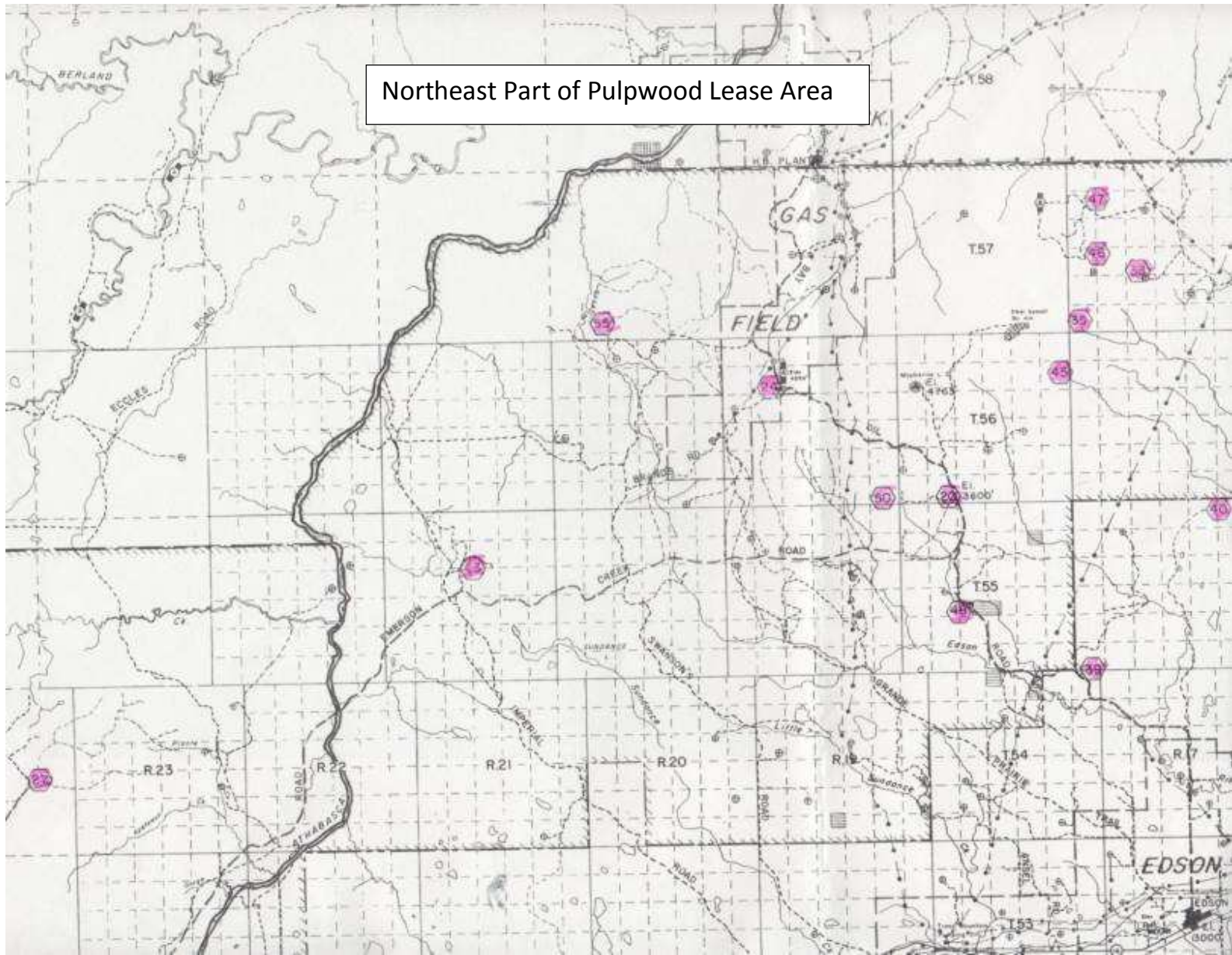
2. Bleuchen and Nordvedt were working on the Imperial Road
3. Corser, Svedberg and Johnston were all operating in the Embarras W.C.

MAPS OF CAMP LOCATIONS



Southern Part of Pulpwood Lease Area (Some camps – 21, 41 missing)





Northeast Part of Pulpwood Lease Area

APPENDIX THREE RECREATION TIMELINE – HINTON FOREST

Year	Source	Events
1952	1	Second FMA – revised boundary. FMA area boundary is Jasper Park boundary south of Athabasca River. Included in FMA is Folding Mountain, Cardinal Divide, Whitehorse Creek, Cadomin Caves and Brule Dunes.
1955	2	Revised FMA area Deleted from FMA is Cardinal Divide, Whitehorse Wildland, and some of Folding Mountain area Part (about 25%) of what is now Switzer Park is in Pulpwood Lease (south–west side), the rest is excluded from Lease.
1957	19	Brule Dunes protected to preserve area adjacent to Brule Lake and dunes. Area not removed from FMA until 1988.
1958	7	Hinton Chamber of Commerce called for establishment of a provincial park near Jarvis Lake. Recent improvements to Highway and the interest of local sportsmen were factors that were taken into account by the Provincial Parks Board. In 1958 Entrance Provincial Park. At this time included in the park were a Royal Canadian Air Force survival training school, an Alberta Forest Service reservation with picnic facilities, a North West Pulp and Power timber reservation, a Kiwanis youth camp, and a junior Forest Wardens Camp reservation. All had to be cleared before current boundaries could be established. Area includes all of Gregg Lake? but never added to park
1958	28	Forest Service Reserves shown on Operating Area Map. Berland River, Switzer Park (reduced boundary), Gregg Cabin and Severson’s Crossing.
1959	7	Wilderness Provincial Park Act. Later named Willmore Wilderness in 1965. – Area is 555,645 ha.
1959	22	Big Berland Campground built (access to Willmore Park?)
1960?		Maskuta Creek and Roundcroft established as Provincial Highway Recreation Areas.
1960?	25	Campground built at McLeod River by LFS
1961	3	Revised FMA area. Additional area removed for Entrance Provincial Park – Still about 10% of what is currently park (West side of Park) is in FMA area Ogre Canyon and Brule surrounds removed from FMA. Folding Mountain - Drystone Valley removed from FMA. Robb, Mercoal, Hinton and Coalspur removed for FMA landbase.
1962	15	Area removed from FMA area and added to Cache Percotte Forest.
1963	30	Campsites shown on Alberta Forest Inventory Maps (prepared in 1954 and revised in 1963). Existing Campsites shown on maps – Watson Creek, Petit Lake, Hay River Group Random Campsites - Ogre Canyon, Gregg River and Wampus. Abandoned campsites under Luscar-Sterco Mine – Coal Valley, Erith River and Nocent (near Lovettville) Abandoned – McLeod Cutoff Road No longer in use. Cutoff, Mile 10 and River View Abandoned – Solomon Creek (just west of Gap Road and Solomon Road Junction and Embarass (2 mile south of Robb)
1963		First reduction to Willmore
1964	16	FMP states area encompassing Jarvis Creek drainage has been deleted from lease area for park. Also, states there are 3 LFS campsites: Big Berland, Wildhay, and Moberly Creek Crossing on Lower Road
1964	24	Rustic campground built at Fairfax Lake by LFS

Year	Source	Events
1965	16	FMP states LFS maintains campsites along highway 47 and Forestry Trunk Road.
1965	15	Additional area removed from FMA area and added to Cache Percotte Forest so that entire Whiskeyjack and Cache Percotte watersheds are in the Forest.
1966	17	FMP states that area has been set aside for Provincial Park (now Switzer Park). Also, states there are numerous campsites (deletions) scattered across the FMA.
1967	26	Campsite built at Rock Lake by LFS
1968	4	Area removed from FMA and added to Switzer Park. Boundary of Switzer Park is as it is today.
1969	29	Forest Reserves shown on Operating Map. Berland River, Moberly Crossing, Switzer Park (current boundary), Pembina Forks, Fairfax Lake, Severson's Crossing and Silver Summit.
1968	27	Campsite built at Wildhorse Lake by LFS
1970	22	Big Berland campsites upgraded by LFS
1970	31	Emerson Lake deleted from FMA. Later to become Provincial Forest Recreation Area.
1972	23	Emerson Lake campsite construction begins.
1972	5	Folding Mountain - Drinnan Valley and Munn Creek removed from FMA.
1972	21	Parks reserve placed on Folding Mountain
1974	31	Big Berland, Fairfax Lake and McLeod River deleted from FMA. Later to become Provincial Forest Recreation Areas under Forest Recreation Regulations under Forest Act.
1974	19 20	Sundance Lake (Wild Sculpture) Trail Development begins by Company.
1974	8	William A. Switzer Park Proclaimed under Parks Act
1974	32	Parks Canada publishes book on Wild Rivers in Alberta. Brazeau River included.
	33	Travel Alberta publishes a trip guide for Alberta's rivers. Athabasca, McLeod and Wildhay Rivers, and Jarvis Creek to Gregg Lake.
1975	31	Wildhay Group Campground deleted from FMA. Later to become Forest Recreation Area
1975		Second Reduction to Willmore.
1976	31	Wildhorse Lake and Watson Creek deleted from FMA. Later to become Forest Recreation Areas
1976	19 20	High Divide (Bighorn Trail), Gregg Cabin and Pine Management Trail development begun by Company.
1977	18	FMP states Sundance Valley removed from timber production.
1979	31	Little Sundance deleted from FMA. Later to become Forest Recreation Area
1979		Beaver Lake – Robb 60 km ski marathon cancelled due to Chinook damage on trail, plus damage by coal and seismic exploration
1979	9	Big Berland, Cardinal Divide, Cardinal River, Coalspur, Eccles Pond, Emerson Lakes, Fairfax Lake, Hornbeck Cross Country Skiing, Little Sundance Creek, Little Sundance Creek Snowmobiling Area, Steeper Water Access, Watson Creek, Wildhay Group, and Wildhorse Recreation Areas proclaimed under Forest Recreation Regulations.
1980	31	Lovett River and Coalspur Forest deleted from FMA. Appears to be administrative cleanup.
1980	19 20	Canyon Creek Trail development begins.
1980	35	Willmore Wilderness Parks Act – Area is 458,944
1980		First and only St. Regis Marathon held on the Beaver Lake – Robb 60 km trail system
1980	31	Alberta Forest Service conducts a River Recreation Inventory and Evaluation on the McLeod River (Mercoal to Whitecourt)
1981	19 20	Spruce management trail development begins because of poor snow at Pine Management Trail.
1981	25	McLeod River campground upgraded.
1982	23	Company turned over Emerson Lakes to LFS

Year	Source	Events
		First 50 km Marathon on the Spruce Management trail system.
1983	31	Steeper Water Access deleted from FMA. Appears to be administrative cleanup.
1984	12	Crown reservation placed on Kinky and Wildhorse surrounds (CNT 840555)
1984	31	Pembina Forks and Hornbeck deleted from FMA. Appears to be administrative cleanup. Canadian Ski Championships held on Camp 29 trail system.
1985	25	Fairfax Lake campground upgraded
1988	6	Athabasca Lookout Forest deleted from FMA. Later to become Forest Recreation Area Silver Summit, Wildhorse surrounds and Brule Dunes removed from FMA. Cardinal Divide, Cadomin Caves, Grave Flats, Muskiki Lake and Solomon Creek set aside as Candidate Natural Areas
1988	22	Big Berland campground upgraded
1988		Muskiki Lake becomes Natural Area.
1991	20	Forest Management Plan – Sundance Lakes, Glacial Cascades and Pinto Canyon – subjective deletion
1991	rbon	Willow Wildhay Campground constructed. Company obtains authority under MLL to build.
1995	bude	Cardinal River Forest Recreation Area closed when area becomes part of Alexis Indian Reserve.
1996	rbon	Company publishes recreation map – first approximation.
1996	rbon	Company inventories recreation facilities and features on FMA.
1996	rbon	Provincial downsizing. Company takes over maintenance of Emerson Lake and Little Sundance Forest Recreation Areas from LFS
1996	djp	Maskuta Creek and Rycroft abandoned as Provincial Highway Recreation Areas and responsibilities transferred to Hinton Community Center. Steeper Water Access Forest Recreation Area abandoned although still is proclaimed a Forest Recreation Area
1997	rbon	Company publishes revised recreation map – second approximation. Company takes over maintenance of Gregg Cabin and Petit Lake from LFS.
1997	djp	Company partners with Fox Creek Development Corporation to maintain recreation areas.
1998	13	Athabasca Nordic Center, Big Berland, Coalspur, Emerson Lakes, Fairfax Lake, Glacial Cascades, Little Sundance Creek, Lovett River, Pembina Forks, Watson Creek, Wildhay Group, and Wildhorse proclaimed Forest Provincial Recreation Areas under Parks Act.
1998	djp	Company proposes Special Places in Forest program. Proposed for protection is Sundance Lakes, Switzer Park Additions, Upper Solomon Valley, Pinto Creek Wetlands, Pinto Canyon, Chase's Flats and Thunder Lake. Proposal developed with input from AEP. Company takes over maintenance of Eccles Pond
1998	10	Whitehorse Wildland Provincial Park proclaimed. Includes Cadomin Caves, Whitehorse Valley and Cardinal Divide which were once in FMA (1952 agreement area).
1999	11	Sundance Lakes and Emerson Lakes proclaimed Provincial Park. Emerson Creek drainage from Lake to Athabasca River removed from FMA and added to protected area.
1999	djp	Industrial Forestry Service completes Recreation Inventory for entire FMA.
1999	djp	Company takes over maintenance of Obed Lake Provincial Recreation Area Eccles Pond dam destroyed by flood. Government unlikely to rebuild. Compensation requested by landowner if dam is rebuilt (floods adjacent private lands). Company upgrades Gregg Day Use Area. Builds shelter, installs toilets and gravels loop road.

SOURCES:

1. 1952 FMA Agreement Map
2. 1955 FMA Agreement Map
3. 1961 FMA Agreement Map
4. 1968 FMA Agreement Map
5. 1972 FMA Agreement Map
6. 1988 FMA Agreement Map
7. 1992. von Hauff, D. Alberta Parks – Our Legacy. Alberta Recreation, Parks, and Wildlife Foundation
8. OC 1499/74 William A. Switzer Park Regulation
9. OC 343/99 Forest Recreation Regulations
10. OC 354/98 Whitehorse Wildland Provincial Park Regulation
11. OC 186/99 Sundance Provincial Park Regulation
12. Wildhorse-Kinky Lakes Crown Reservation – CNT 84055 (AEP Website)
13. OC 7/98 Forest Provincial Recreation Area Regulation
14. Natural Area Designation Regulation
15. Hart, H. 1980. History of Hinton. Hazel Hart Publisher, Hinton, Alberta
16. 1961 Forest Management Plan
17. 1966 Forest Management Plan
18. 1976 Forest Management Plan
19. 1986 Forest Management Plan
20. 1991 Forest Management Plan
21. 1986. Kolar, B. and A. Braun. East slopes wildlands: Our living heritage
22. LFS. Big Berland Brochure
23. LFS. Emerson Lakes Brochure
24. LFS. Fairfax Lake Brochure
25. LFS. McLeod River Brochure
26. LFS. Rock Lake Brochure
27. LFS. Wildhorse Brochure
28. 1958 North Western Pulp and Power Ltd. Operating Map (1 inch = 2 miles)
29. 1969 North Western Pulp and Power Ltd. Operating Map (1 inch = 2 miles)
30. 1953 Alberta Timber Inventory Map (1 inch = 1 mile) prepared in 1953 and updated in 1963
31. Government of Alberta. Land Access Status Report
32. Pearce, J. and R. Lidstone. 1980. McLeod River Recreation Inventory and Evaluation. Alberta Forest Service
33. Parks Canada. 1974. Wild Rivers: Alberta. Department of Indian and Northern Affairs.
34. Canoe Alberta. 1974. Canoe North: Book 2., Travel Alberta.
35. Willmore Wilderness Parks Act

rbon – Rick Bonar

djp – Dave Presslee

bude – Bob Udell

APPENDIX 4 THE HINTON TRAIL – JUNE 1957 PULP & PAPER MAGAZINE OF CANADA

In June, 1957, the Pulp and Paper Magazine of Canada ran a 70-page feature on the newly-minted operation in Hinton, just as the pulp mill was beginning production. This feature by Assistant Technical Editor Fred A. Price sheds much insight into the early days of the operation at Hinton and the key players who made the startup a success.

OUR COVER PICTURE shows the original site of The Hinton Trail, with the Athabasca river running through the woodlands of North Western Pulp & Power Limited. (*Harry Rowed, O'Neill & Associates Ltd., photo*).

ERRATA—Due to an error the captions under the photographs of Mr. Wayne Smith and Mr. Wayne Sawyer on page 185 have been transposed in the printing.



The future of the pulp and paper industry in Alberta

Norman Willmore
Minister of Lands and Forests,
Province of Alberta

THE IMPORTANCE of the forest of Alberta economically to the pulp and paper industry is dependent upon many factors which must be evaluated. It is necessary to take into account the relative suitability and cost of wood from Alberta with other sources in Canada, the United States, and the rest of the world. Due allowances must be made for such factors of commercial significance as transportation charges, labor supply, power, effluent disposal, and proximity to markets in which the pulps must be sold and the competition to be expected from pulp produced elsewhere. Pulps are a world commodity and, as such, tend to sell on the basis of a world price. But probably the most important to the stability and continuity of the industry is the size, kind and quantity of the species growing in Alberta and the government's forest management policy, because the majority of the forest in the province grows on crown-owned land and is administered by the province.

Many of the factors mentioned above can be assessed only by the industry itself through an intensive study, but it is well known that pulpwood has become a major use of timber and competition for wood is increasing, particularly for the softwood species. It is logical to expect that this will intensify as the national economy expands and populations grow. With one large pulp mill already established and other prospective ones being studied, there is every reason for Alberta to expect further expansion of industry here.

This expectation is sound because the province is rich in natural resources, particularly for sources of power with its abundance of natural gas, oil and coal. Many of the rivers are large, rising in the glaciers of the mountains and flowing across the province providing a plentiful supply of water and a possible source of power.

The recently completed provincial forest inventory shows that Alberta is also well favoured with timber resources and with natural conditions to produce successive crops in abundance. In addition, the inventory has shown that this resource is suited to diversification and integration, i.e., the combining of solid wood and fibre utilization. But on account of the smaller sizes at maturity of the majority of the stands, tree growth is more favourable to cellulose production.

We are living in an age of kaleidoscopic changes characterized by the mechanization of industry, mass production, highly developed communication and transportation, complicated processes of distribution and financial control, new products, uses and methods. With these changes economic pressures are tending to push most industries into larger and more integrated units. This trend applies to forest industries as well as to farming, retailing and other service industries and it appears that the trend will continue into the future. This is bound to have a tremendous impact on forest utilization. At present, our forest industry is composed of many comparatively small industries which are not too dependent on long-range supply to liquidate plant investment and which are reluctant to go further than to process basic spruce saw logs into lumber which is known to be in short supply. But it is desirable in a democratic country such as this to continue to extend to any firm, regardless of size, an equal opportunity to purchase and use our timber resources. On the other hand, it is most important to a sound forest industry to process more fully the more abundant poplar and pine as well as the smaller diameter and yet mature stands of spruce. It is well known that less than half of the merchantable wood content of a tree cut for lumber alone is delivered in the finished product.

Here is where integrated utilization has a future important role to play, and our objective of successful forest management in this respect may require a timber sale policy where the criterion becomes integrated use which provides utilization of waste and the use of the more plentiful pine and poplar species.

We have to face-up openly to the fact that with a forest we are dealing with a long-time proposition and cannot operate successfully on a day-to-day basis. The quantity of forest products available to the future will depend greatly on present day policies and management. Therefore, it is our government's policy to have a comprehensive program of forest management dealing adequately with all phases of a sustained timber supply for the years to come and all the benefits that such a program implies. This means a continued step-up in protection to provide against our forests' greatest enemy — "fire" — and to a lesser degree, insects and diseases, and thus save for future timber production, millions of seedlings and saplings now destroyed each year. It also means that the volume of cutting must be planned so that, barring catastrophe, there will be annual harvest commensurate with the productive capacity of our forest land. If the growing stock is deficient, in certain areas, for such annual harvest, the plan of cutting must provide for building it up while maintaining, if at all possible, a steady flow of merchantable products possibly at a substantially lower rate. For management units which have a back-log of mature or over-mature timber, cutting must be rationed so that no waiting period will be necessary for second growth to come to maturity.

It is my firm belief that the public forest should continue to play a positive role in the economic development of the Province on a long-term basis, which means that we should attain the level of allowable cut on the sustained yield principle as soon as possible. In this way we can attain conservation of a renewable resource and at the same time keep our forest industries in good economic health.



William R. Adams

President,
North Western Pulp and Power Limited

W. R. ADAMS is president and a director of North Western Pulp and Power Limited, and president of St. Regis Paper Company

Mr. Adams was appointed president of St. Regis Paper Company this year, having served as vice-president since 1949. He was appointed a director of the company in 1952, and was put in charge of all manufacturing in 1953.

He is a native of northern New York State, and a graduate of Union College, from which he also received the honorary degree of Doctor of Laws in 1953. He joined St. Regis in 1937, serving as chief of the coarse papers division of the OPA from 1941-43.

He is vice-president and a member of the executive committee of the American Paper and Pulp Association. He is also a trustee of Union College, and of the American Forest Products Industries.

Frank E. Ruben

Chairman of the Board,
North Western Pulp and Power Limited

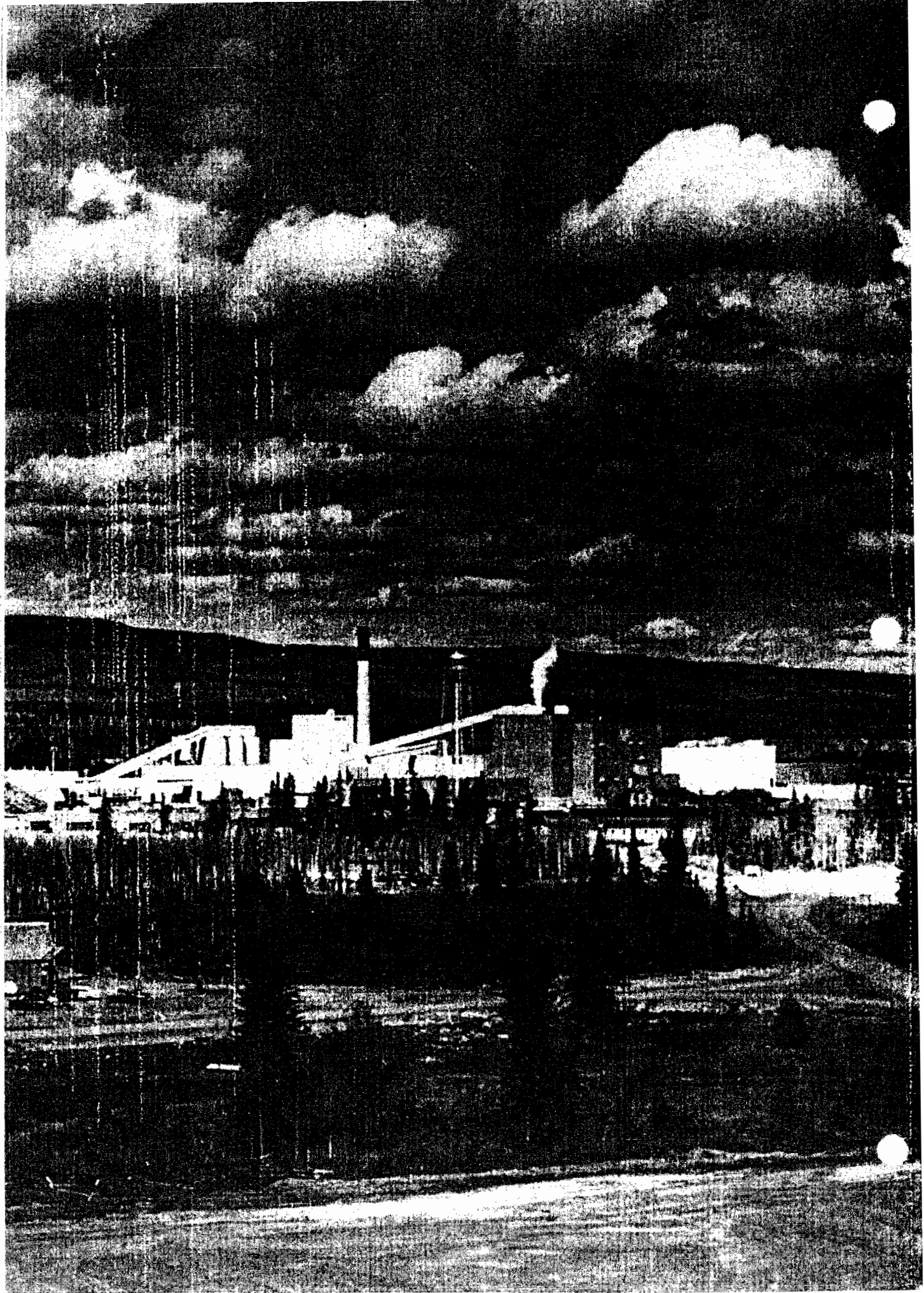
F. E. RUBEN is chairman of the board of North Western Pulp and Power Limited, and president of North Canadian Oils Limited, and New Pacific Coal and Oils Limited.

He is a native of the Los Angeles area where he was active in the construction industry. Prior to coming to Canada in 1936, he was a wildcatter and oil operator in California.

For the following ten years he actively participated in the drilling, producing and refining phases of Alberta's oil industry, and in 1947, right after the discovery of Leduc, he formed North Canadian Oils Limited.

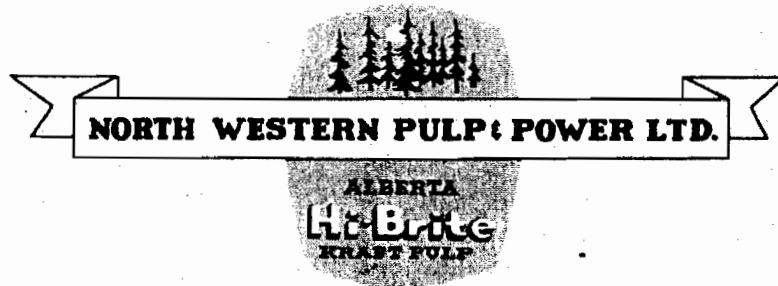
The first time that he ventured west of Edmonton he recognized the tremendous potential in the heavily wooded slopes of that area of the western foothills of the Rockies, and it was then that the idea now seen as the Hinton Mill was born.





THE HINTON TRAIL

the story of



by **Fred A. Price**
Assistant Technical Editor

ANY STORY worth telling requires a dedication, an introduction and a theme. The Hinton Trail is no different in this respect.

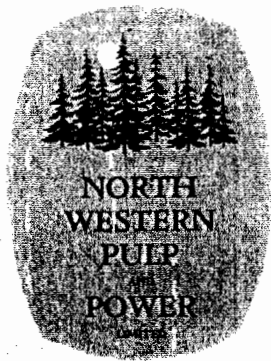
It is dedicated to the pioneer spirit of the men involved in the venture; the men who visualized the completed project and who had sufficient faith in their vision to follow it through to the end; the men who had the experience to design and build the plant and equipment, and the men who are now operating a modern pulp mill in a frontier setting.

It covers the period from 1949, when Frank Ruben, president of North Canadian Oils Ltd., stood in the high foothills of the Rockies west of Edmonton and saw the virtually untouched forests on either side of the Athabasca river, to the month of April 1957 when the first merchantable pulp was produced at the new mill.

It resolves itself into four well defined parts. First a general summary of the events leading up to the initiation of the project, a brief history of the principal owners and a short description of the actual operation — secondly, a description of the construction of the gas pipe line, the townsite and the mill with mention of the attendant problems — thirdly, a discussion of the forest management plan and woods operating program — fourthly, a review of the salient features of the design and layout of the pulp mill with some remarks on the operating features.

It is a story of fact and of human accomplishment; of two great natural resources, gas and wood fibre and of their marriage; and of the design and construction of pipe line and pulp mill to produce as end product, a high purity, high brightness bleached kraft pulp.

Great appreciation is expressed to the management of North Western Pulp and Power Limited for the many courtesies extended to the author during his visit to Hinton, and for the information and data provided for his use. Also to the officials of St. Regis Paper Company and North Canadian Oils Limited, for the histories of their respective companies, biographies of their chief officers and further information relating to the early days of North Western Pulp and Power Ltd. Photographs of the mill were taken by Ray O'Neill, and of the woodlands by the author.



THE HINTON TRAIL — part 1

The Inception of North Western Pulp & Power Limited

IN mid 1949 Frank Ruben, president of New Pacific Coal and Oils Ltd., was visiting the company's Bryan Mountain coal mine in the foothills of the Rockies west of Edmonton. While he was in the vicinity he was impressed with the vast stands of lodgepole pine and white spruce growing untouched in the general area. He felt that here was an undeveloped asset which only needed money, cheap fuel and technical knowhow to turn into marketable products. The first two, he and his associated companies could supply; the latter was harder to find.

Timber Reservation

However, first things come first, and before he could search for a partner with the technical background it was necessary to obtain the forest cutting rights to an area sufficient to support a good sized enterprise. With this in mind, he approached the Alberta provincial government in the persons of N. E. Tanner, then Minister of lands and forests, and his deputy John Harvie. Fortunately the government had recently completed a forest inventory of the "green belt" or lands earmarked for forest use, and were looking for groups willing and able to harvest them on a perpetual use basis. With a common end in view and good will on both sides, it was not long before Mr. Ruben had completed a timber reservation agreement with the Province of Alberta. The next step was to provide a corporate entity to take over and operate

this agreement and North Western Pulp & Power Ltd. was formed as a wholly owned subsidiary of New Pacific Coal & Oils Ltd. and the reservation was handed over to the operating company.

Timber & Market Surveys

During the subsequent years until 1953 New Pacific Coal & Oils Ltd. spent a considerable amount of time and money in timber and market surveys and in engineering reports on the various combinations of pulp and/or paper mills that might be built to take advantage of the timber available from the reservation. At the same time Mr. Ruben approached several groups actively operating in the pulp and paper industry, with a view to interesting one or another in joining New Pacific in their proposed development. No great interest was shown by these outside groups and it became apparent that New Pacific was of insufficient stature to attract the type of partner desired by Mr. Ruben.

The directors of North Canadian Oils Ltd., of which Mr. Ruben was president, then decided to purchase North Western Pulp & Power and to actively promote a pulp or paper mill project. This was acted upon and in June 1953 the change of ownership took place.

St. Regis Shows Interest

Once the new owners took over, an additional large amount of money was spent in obtaining a detailed eval-

uation and inventory of the pulpwood contained in the reserved area. Armed with this additional information the company approached several of the larger pulp and paper companies. None at first contacted showed much interest, and it was only in April 1954 that Frank Ruben met Roy I. Ferguson, then president of the St. Regis Paper Company, who was immediately impressed with Mr. Ruben's ideas. By early May a reconnaissance party of St. Regis officials had taken back their report to New York and to their president. Then followed a series of inter-company meetings and by mid-June an agreement had been reached. This was confirmed in a joint announcement by St. Regis and North Canadian Oils on June 17th 1954, when they stated that plans had been finalized for the financing and construction of a bleached sulphate pulp mill in Alberta.

The agreement did not stipulate an exact location for the proposed pulp mill but at the time, it was generally understood that it would be built in the Edson area, some forty-five miles east of its present site. At the same time North Western signed an agreement with Bryan Mountain Coal Company, having a deep seam hard coal mine some 30 miles from Edson for the entire fuel requirements of the pulp mill for a period of 10 years.

Mill Design Started

The partnership agreement between St. Regis and North Canadian Oils stipulated that each should supply

half the equity capital required by North Western and the balance of the cash required for the construction and initial operating period was obtained through a special financing arrangement concluded with the Royal Bank of Canada and the Bank of Nova Scotia. St. Regis was to direct the design and construction of the mill, to manage its operations and to sell its output through its sales organizations in the United States, Canada and abroad. In addition, a portion of the new mills production was to be used by St. Regis in its own paper mills.

With this general agreement in effect the St. Regis engineering and operating advisory staff started studies of the proposed mill design. These were initiated under the direction of Justin H. McCarthy, vice-president and chief engineer of St. Regis, assisted by U. J. Westbrook, supervisor of all St. Regis pulp mills. The project being several thousand miles away from the general area of St. Regis's head office and main operations, it soon became obvious that the optimum method of procedure would be to engage a consulting engineer with an office nearer the mill site and to have him look after the major portion of the engineering and drafting involved. As a result H. A. Simons Ltd. of Vancouver, B.C. was engaged for this work and subsequently took over the supervision of the mill construction and ordering of the mill equipment. This arrangement necessitated a very close liaison between the consulting engineers and the St. Regis officials and no major features of mill design or layout were approved without joint agreement.

Hinton Selected

Shortly after the mill studies commenced it became apparent that the area around Edson was not entirely suitable for the mill location and further possible sites, along the Athabasca river, were investigated. This led to the ultimate choice of Hinton as the mill site and shortly afterwards the designers stated that it would be preferable to use natural gas as fuel rather than coal. This preference was expressed mainly to save expensive coal handling equipment and to avoid the coal dust problem, always a hazard in making a high brightness pulp.

North Canadian now advised North Western Pulp & Power Ltd. that it was prepared to take over the fuel contract from Bryan Mountain and to provide the mill with natural gas instead of coal, provided the fuel contract could be extended to 20 years from the original 15 years at a price which would give North Western the same fuel cost per B.t.u. as it would

have paid under the original fuel contract. This was agreeable, an amending agreement was signed and North Canadian Oils took over the job of finding an adequate supply of gas for the mill and providing a means of transporting the gas to the mill site.

Construction Started

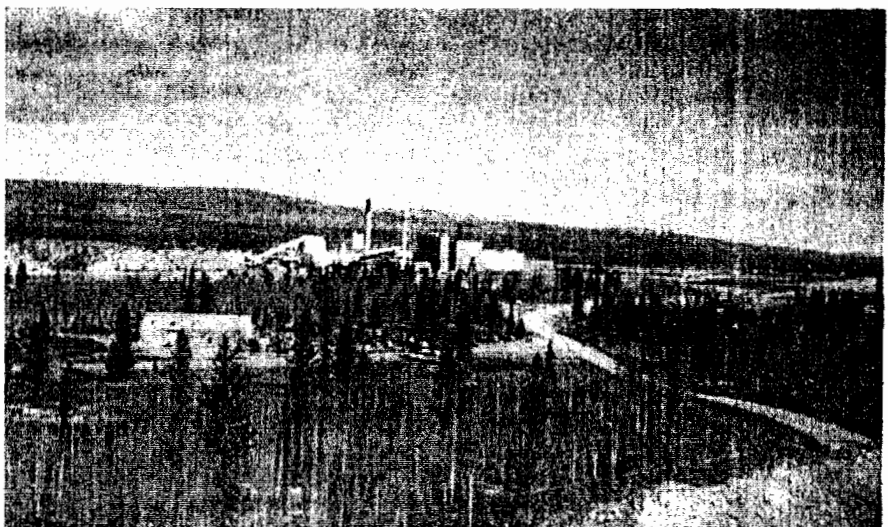
With this major change out of the way, it was possible for the engineering to proceed rapidly and by March of 1955 this work was substantially completed. During this period consideration had been given to the best method of handling the mill construction. The normal procedure of hav-

ing the work done by a general contract was given much thought but ultimately was discarded because no general contractors from western Canada with pulp mill experience were available and free for the construction period. As a result, it was agreed to have the job done by individual contractors, each looking after his own special field, and to have the consulting engineers act as co-ordinators and supply a job manager and field staff. Tenders were called for the construction camp, repair shops, main office and warehouses in March 1955 and the ground was broken and construction started on May 23rd, 1955.

HINTON — BEFORE AND AFTER



The original Hinton at start of construction.



Completed mill at Hinton.

The History of North Canadian Oils Limited

NORTH CANADIAN Oils Limited was incorporated in 1947 in Alberta, and originally engaged in exploration and development of oil and gas properties in the provinces of Alberta and Saskatchewan. During its early years various properties were acquired and a number of wildcats drilled. In 1951 the company participated in the drilling of the discovery well in the Armena field. The latter is part of the Joarcam Field, the largest Viking Sand oil field in Alberta.

Change of Direction

In 1953 North Canadian acquired all of the outstanding shares of North Western Pulp & Power Ltd., and Bryan Mountain Coal Company Ltd. Through these acquisitions, which gave the company one of the largest timber reservations in Canada, and a major source of coal, the direction of its activities was materially changed.

The timber reservation alone was for an area of some 6000 square miles, determined by actual survey to contain in excess of 64 million cords of pulpwood. This reservation was for a period of 21 years, dating from September 1, 1954, and lies on the Eastern slope of the Canadian Rockies just East of Jasper National Park between 135 and 190 miles West of the City of Edmonton, Alberta. One half of the land will be held as a reserve area for future expansion. This is assurance that annual forest growth will provide a perpetual supply of high quality pulpwood species.

Agreement With St. Regis

At that time negotiations were entered into with several paper companies for the establishment of a pulp mill at the site of the timber reservation which would also use the coal from Bryan Mountain. These negotiations culminated in June 1954 with the execution of an agreement between North Canadian and the St. Regis Paper Co., with respect to the joint development of the holdings of



ROBERT F. RUBEN is a director and vice-president of North Canadian Oils Ltd. He is also vice-president and general manager of Athabasca Valley Development Corp., Ltd., and a director and assistant secretary-treasurer of North Western Pulp and Power Ltd.



FRANK C. FINN is a director and secretary-treasurer of North Canadian Oils Ltd., and a vice-president of North Pacific Coal and Oils Ltd.



N. P. URICHUK is responsible for the operation, maintenance and future design of North Canadian's pipelines.

North Western Pulp & Power Ltd.

As a part of this agreement, North Canadian's subsidiary, Bryan Mountain Coal Company Ltd., obtained the contract to supply the mill with its entire fuel requirements for a period of 15 years. Subsequent to this, North Western decided that it would prefer natural gas to coal as fuel for the mill's heating and power generating requirements, and in order that Bryan could meet these new fuel contract obligations North Canadian had the fuel contract extended from 15 to 20 years and took over the obligations of Bryan. This then put North Canadian in the gas supplying business and it commenced the job of obtaining the required fuel supply and constructing the necessary pipeline to get the gas from the field wells to the mill. In 1956 North Canadian constructed a 140 mile, 10¾ inch o.d. natural gas transmission line from Wabamun, 40 miles West of Edmonton, to Hinton, at a cost of \$4,000,000. This made North Canadian the owner and operator of one of the largest independent pipelines of its size in the Province of Alberta.

Return to Oil

Since the beginning of 1956 North Canadian's budget for oil exploration and development has been negligible, due to the heavy commitments it accepted to finance its share of the pulp mill and the cost of the pipeline. In planning its budget for the last quarter of 1957, however, the company's officers are proposing to get back into the conventional oil business full scale, either then or in the first quarter of 1958, making maximum use of any tax advantages which may accrue to it on its revenues from the pulp mill and pipeline.

With the past history of the company in mind and with knowledge of the vision and forceful direction of the management, there is no doubt that North Canadian Oils Limited will once again move to the forefront among the oil and gas development companies in the Canadian West.

The History of St. Regis Paper Company

FROM ITS CRADLE in Deferiet, New York, where the St. Regis Paper Company was founded shortly before the turn of the century, St. Regis has grown to be one of the leaders in the pulp and paper industry, the fifth largest industry in the American economy, exceeded only by automotive, steel, meat packing and oil.

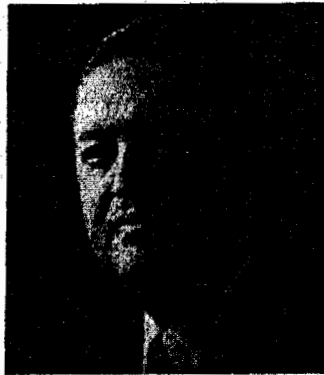
St. Regis has come a long way from the small newsprint firm organized in 1899 by a group of northern New Yorkers to manufacture newsprint from the plentiful supply of spruce in the neighbouring Adirondack forests. Operations commenced with two paper machines at Deferiet in 1901, and since the founders had extensive timber holdings along the upper reaches of New York's St. Regis River, they chose the name St. Regis Paper Company.

When Congress removed newsprint from the protective tariff rolls in 1913, the newsprint industry shifted mainly to Canada and St. Regis gradually withdrew from that field and converted its mills to other types of paper, including lightweight papers for catalogs, directories and magazines. Over the years, St. Regis diversified its products, built and purchased pulp and paper mills, and acquired additional timberlands.

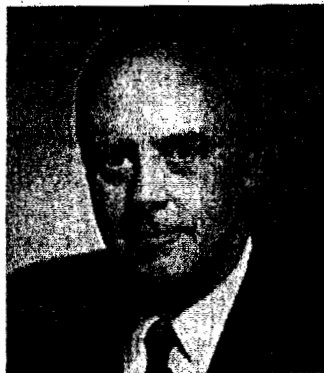
St. Regis, today the third largest paper company in the country, is a major integrated pulp and paper company with approximately 19,000 employees and 29,000 stockholders. It has mills and plants at 61 locations in the United States, Canada, Europe and South America, as well as licensees in almost every major country of the world.

Timber Reserves

The company has timber reserves in the United States and Canada of nearly 2,900,000 acres, not including cuttings rights on some 4,000,000 acres of Crown timberlands in Alberta, Canada, available to North Western Pulp & Power Limited, in which St. Regis owns half interest. All of



ROY K. FERGUSON, is chairman of the board and chief executive officer of St. Regis Paper Company and a director of North Western Pulp & Power Ltd.



ARCH CARSWELL was recently elected an executive vice-president of St. Regis Paper Company. He has been closely associated with the development of North Western Pulp and Power.



BENTON R. CANCELL, was recently elected an executive vice-president of St. Regis Paper Company. He is also executive vice-president of North Western Pulp and Power Ltd.

these lands are protected and scientifically managed, and St. Regis operates two nurseries in the South which have an annual capacity of more than 25,000,000 pine seedlings for the company's reforestation program.

St. Regis' widely diversified operations include the manufacture of kraft pulp, paper and board; printing, publication and converting papers; multi-wall bags, and bag making and bag filling equipment; a wide range of fibreboard and other paper shipping containers; specialty papers such as wrappers for bread and frozen food; glassine and greaseproof papers; lumber and forest products; and a wide range of plastics for home and industry.

Expands to Pacific Coast

Over a period of years, as part of its growth in the field of pulp, paper and packaging, St. Regis has built up substantial operations in the western states, extending into western Canada. At Tacoma, Washington, more than \$12 million has been invested since World War II to give the company a completely integrated kraft pulp, paper and multiwall bag operation on the Pacific Coast. In 1949 a modern kraft paper and board machine was added to the pulp mill which St. Regis acquired in 1930. A new multiwall bag plant was placed in production in 1952 to add to the output of the company's two California bag plants at Los Angeles and San Leandro.

The Tacoma mill pioneered in the utilization of clean wood chips to make wood pulp which today has been widely adopted by the entire paper industry. Wood chips formerly left unused by Pacific Coast sawmills and plywood plants today account for more than 40 per cent of the fibre used at St. Regis' Tacoma pulp mill, and this valuable wood conservation measure has been extended to the company's mills in Florida. This figure will be raised following installation of barkers and chippers at

the recently-acquired J. Neils Lumber Company sawmills in Washington and Montana. It is expected that this will provide an important added supply of wood chips for use at the Tacoma mill.

At Seattle, Washington, St. Regis in 1956 acquired for Pollock Paper Corporation, a subsidiary of the company, a plant to produce paper, film, and foil protective packaging materials from paper stocks, cellophane, pliofilm, polyethylene, saran, acetate and foil. Widely used as wrappers for frozen foods and bread, these products are marketed in eleven western states, Alaska, Hawaii, the Philippines, and Central and South America. In California, Pollock is also planning a new plant to manufacture bread wrappers.

Operates in Canada

Moving north, St. Regis' Canadian subsidiary has a multiwall bag plant at Vancouver, British Columbia, that serves the growing economy of the western provinces. The company's participation in North Western Pulp & Power's bleached kraft mill at Hinton, Alberta will considerably enlarge St. Regis' Canadian operations. Multiwall bags are also produced by St. Regis in Canada at Cap de la Madeleine, and St. Lambert, Quebec, and Dryden, Ontario. The company, furthermore, operates a modern plastics plant at St. Johns, Quebec, producing a wide range of laminated plastics for Canadian homes and industry.

Paper and paperboard have played an ever-increasing role in the industry in recent years, and under the leadership of Roy K. Ferguson, president and chairman of the board, St. Regis has paced the phenomenal growth of the United States pulp and paper industry since World War II. The company has plowed back more than \$186,000,000 in capital expenditures since that date in a continuing program of growth and integration.

Post-War Expansion

Acting on a basic philosophy, which Mr. Ferguson has described as "awareness of opportunity," St. Regis embarked on an expansion program in 1946 designed to maintain St. Regis' position as a long-time leader in the multiwall bag field and also to capitalize on the growing popularity of bleached kraft board for sanitary food containers. In 1946, St. Regis purchased Florida Pulp and Paper Company which had a two-machine mill at Pensacola, Florida, and in 1947, purchased the Alabama Pulp

and Power Company, which was then building an adjoining mill with one machine. By merging these sizeable operations and building a multiwall bag plant at the same location, St. Regis created its first major integrated kraft paper and multiwall bag operation in the South.

Kraft Center

The operations at the Kraft Center at Pensacola have been expanded considerably since these original mills were acquired, making the Kraft Center one of the largest seedling to multiwall bag operations in the world. In 1952, a new paper machine was added which raised the Kraft Center's production to 265,000 tons of kraft paper and board annually. A new bleach plant was constructed at Pensacola in 1954 which raised the bleaching capacity at the Kraft Center to 250 tons daily and increased St. Regis' share of the many new markets for bleached paper and board. The capacity of the multiwall bag plant was increased fifty per cent, making it one of the largest plants of its type in the world.

St. Regis has been one of the world's largest producers of multiwall bags since the late 1920's, dating back to the company's purchase of the Taggart Corporation and the Bates Valve Bag Company. The versatility of multiwalls as a packaging medium is testified to by the fact that today nearly four times as many bags are sold as in 1950.

A large part of this growth is due to the fact that automatic bag filling equipment in combination with multiwall bags offers an economic, flexible packaging system. St. Regis is a leader in this field also and designs and manufactures bag making and bag filling equipment as well as scales for automatic weighing at its modern machine shop in East Providence, Rhode Island, and at Emeryville, California.

Largest Machine

The company's most modern kraft pulp, paper and board mill, located at Jacksonville, Florida, is in the midst of a multi-million dollar expansion program which will more than triple the mill's daily output when it is completed in the second quarter of 1957. The present kraft pulp, paper and board mill was completed in January, 1953 and has an annual capacity of 100,000 tons. With the addition of a new 1,000 ton-a-day kraft paperboard machine, the largest kraft board machine ever built, together with the expansion of pulp produc-

tion facilities there, the Jacksonville mill will have a kraft paper and board production in excess of 400,000 tons annually.

As a further step in the broadening of its operations in the paper converting and container fields, St. Regis in the past two years has acquired the Pollock Paper Corporation (Dallas, Texas; the General Container Corporation (now St. Regis Container Corporation) of Cleveland, Ohio; the Ajax Box Company, Chicago, Illinois; the Gummed Products Company, Troy, Ohio; Cambridge Corrugate Box Company, Cambridge, Ohio, and the Rhinelander Paper Company, Rhinelander, Wisconsin. In addition, St. Regis entered the rapidly growing container field early in 1954 with the acquisition of Superior Paper Products Company with two plants at Pittsburgh and Mt. Wolf, Pennsylvania.

Fine Paper Division

From the original two-machine mill at Deferiet, New York, with a rated capacity of 100-150 tons a day, has grown the Fine Paper Division of St. Regis, producing close to 1,000 tons of white paper every 24 hours. Now expanded and modernized, Deferiet is still one of the company's major mills and specializes primarily in lightweight groundwood papers of which St. Regis is a major manufacturer. Along with the company's mill at Bucksport, Maine, Deferiet produces much of the paper for telephone books east of the Mississippi River, and a large part of the paper in Montgomery Ward and Sears Roebuck catalogs.

St. Regis also operates fine paper mills at Sartell, Minnesota, and Harrisville, New York in addition to Bucksport and Deferiet. During 1956, St. Regis began extensive improvements at its fine paper mills which will increase production 60,000 tons a year by mid-1958 and further raise the level of quality.

Research & Development

Deferiet, New York, is also the home of the St. Regis Central Technical Laboratory, which carries on research and development on pulping processes, paper making, coatings, and multiwall bags, and serves all St. Regis pulp and paper mills and plants. The Central Laboratory has separate sections for analytical, pulping, paper, coating and bag testing laboratories; a special pulp pilot plant; a technical library and a control room for testing which is kept under constant humidity-temperature control.

St. Regis' Kraft Center at Pensacola, a kraft pulping laboratory at Jacksonville, and quality control laboratories at all mill and plant locations supplement the work of the Central Laboratory. Late last fall, at the Pensacola Kraft Center, St. Regis began building an extensive new pulp and paper developmental laboratory for the kraft mills. It will have a pulp pilot plant large enough to study pulping on a semi-commercial scale. Research and development in connection with the kraft pulping of southern woods will be done at Pensacola.

St. Regis has a new thermoplastics laboratory at Richmond, Indiana where the Panelyte Division has plants for injection molding and vacuum forming plastics. This laboratory is concerned with the development of new processes and applications for thermoplastic materials, and with the study of materials and equipment for use in thermoplastic manufacture. Trenton, New Jersey, is the headquarters for the Panelyte Division's thermosetting laboratory, which studies thermosetting plastics produced in Trenton, Kalamazoo, Michigan and St. Johns, Quebec.

Plastics & Laminates

St. Regis is also one of America's two largest integrated manufacturers of high pressure plastic laminates with more than 25 years' experience in this growing field. St. Regis has widened its plastics horizons in recent years through its entry into the injection and compression molding, and vacuum forming plastics fields. The rapidly growing demand for such industrial plastics in the refrigeration, air conditioning, home appliance, packaging and automotive industries, among others, has provided a steadily widening market for these plastics products.

Polyethylene film is one of the fastest growing segments of the packaging industry and the company made its initial entry into this field early in 1956 through the acquisition of Chester Packaging Products Company, Yonkers, N.Y. Chester produces unsupported polyethylene film used in the packaging industry; laminates and coats polyethylene to cellophane, foil and kraft paper; and manufactures extruded polyethylene pipe.

With the continuance of the dynamic leadership and management and with a supply of up and coming executives assured by the company training plan there is no reason to doubt that St. Regis will retain and even improve its position in this rapidly expanding industry.

OFFICERS AND DIRECTORS

North Western Pulp and Power Limited

Directors of North Western Pulp & Power Limited, which is jointly owned by St. Regis Paper Company and North Canadian Oils Limited, include W. R. Adams, G. H. Allen, A. Carswell, J. E. Cowles, R. K. Ferguson, E. R. Gay, H. B. Griffith, F. E. Ruben, R. F. Ruben.

F. E. RUBEN

Chairman of the board of directors, North Western Pulp and Power Limited
President, North Canadian Oils Limited

W. R. ADAMS

President, North Western Pulp and Power Limited
President, St. Regis Paper Company

B. R. CANCELL

Executive vice-president, North Western Pulp and Power Limited
Executive vice-president, St. Regis Paper Company

A. CARSWELL

Vice-president, North Western Pulp and Power Limited
Executive vice-president, St. Regis Paper Company

R. L. YAYO

Vice-president, North Western Pulp and Power Limited
Vice-president, St. Regis Paper Company

J. E. COWLES

Treasurer, North Western Pulp and Power Limited
Treasurer, St. Regis Paper Company

HOMER CRAWFORD

Secretary, North Western Pulp and Power Limited
Secretary, St. Regis Paper Company

R. F. RUBEN

Assistant Secretary, North Western Pulp and Power Limited
North Canadian Oils Limited

E. F. STABERG

Assistant Treasurer, North Western Pulp and Paper Limited
St. Regis Paper Company

The Overall Project

IN THE INITIAL phase of this article emphasis was placed on the availability of ample wood and natural gas at reasonable cost in the foothills region of Alberta. This was the point of departure for the studies, economic and engineering, which had to be made to determine the end product to be manufactured. The St. Regis officials, with a wealth of experience to fall back upon, proposed that bleached sulphate kraft should be produced and that the mill design should be for an annual production of 150,000 tons. There were various reasons behind their thinking in this matter. The first was the existence of a ready market in the U.S.A. for a high brightness, high quality bleached kraft pulp, much of which was then being imported from Scandinavian countries. Secondly, the initial capital cost and power requirements of a mill of this nature would be less than for a mill producing newsprint or fine papers; and thirdly, the forecasted economic return from bleached sulphate pulp appeared to be better than from any other end product.

This reasoning was accepted by the board of directors of North Western, and the design of the pulp mill was started under St. Regis direction.

The Woodlands Department, the first operating department on the scene at Hinton, was organized in May of 1955 and immediately began assembling a staff of trained foresters and operating personnel. The first steps were aerial and ground cruises of the area and from the data gathered, initial management and cutting plans evolved. Contracts for the cutting of pulpwood were let and the construction of modern camps in the various working circles commenced. During this initial period particularly, there was extensive and co-operative contact with various officials and sec-

tions of the Department of Lands and Forests of the Province of Alberta, resulting in the perfection of formal agreements relating to the management of the area set aside for company use. A program of cutting 175,000 cords of pulpwood was commenced, preparatory to the hauling season of 1956-57, to assure the mill of sufficient wood to operate from the time of its proposed start-up in the spring of 1957 until the 1957-58 hauling season. Plans were also projected for the procurement of the 300,000 cords required the following season to support a full year's operation.

The main sources of supply were the company supervised logging contractors; additional wood was also purchased from farmers, settlers and independent lumber operators. The species cut consisted mainly of white spruce and lodgepole pine.

Design and Location of the Mill

The pulp mill was established at Hinton for several reasons such as unlimited water supply of good quality, being in the centre of the wood supply, on a main railroad and alongside an excellent highway. In addition a good level site was available where piling would be unnecessary.

Hinton experienced its first boom in 1912 when it was the headquarters for the firm of Foley, Welsh and Stuart, builders of the Grand Trunk Railroad grade to Jasper. Still earlier, Hinton was an important outfitting centre on a trail originating in Montana, following the foothills through Rocky Mountain House and Luscar, to Dawson Creek, British Columbia. The trail was known as the Great North Trail and was the main route to the Peace River country.

Hinton was known as Hinton Trail in those days and its post office was

named after W. D. Hinton, vice president of the Grand Trunk Pacific Railroad.

The plant design is not that of a conventional type sulphate mill as generally understood.

First, it was designed for a primary purpose: to make the highest quality bleached pulp at the lowest possible cost; it was designed to operate with the local conditions in mind; it was also built with future expansion in mind and laid out for that eventuality. The equipment is of the most modern design available and some is completely new to the industry in North America.

The plant is designed to operate with the lowest man power per ton of any mill now producing. The plant is staffed with high quality personnel, all of whom have passed through a standard training program. With excellent equipment, first-rate design and top operators the mill should produce a top grade, high brightness, high quality pulp of complete uniformity.

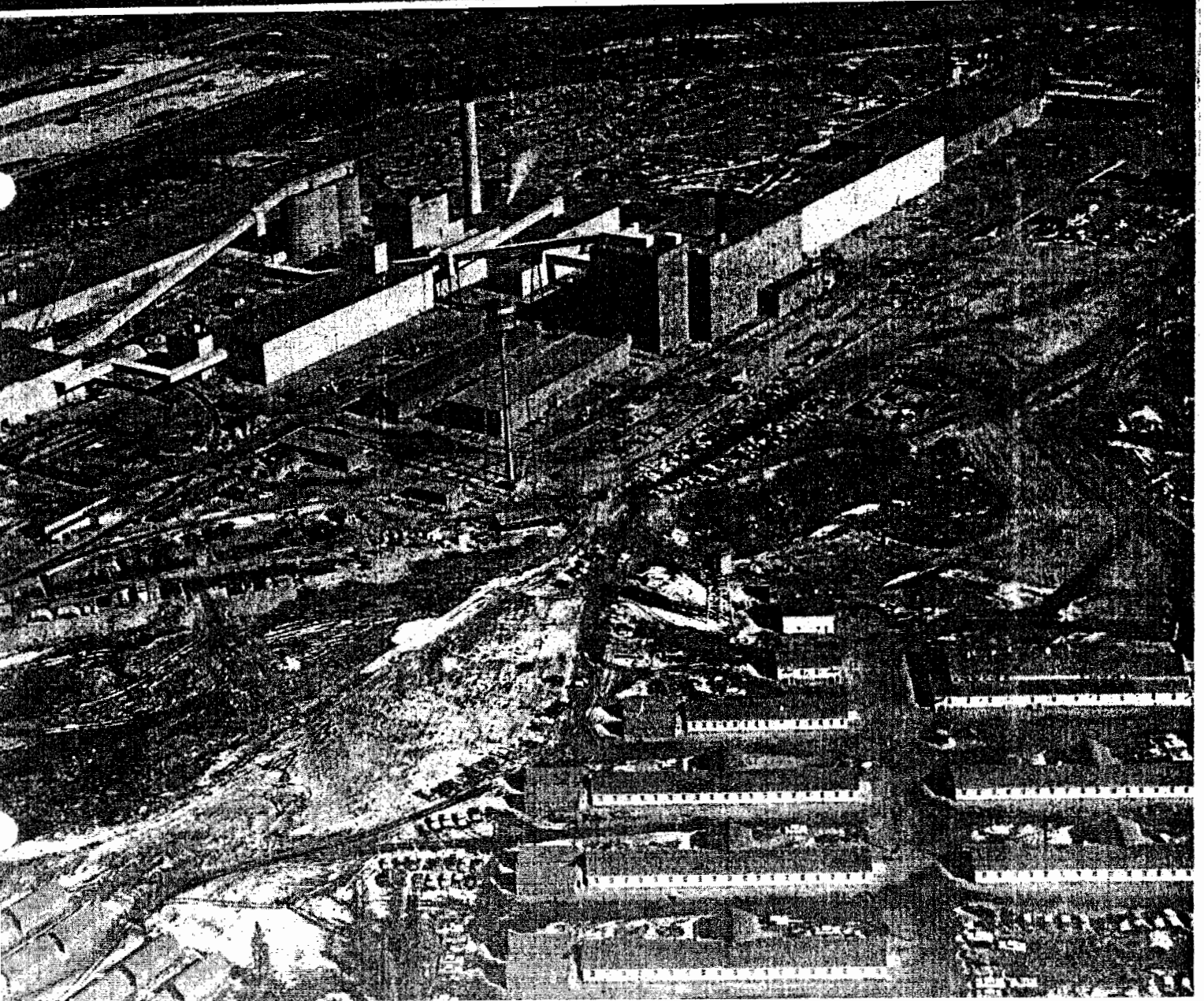
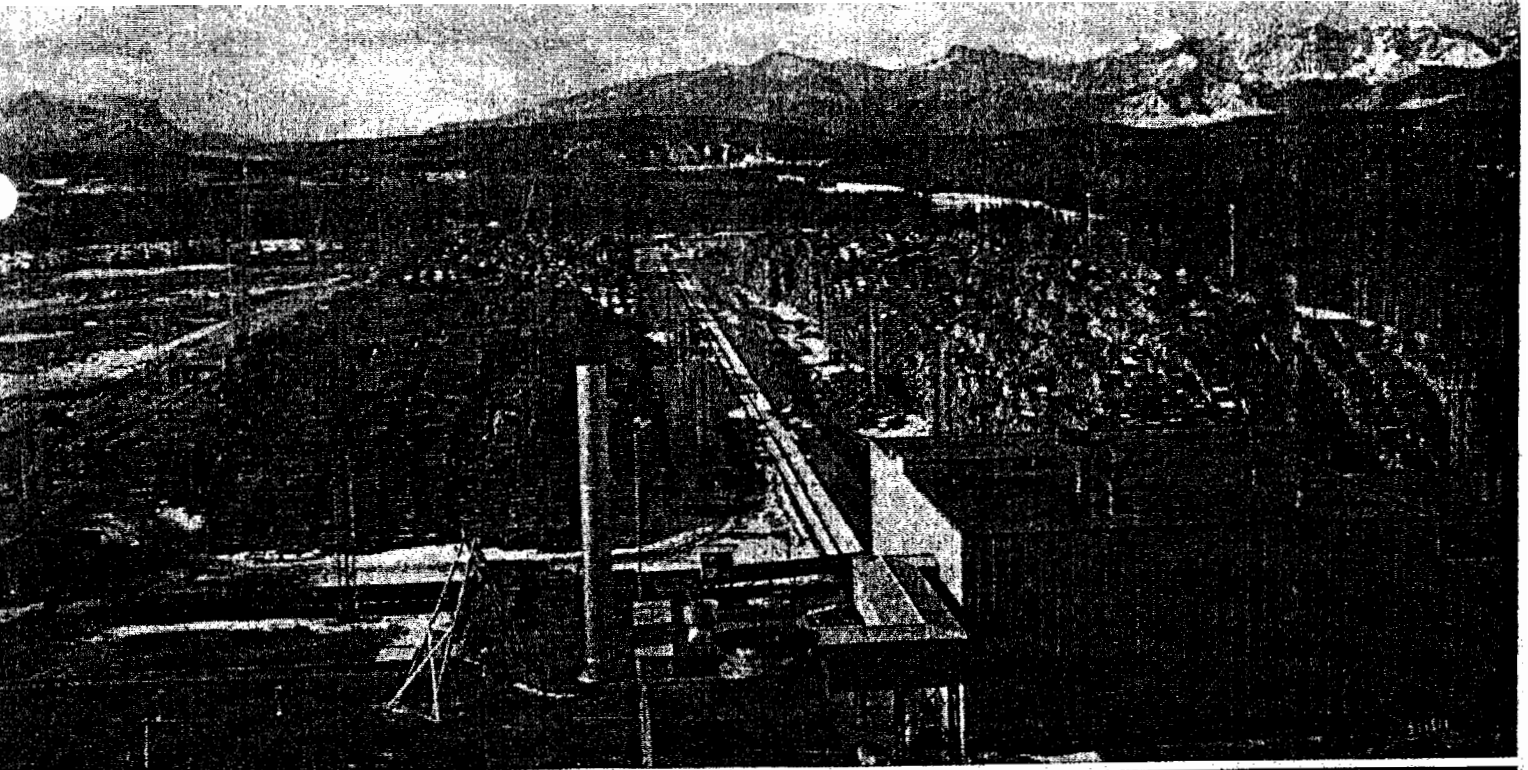
The Mill Processes

The Wood Room

All wood will be received and stored in the woodyard which is located at the west end of the plant proper. It will be stored in piles of approximately eight hundred and fifty feet in length and two hundred feet in width, and will consist of four such piles — two of pine and two of spruce. Down the middle of these piles runs a flume, through which water will be circulated and which will float the wood to the woodroom.

Above right) Woodyard with flume between wood piles. Wood room on right, taken from recausticizing building roof.

Below right) Overall view of the completed project.



ing the months when weather will permit.

The major equipment in the wood-room will be three barking drums for the removal of the bark, two Carthage Norman-type chippers, which will be set to cut approximately five eighths inch (long chips); Rotex screens which will screen out the oversize and undersize chips, a rechipper (or crusher) that will rechip the oversize chips, a hog and bark press which will cut up the bark and squeeze the water from it so that it is suitable to burn in the bark boiler. The chips will be stored in three silos (with conical bottoms and rotary discharge plate with adjustable gates) to get steady, uniform delivery of chips to the digesters.

Continuous Cooking

The cooking equipment consists of two digesters constructed for the continuous (rather than the usual "batch") cooking (or digesting) of wood chips of a size and quality usually associated with the sulphate or kraft pulp process. They operate basically on the principle of introducing a steady and measured flow of chips at the top of the digester, metering in the correct amount of white liquor and black liquor, and recirculating the liquor through heaters and back to the digesters. (The upper part of the digester is called the cold or "impregnation" zone, and the lower part the hot or cooking zone). The digesters are equipped with continuous blow valves, thus permitting a continuing flow of chips through the cooking process to the blow tank. They are also equipped with high-pressure liquor pumps, heaters, blow tank, high and low pressure chip feeders, and the usual instrumentation where desired or needed.

Brown Stock Washing, Screening, and Hi-Density Storage

The brown stock washing, screening, and storage system consists of five Jonsson knotters, set just ahead of Sherbrooke washers. These washers make up the conventional three-stage counter-flow system.

From the third stage washer, the stock may be conveyed to either of three Hi-Density storage chests. From the storage chests, the stock will be diluted and put through four primary, and one secondary, Cowan-type round screens. The tailings or rejects will be refined in a Bauer refiner and sent back to the primary head box for rescreening.

The accepted screened stock will be put over a Sherbrooke washer to bring up the consistency and give the

pulp a final washing before it is put into a low-density storage, from whence it will be pumped either to the bleach plant or direct to the pulp drying machine.

Stock Bleaching

The bleach plant is basically a six-stage bleaching system composed of chlorination, caustic extraction, hypochlorite, chlorine dioxide, caustic extraction, and chlorine dioxide. The total time required to bleach the pulp will be approximately fourteen hours.

From the bleach plant the pulp goes to three high-density storage chests, then through unit-type vibrator screens with the rejects from these screens going to an Oliver Ahlfors unit-type tailing system. The stock then is put through a complete set of centri-cleaners consisting of primary, secondary, tertiary and quaternary cleaners and then to the machine chest. Part of the stock is put over a decker to increase the consistency.

Pulp Drying & Baling

The stock is pumped from the machine chest to the machine head box from which point it goes on the wet end of the machine. The stock is carried on an endless fourdrinier wire, equipped with flat boxes, dandy-roll and a Rotobelt, then over a suction couch. The first press is a suction press, followed by two predryers, then a plain second press, followed by two predryers, then a plain third press, followed by a basis weight controller. The sheet of pulp then enters the Minton dryer which consists of sixty six cylinder dryers entirely enclosed and sealed at each end by seal rolls. The sheet is carried over the dryers by felts, the dryer being divided into two sections with a top and bottom felt on each section. The entire dryer is under a vacuum of twenty four to twenty six inches. From the dryer the sheet goes through a layboy where the pulp is cut into sheets and stacked into individual piles preparatory to weighing, wrapping, and baling.

From the layboy, the bales pass over a scale where they will be weighed into five hundred pounds each. They then pass through the press where they will be compressed to a minimum size and, from the press, they will pass through two automatic balers where the bales will be wrapped and the wires tied. From the baler, the wrapped and tied bales will be conveyed to the pulp storage building and to an automatic stacker where the bales will be stacked to any desired height. From the stacker, the bales will either be loaded directly

into box cars, or put into storage pile in the pulp storage building. The handling of the pulp in the warehouse will be done with fork trucks, properly equipped and properly guarded. Approximately nine cars a day will be required to ship the tonnage of the present plant.

Evaporators, Recovery Furnace & Precipitators

The evaporators are more or less of the standard Swenson long vertical-effect type.

There are six effects, with split feed to numbers six, five and four effect then straight through numbers three two and one, then to storage.

The recovery furnace is a Combustion Engineering furnace designed to burn one million four hundred thousand pounds of solids per day, which should be ample for the tonnage of this mill. The furnace is the square water-cooled bottom type and can be fired from all four sides.

Connected to the furnace will be a cascade evaporator of the latest design, being a single-wheel type with one wheel and body located on the operating floor and the second wheel and body located on the floor directly above. The liquor enters the cascade and overflows to the next one over a pre-set dam.

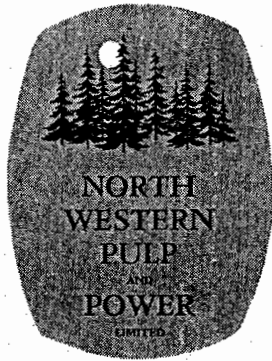
The flue gases leaving the cascade evaporators then enter a Koppers electrostatic precipitator. This unit is of the most modern design and is actually two units in that each unit is equipped with dampers at both inlet and outlet, so either unit can be shut off and all gas can go through the other unit.

The boiler end of the furnace is equipped with automatic soot blowers and automatic cleaning of the various parts of the boiler, using both high pressure steam and air. The whole recovery is compact and streamlined for ease of operation and efficiency.

Causticizing & Lime Kiln

The causticizing department is more or less a standard system. There is the usual green liquor clarifier, green liquor storage, three continuous causticizers, slaker, classifier, white liquor clarifier, mud washer, dregs clarifier, lime mud storage, and weak liquor storage. Also, three white liquor storage tanks with three floor polishers are provided to insure perfectly clean white liquor.

For the reburning of lime, there is an Allis Chalmers kiln with a Peabody scrubber, and a Dorr Oliver mud filter with the usual amount of controls and fans.



THE HINTON TRAIL — part 2

General Design and Construction

The Gas Pipe Line

AS RELATED in Part I of 'The Hinton Trail', North Canadian Oils Ltd., undertook to supply North Western Pulp and Power with a supply of natural gas adequate for at least 20 years operation.

There were numerous possible sources for this gas but the only one that met the requirements of reserves and deliverability required by North Canadian was Mid-Western Industrial Pipeline (Wabamun) Ltd. This company had a contract to supply the Calgary Power steam generating plant at Wabamun and had a pipeline leading from its gas reserves on and adjacent to the Alexander-Indian Reserve already planned. North Canadian then entered into a 20-year contract to purchase the required gas from Mid-Western at Wabamun and set about laying plans to build the 136 miles of pipeline it would require to get the gas from Mid-Western's line at Wabamun to the pulp mill at Hinton.

Permit and Contract Passed

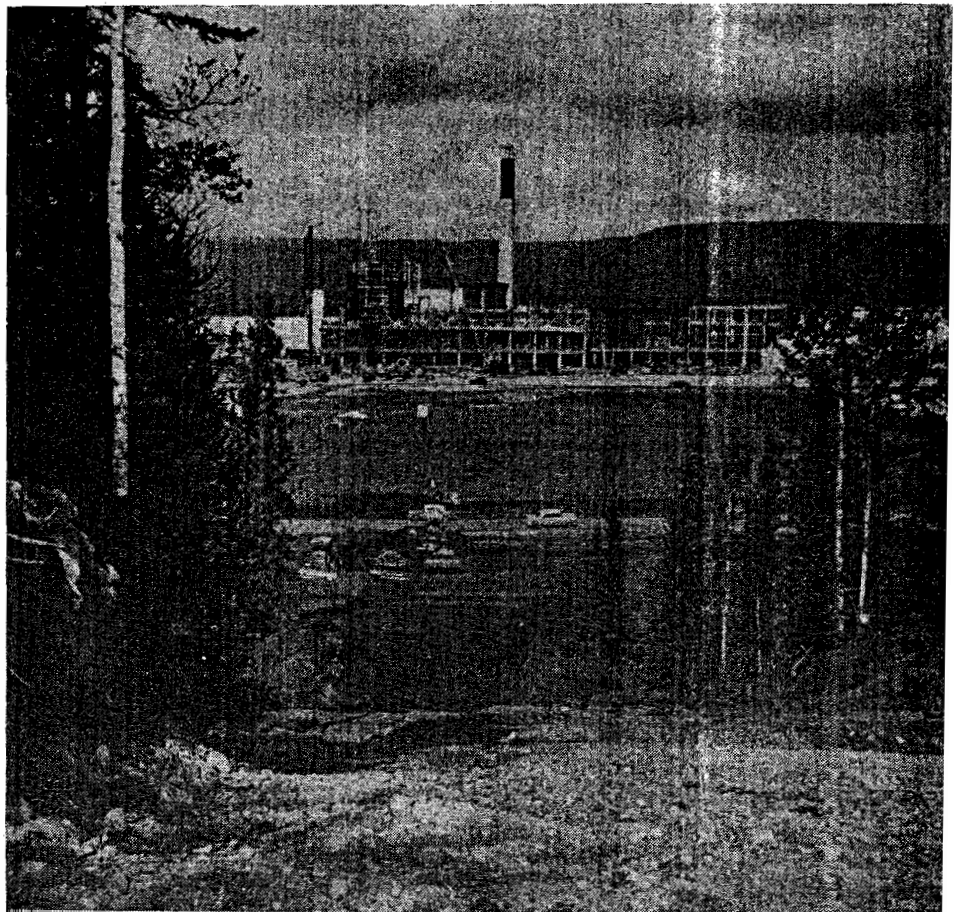
Pipeline engineering specialists, Petrol-Structors Ltd., of Calgary, were hired to plan the line and prepare the necessary engineering report to enable North Canadian to go before the Alberta Petroleum and Natural Gas Conservation Board and obtain a permit to build this line. This permit

was obtained in October 1955 and immediately a construction contract was let to Dutton-Williams Bros. Ltd., of Calgary, and the necessary pipe and materials were ordered.

Three River Crossings

The three major river crossings were put in during the winter of 1955-

56 and construction of the main North Canadian line was commenced in the middle of June 1956, immediately upon completion of the Mid-Western leg of the system. Construction proceeded right on schedule and at times more than 3 miles of pipe was laid in a single day. The line was completed and ready for operation by the scheduled date of October



Terminus of the pipeline at the Hinton mill. Grading crews completing the final section of the right-of-way to the terminal.

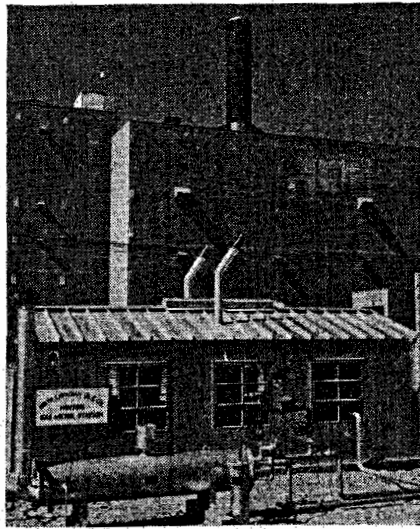
1, 1956 and on that date commenced gas supply to the mill for heating purposes. This was necessary in order that cold weather construction could proceed and the mill could be completed on schedule.

Natural Gas Source

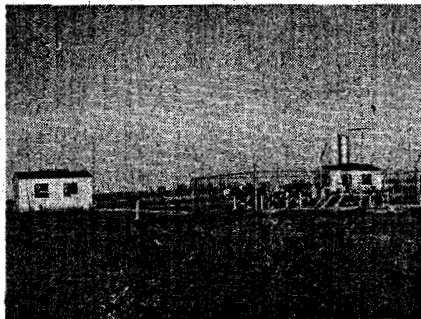
As stated earlier, the gas supply is obtained from the Mid-Western wells on the Alexander-Indian Reserve and adjoining area where Mid-Western currently has 10 wells, 6 of which are presently tied into the system and the other 4 will be tied in next year. This area has gas reserves in excess of 100 billion cu. ft., and is capable of delivering 60 million cu. ft. per day at a wellhead pressure of 1200 pounds.

The gas from these wells is relatively free from impurities and, therefore, the gas goes from the wellhead directly to a glycol dehydrator. This dehydrator is built in conjunction with a high pressure separator which operates at 1200 pounds, where all of the free water and other products are extracted. A fluid level controller dumps these waste products to a flare pit. The gas passes from this high pressure separator into the upper section of the tower where it comes into contact with tri-ethylene glycol, a substance which has an affinity for water at temperatures near 60 degrees. The gas passes through bubble trays and thence out of the top of the dehydrator into the metering portion of the equipment. The pressure is there reduced by a control valve which automatically delivers the gas into the pipeline system prior to entering the meter run, a straight run section of pipe into which is inserted an orifice plate. This plate is so calibrated and so positioned that the differential pressure across this restriction may be corrected and applied to a set of calculations to obtain the volume of gas. The constant control of the static pressure and the constant recording of the temperature under any and all prevailing conditions provide enough information to apply the necessary corrections to obtain an accurate reading of the quantity and the quality of gas passing through the line. The gas at this point is relatively free of moisture so that no trouble is anticipated in the main pipeline.

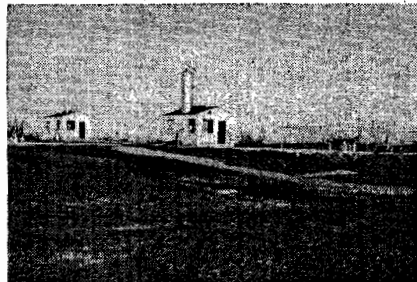
The operation of these wells is automatic, controlled either by pressure, temperature or fluid level. The high pressure separator has a Fisher fluid level controller which automatically dumps fluid into the flare line when the fluid level rises as much as $\frac{1}{4}$ inch, and closes automatically with a drop in fluid level of $\frac{1}{4}$ inch, therefore maintaining a constant fluid



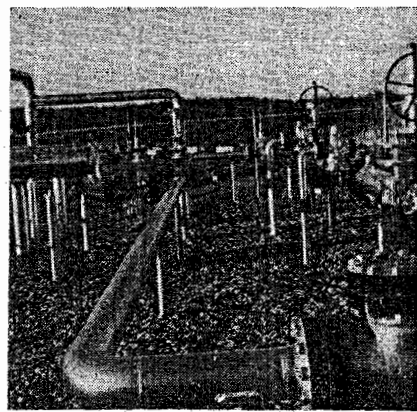
Metering station at North Western.



Typical wellsite installation showing glycol dehydrator, meter-house and enclosed wellsite.



Typical wellsite installation showing dehydrator and reboiler building.



Scrubbers and intermediate scraper traps located at midway point on the gas line.

level at any given time. The glycol in the dehydrating tower is controlled by a similar device and maintains constant level of glycol in the upper section of the dehydrator.

Pressure reducing controls are preset with pressure piped to a Wizard controller. This Wizard control transmits to a mechanical diaphragm thus opening the control valve upon decrease in pressure and closing the control valve upon increase. Under constant conditions of flow this valve will stay in approximately one given position and the variations in flow will only be reflected by a slight change in the valve opening. In the case of failure of a well the other well will be required to produce more gas into the system to make up the production lost. In case one portion of the divided gathering system should break down, check valves and automatic controls will allow the other section to produce the full load without manual attention.

The metering stations at the Calgary Power and North Canadian Oil take-off points are equipped with duplicate control systems and metering devices to ensure continual performance in the case of failure of a side portion of the system. In other words the system is so automatically designed and constructed that any change in demand by the pulp mill or other customers along the route of the line is automatically transmitted back to the well and the changed requirement automatically taken care of or, vice versa, any change in output from any of the wells tied into the line is automatically taken care of without manual attention.

Pipeline Route Chosen

The route of the pipeline was chosen by the engineers only after a very detailed reconnaissance of the ground over the entire length of the line, both on foot and on horseback, which followed a detailed study of aerial photographs and topographical maps which were available. Wherever it was feasible the route was selected to parallel municipal roads or Highway 16, which is the main hard-surfaced highway between Edmonton and Jasper. This resulted in over 50 per cent of the pipeline being constructed within a distance less than 100 yards from a main road, while the balance of the line is generally within a quarter of a mile from an access road. This enabled easy access during construction and will make access for maintenance or emergency repair fast and much less costly. The right-of-way is 33 ft. wide except in muskeg areas, where

it was necessary for mobility to increase the width to 50 ft., and at river crossings where the width was further increased to 100 ft.

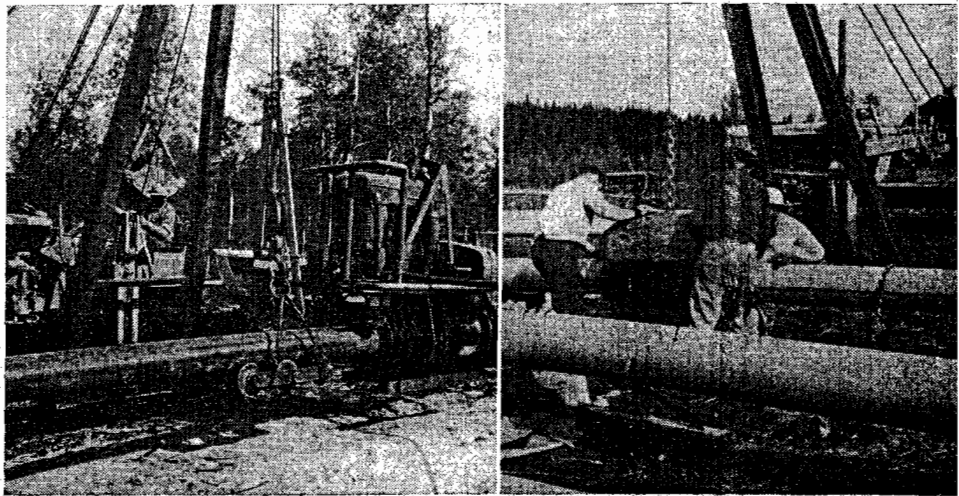
Crossings Avoided

Due to other pipelines and power transmission lines in the general area, particular effort was made to eliminate as many crossings of these various lines as possible and to avoid encroachment on easements presently held by these companies. Although the gas line parallels Trans Mountain Oil Pipeline for approximately 80 miles, it was only necessary to cross their line at six locations. The ground survey crews spent considerable time locating the most practical approaches to the various river crossings and the beds of the rivers were probed before the crossings were finally selected. Three major rivers had to be crossed; these crossings were made during the winter of 1955-56. Special pipe, having a wall thickness of .500 inches, nearly three times the thickness of the normal pipe, was used for each of these three river crossings. Because soil stresses to the coating of the submerged lines may be expected, the lines were given a double coating and wrapped with rock shield to protect them during the lowering into the river bed and backfill operations.

The line was laid across the rivers in a straight section with a minimum cover of 8 ft. to protect it against any shifting of the river bed. Sags were placed well back into the river bank for anchorage. The banks of the rivers were restored as nearly as possible to their original condition and sandbagged where needed to prevent soil erosion. Elsewhere along the line where construction conditions were normal a minimum of 40 inches of cover was placed over the pipe except at highway and railroad crossings and at points where the contour of the earth required a greater depth of cover. In areas where rock was encountered the ditch was made deeper because 4 to 6 inches of padding had to be placed below and above the pipe to protect it and the coating. The pipe was coated in its entirety with a flood coat of Trenton Wax Dummy Wrap to a minimum thickness of 1/32 inch, then spiral wrapped with Trenton Mono-ply opaque plastic wrapper and followed by a wrap of kraft paper to protect the coating during the backfill operations.

Welding and Casing

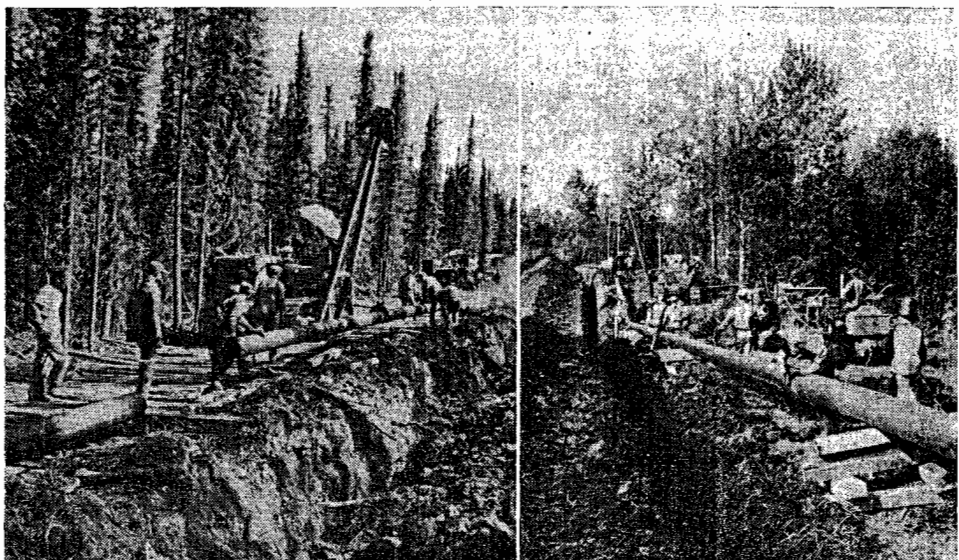
The welding of the line was inspected by two welding inspectors employed by the consulting engineers and approximately 10 per cent of the



Winter crossing of McLeod River with dragline cleaning out trench which was blasted across the river.



Left) Cleaning pipe line prior to wrapping. Right) Wrapped and coated pipe receiving weights prior to sinking pipe in river.



Left) Welding the line. Right) Welding crew move ahead on the summer pipeline project.

welds were X-rayed, except at river crossings and crossings of other pipelines where all welds were X-rayed.

Prior to lowering any sections of line into the ditch, a gauging scraper was run through the line to insure safe scraper travel during operations and to remove the larger foreign matter and to locate flat spots and obstructions. The section was then blanked off at both ends and pressured up to 100 p.s.i. with compressed air. All welds were then checked by means of a soapy water solution and any welds found to have leaks were cut out of the line and replaced by the contractor.

Most highway and all railway crossings on the main line were cased using a 14-inch o.d. casing with 2-inch vent risers welded on each end of the casing. A combination insulator and spacer were used as casing insulators and were spaced at 20 ft. intervals, while a rubber casing seal was used at each of the casing to shut out liquids and dirt.

A conventional cathodic protection system is planned by North Canadian; however, this will not be done until later this year after the backfill makes its initial settling. Test leads were attached to the mainline every mile to facilitate the installation of the cathodic protection program.

Upon completion of construction the entire line was tested with natural gas to 1140 p.s.i. The procedure followed was to run three scrapers with wire brushes propelled by air to clean up the inside of the line to operating cleanliness, removing not only dirt, but also loose mill scale, weld slag and any water that may have collected in the low spots. Since mixing gas and air can be hazardous and cause an explosion, a batching scraper was run ahead of the gas followed by two slugs of nitrogen spaced by other batching scrapers to displace the air ahead of the gas to eliminate the dangers of explosion.

Gate valves were installed on either side of major stream crossings and

block valves with header type blow-offs were installed at approximately 25-mile intervals along the entire main line. These valves were installed so that in the event of a line break, the section where break occurred could be isolated for repairs and a limited amount of gas from the line pack would provide the pulp mill and other consumers along the route with sufficient gas for emergency requirements.

Drips were fabricated and installed ahead of all block valves and scrubber banks to collect any moisture or foreign matter such as rust, earth, etc., which may have entered or formed in the line. The drips were conventional pipeline ladder drips connected to the main line by two six-inch legs, while the drip itself was fabricated from 10-inch heavy wall pipe with the ends blanked off with welding caps. All branches to the main line and drips were reinforced with welding saddles to strengthen these connections. A 2-inch blow off connection was welded to the drip and 2-inch plug valves were installed above and below ground to permit blowing off to atmosphere anything which may have collected in the drip.

Scraper Traps Installed

One of the principal considerations during the construction of the line was fabrication and installation of scraper traps so that internal scraping of the line at regular intervals could be accomplished without affecting normal operating conditions. Due to the distance involved and because the rubber discs and wire brushes of the scrapers wear while travelling through the line, it was decided to perform this operation in two stages. The outgoing scraper trap on the first section was installed at the start of the line at Wabamun, while the incoming scraper trap for this section and the outgoing trap on the second section was located at the terminal of the line at the pulp mill in Hinton.

Gas Scrubbers Installed

Besides the possibility of accumulation of liquids in the pipeline of some kind and magnitude is four wherever gas flows. Therefore, gas scrubbers were installed at the start of the line at Wabamun and at the intermediate scraper trap, as well as at Hinton. Moore Lane gas scrubbers were installed at these locations and are capable of removing dust less than 10 microns in size.

Dual 6-inch meter runs were installed at the pulp mill meter static and each is capable of handling very large range of flow rates, each having a maximum capacity of 1 million cu. ft. per day. Daniel S. Senior orifice fittings were installed on these runs so that the orifice plate could be changed without having to shut down the run and interrupt the flow. The downstream pressure controlled by means of diaphragm loaded control valves with America meter pressure controllers which maintain a constant downstream pressure to the mill regardless of the flow rate. Safety relief valves have been installed on each run to protect a station and mill piping in the event of failure of control valves within the station. These valves are set to relieve at 10 per cent above required downstream pressure.

Gas is measured by means of mercury type orifice meters, which record the differential, static and flowing temperature of the gas on 24-hour charts. The quality of the gas will be continually recorded by means of an Acme specific gravity recorder which will record the specific gravity of the gas, while a Sigma Calorimeter has been installed to record the calorific or Btu content.

All meters and recording instruments are housed in a prefabricated steel building located approximately 30 feet from the meter station and special control and flow lines were constructed to transmit the reading from the meter runs to the various recorders. The main meter station is also housed in a prefabricated steel building and all lighting within the building is explosion proof. Special attention was taken to insulate the meter station from the building as well as from the mill and the main line.

A Peerless Type MP package odorizer has been installed at the start of the line at Wabamun to odorize the gas entering the line from the supplier. The odorizer utilizes the principle of liquid odorant injection and is controlled by the differential around an orifice plate which actuates a positive displacement meter.

Principal Equipment Suppliers

SO MANY companies contributed to the growth of this mill that inevitably there are some supply and service companies who have not been mentioned in the course of this feature article.

The editors feel that the many firms who took part in mill construction and installation should be given due credit for the part they played in this endeavour.

At the back of this issue, in the 'Affiliated Industries' section, we are carrying a comprehensive listing of the principal equipment suppliers who took part in the Hinton project, including list of equipment supplied, and names and addresses of companies.

This particular department this month is centred around some of the major pieces of equipment which went into the mill.

Town Site Development

ONCE THE DECISION had been taken to locate the pulp mill on the Athabaska river below Hinton, one of the first problems to be confronted was provision of living accommodation for the company employees and for the construction force. The existing hotel and homes at Hinton, then a settlement with a population of a few hundred souls, were completely inadequate for the coming influx of people and the site of the old town did not lend itself to modern development.

Temporary Accommodation

With this in mind the company approached the problem in two stages. First, and foremost, was a need for temporary accommodation for the company employees and construction workers during the initial period when the mill was building. This was met by awarding a contract in early 1955 to Poole Construction Co. Ltd. of Edmonton for a construction camp for 1000 men and by arranging with Canada Catering Co. to operate this camp and provide the necessary services and meals. This took care of

all personnel who were without dependents.

Family Accommodation

However, family accommodation of some type was essential to look after married men holding key positions. After some consideration a bold and logical move was made and the company purchased close to one hundred American house trailers and set up two trailer courts. These homes on wheels were equipped with running water, electricity and air conditioning. Propane gas is used for cooking and heating. Centralized washing machines with automatic dryers are provided at both courts.

These two moves looked after the immediate problem but did not solve the long range necessity of permanent accommodation, shopping facilities and public buildings for a population of several thousand newcomers.

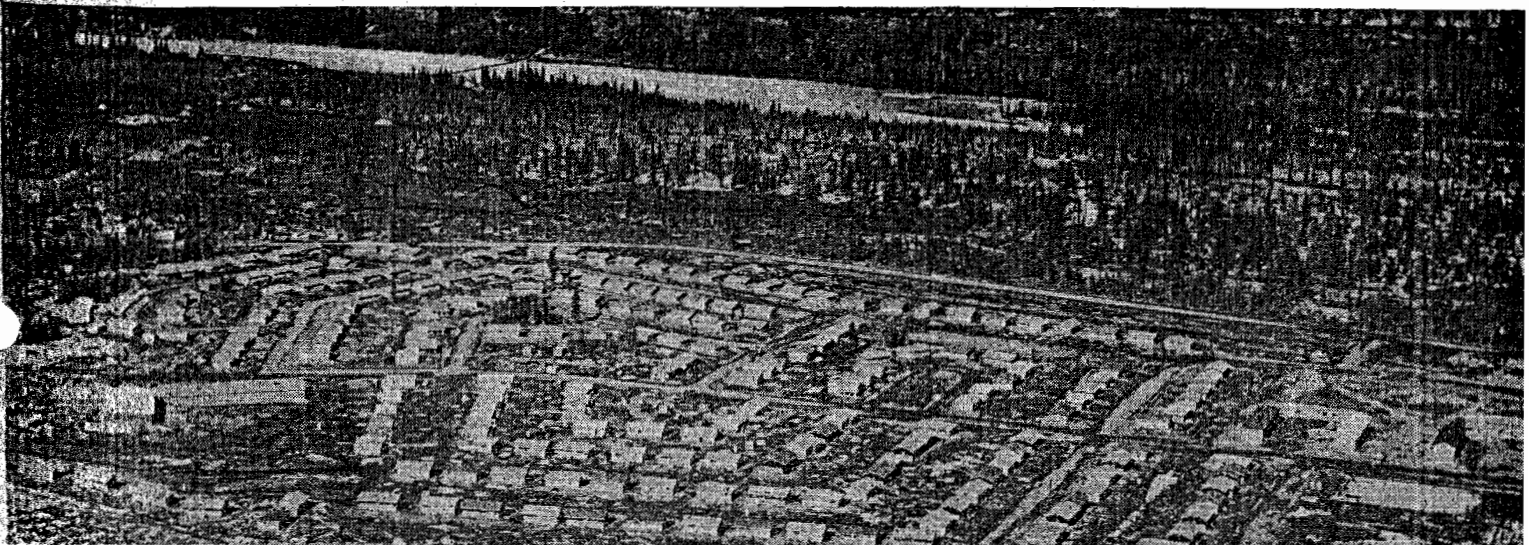
Townsite Development

The company were loth to enter the real estate and development field themselves and felt that a company

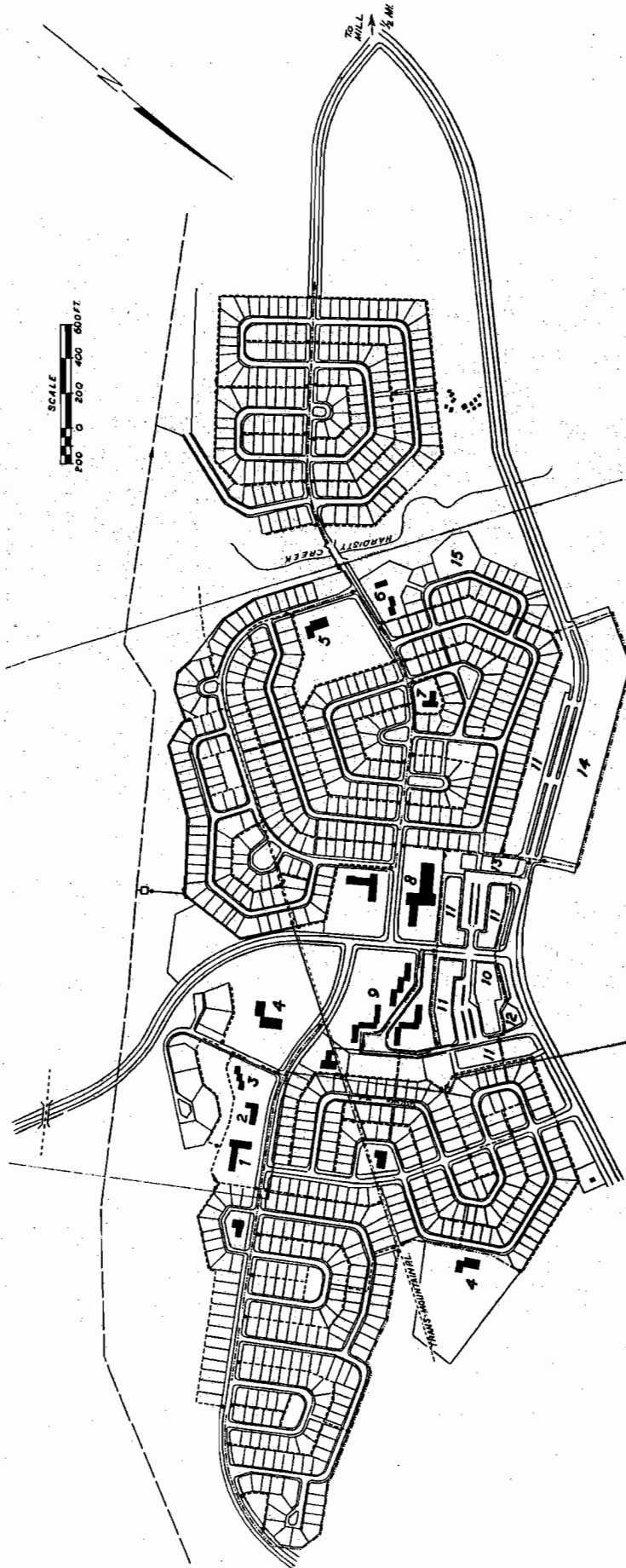
town was undesirable from most points of view. This was concurred in by the Alberta Government authorities in the Department of Municipal Affairs. After several company-government meetings an independent company, the Athabasca Valley Development Corporation, entered the picture and offered to acquire land and develop a suitable townsite near the pulp mill. They proposed to build an adequate number of houses of various standard types for resale and to give employees of North Western priority of purchase. They agreed to build certain public buildings such as schools, etc., and turn them over at cost to the new town upon its incorporation and they agreed to provide sites for churches, hotels and commercial ventures. They also proposed to build a number of apartment houses, a hotel and possibly some shops. These would remain their property and be operated by them.

This solution was accepted by the company and approved by the government and a search for a suitable

Below) Aerial view of the new townsite.



Plan of Hinton Townsite



LEGEND FOR TOWNSITE

- | | |
|--------------------------------|----------------------------|
| 1. Hospital | 11. Commercial locations |
| 2. Clinic | 12. Motor service stations |
| 3. Nurses' home | 13. Public buildings |
| 4. High school | 14. Industrial locations |
| 5. Elementary schools | 15. Playground |
| 6. Church and church hall | |
| 7. Church | |
| 8. Community recreation centre | |
| 9. Apartments | |
| 10. Hotel site | |

site started. After some time, several hundred acres of land, sloping up from the Athabasca river and about one mile down stream from the mill, were acquired by the Development Corporation and approved by the Director of Town & Rural Planning.

This latter authority and the Development Corporation worked together on the townsite layout and an independent consulting engineer was engaged to plan the public services.

Financing Approved

In March 1956 the townsite plans were approved and as soon as conditions permitted the first construction work was put in hand. All houses were designed within the specifications of Central Mortgage & Housing Corp. and are approved for financing on the National Housing Plan. The cost of local improvements such as sidewalks and roads has been included in the cost of the houses and all houses are connected to the main sewer, natural gas supply and to the electric mains. A separate company, the Athabasca Valley Utilities Ltd. supplies gas and electricity at reasonable prices.

The construction was carried out by the Development Corporation who placed a superintendent on the job and brought in the necessary skilled labour. The best materials were used throughout and all houses have full waterproofed concrete basements. Wiring and piping is up to the best modern standard and the interior finish leaves nothing to be desired.

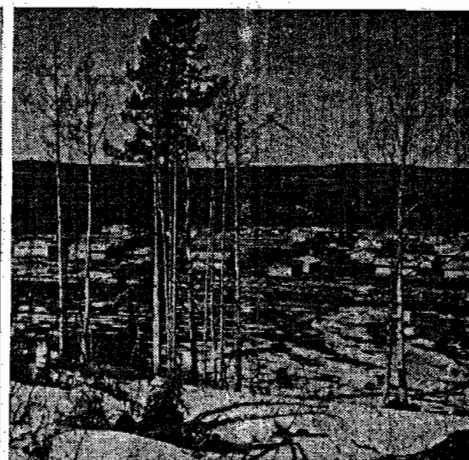
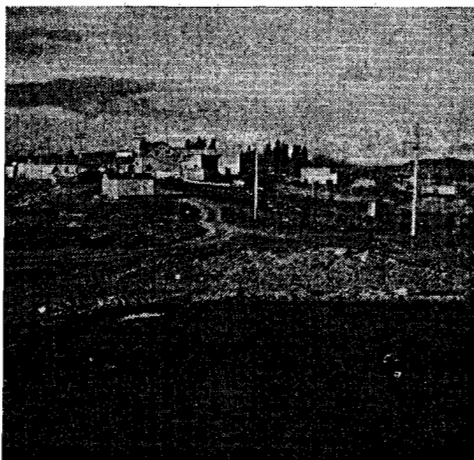
By the end of 1956 a number of houses and several apartment buildings were finished and occupied and a school has been opened. A start had been made on a hotel and supermarket and commercial lots were available for sale to private individuals or companies willing to locate and carry on business.

Municipal Area

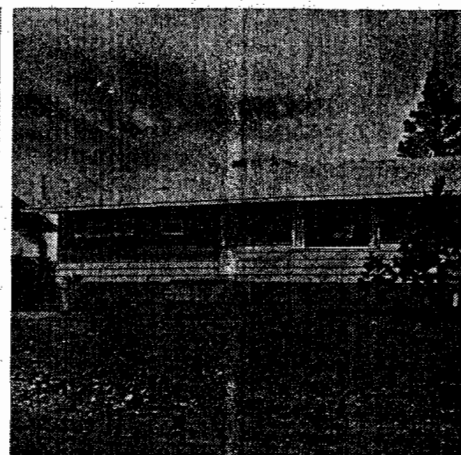
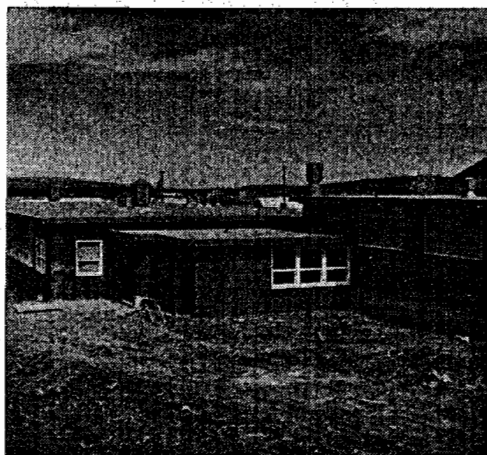
In early 1957 the construction of the mill was drawing to a close and the construction camp was emptying. To provide more adequately for single employees remaining on the operating staff, two of the standard bunkhouse buildings were remodelled and the rooms brought up to staff house standard.

All employees of the company are encouraged to settle in the community and to engage in some form or another of community activities. Recently, the old and new townsites have been included in a municipal area called Hinton and the destinies of the town are in the hands of a new municipal council independent of any company control.

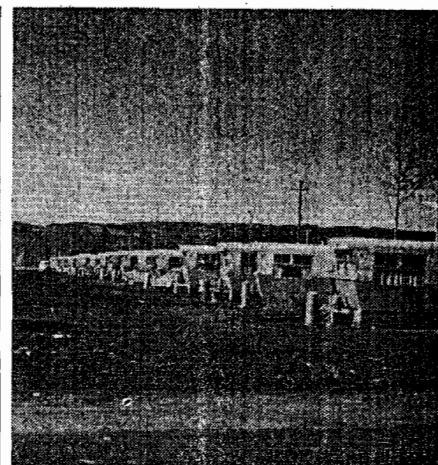
BEFORE AND AFTER LOOK AT HINTON TOWNSITE



Left) The old townsite at Hinton. Right) New townsite at Hinton.



Left) Public school building at new townsite. Right) Typical bungalow construction at new townsite



Left) Trailer town and mill. Right) Company trailer camp at Hinton providing a temporary townsite.

The Mill

ENGINEERING studies and design of the mill were initiated in mid 1954 under the supervision of J. H. McCarthy, St. Regis vice-president and chief engineer, in collaboration with H. A. Simons Ltd., consulting engineers of Vancouver, B.C. Assisting prominently in the activity were U. J. Westbrook, supervisor of pulp mills for St. Regis and Oliver Laakso of H. A. Simons, Ltd.

The chief object of the designers was to provide a pulp mill which would turn out a high grade, uniform quality product at a competitive price. At the same time they were required to keep in mind the possibility of future expansion and make provision for this in the mill layout.

This concept was laid down by St. Regis and was the primary consideration through all the subsequent months. H. A. Simons Ltd. supplied the drafting and engineering services and Oliver Laakso of their organization was named their project manager. All major decisions on design features, mill layout and choice of equipment were made by the joint group of St. Regis and Simons officials.

In order to save time and unnecessary inconvenience the Simons organization undertook to price and order all equipment specified by the designers. As much as possible was purchased on an installed and operating basis which lessened the worries and responsibilities of the mill operating personnel at start-up time. The balance of the equipment was installed by contract with Provincial Engineering Ltd.

Continuous Production Concept

The main feature of the design is difficult to spot but is probably the continuous production concept. The heart of this is, of course, the Kamyr continuous cooking operation. There is no saving in capital cost from this system but by judicious use of semi-automation a substantial saving in



JUSTIN H. McCARTHY, vice-president and chief engineer of the pulp and paper division of St. Regis, who directed design and construction of Hinton.



U. J. WESTBROOK, supervisor of all St. Regis pulp mills, who was active in the Hinton mill project.



OLIVER LAAKSO, Hinton project manager for H. A. Simons.

man power and operating labour cost has been achieved. In addition, continuous operation is a tremendous factor in producing stable, uniform quality pulp.

Other features of design or conception which should be mentioned are the size and layout of the woodyard. Having four separate wood piles with space for 50,000 cords plus in each gives flexibility of operation and chance of separating wood species. The unloading and stacking crane can handle up to 3,000 cords per day into the wood piles from trucks and rail cars.

The use of a flume to move wood from the piles into the wood room is an innovation in Canada. Water used in this flume is screened and recirculated; in cold weather surplus warm water from the mill is used to prolong the use of the flume well into the winter. In addition, provision is made to unload trucked wood on a table feeding directly to the conveyor entering the wood room from the flume.

In the woodroom the layout is more or less standard except for a special regulated feed to the chipper which provides a continuous chipper load. It has a capacity of 1000 cords per day on two shifts.

There are no particular innovations in the chip handling system or in the chip silos and it is in the pulping group of digesters, brown stock processing and bleaching that we find further features. The concept of design for this portion of the process was to provide a completely integrated operation, all of which could be controlled by panels located on the fourth floor and which could be supervised by one man, the pulp preparation operator.

In line with this idea the digesters, knotters, brown stock washers, screens and bleach plant are all in the same building. The fourth and top floor is an open operating floor with digesters and main operating panel at one end, the brown stock operation along one side and the bleaching operations on the opposite side. With

its glazed tile walls and polished metal ceiling, it provides an impressive outlook of functional design, cleanliness and spaciousness to the observer.

All chemical preparation, including the manufacture of ClO_2 by the Mathieson process takes place in this building, an innovation for plants of this type.

With continuous operation established, provision must be made for temporary shut-downs of the various items of equipment for adjustments or maintenance. This is provided for by having stock tanks and chests with capacity to supply the pulp dryer for six to eight hours.

The machine stock preparation and the pulp drying machine are located in the same building with control panels on the machine floor at each end of the room. There are no particular items of design significance here except the provision of screens and centricleaners to ensure a clean furnish to the machine and the low temperature drying for high brightness of the product.

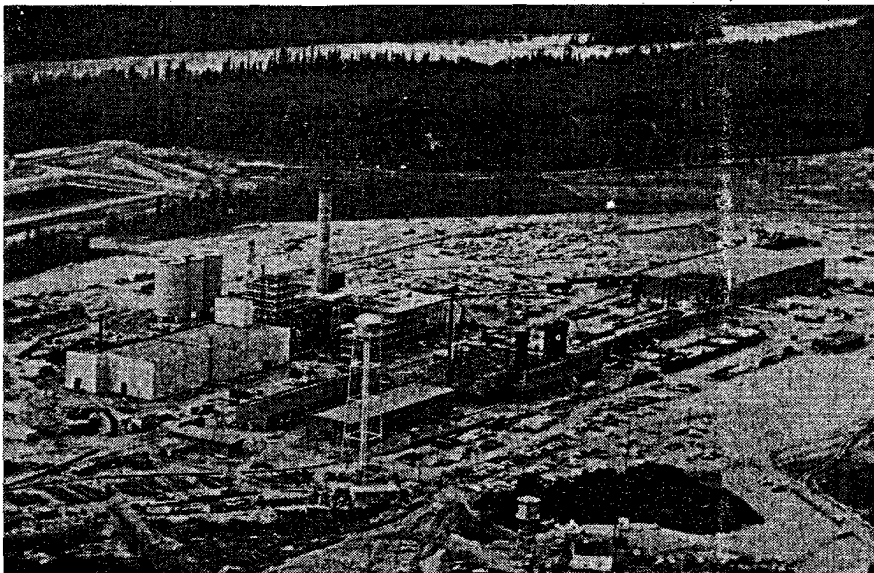
The cutting, piling, baling and wrapping of the finished pulp sheet is done in accordance with best modern standards and is very nearly automatic. Conveying of wrapped bales to the pulp warehouse, piling and shipping is done in accordance with accepted material handling practice.

The recovery and recausticizing operations follow the normal accepted design and layout. The only features of any significance are the evaporator control, which is semi automatic, and regulated from a panel in the recovery room adjacent to the recovery panel. The other item which may be mentioned is the spaciousness and convenience of the recausticizing plant.

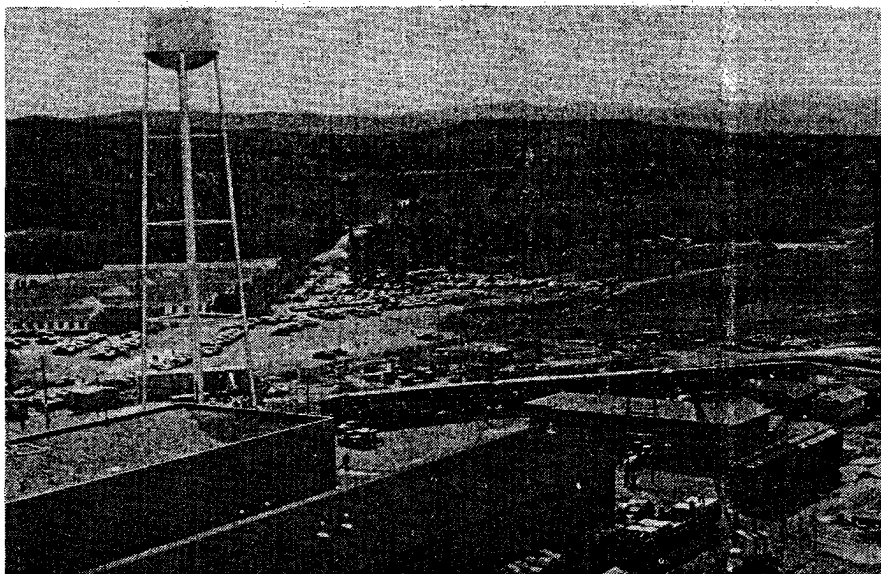
Novel Design Features

Certain general features of design are found throughout the plant. Ones which are novel to the industry are the lack of windows which is compensated for by the excellence of the artificial lighting. There is a complete ventilating system through all buildings. This provides clean conditioned air to areas where pulp is being processed and aids in keeping it bright and clean. The use of salt-glazed tile for the walls of the pulping group of buildings and of a polished metal ceiling over the main operating floor will reduce maintenance and improve cleanliness.

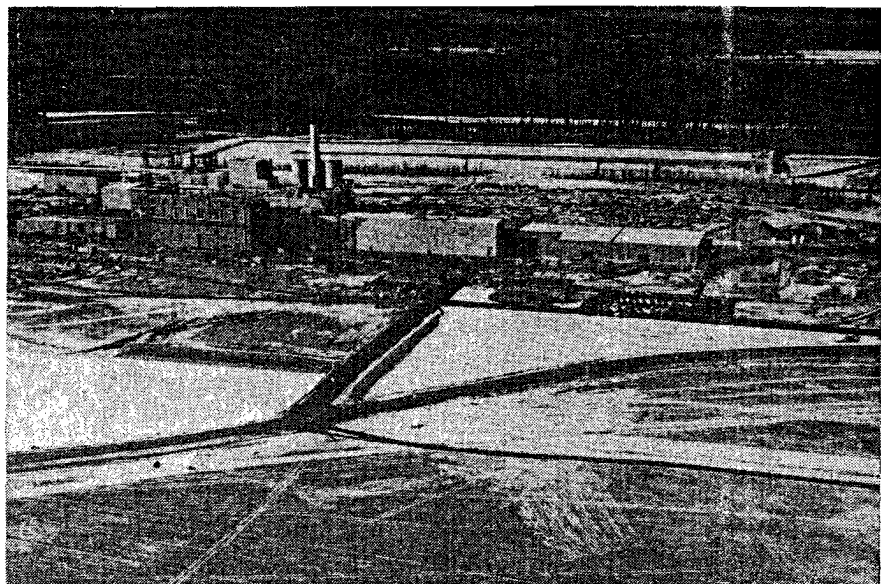
All equipment layout and design concept has been aimed at keeping operating man-power requirements to a minimum. For instance, the pulping group including the drying, ware-



Early construction scene at the Hinton mill.



Rail sidings at the newly-completed mill.



Nearing final completion at Hinton.

housing and shipping will operate with a little over twenty men per shift. The wood yard and wood-room force will be correspondingly low.

In order to achieve this it has been necessary to carry instrumentation and automatic control of the manufacturing cycle to an extent never before realized in a pulp mill. This in turn has provided the operators with training problems and has necessitated employment of personnel with above average intelligence.

Mill Construction

While the Hinton area was chosen for the mill site early in the design stage, the actual location of the mill buildings took several months to establish. This was due to a deposit of gravel of glacial origin on top of a 60 ft. thick clay stratum, along the banks of the Athabasca river. Piling through this was impossible and borings were taken until an area was found with the gravel deposit 40 to 60 ft. deep and of sufficient stability to support the mill buildings on spread footings. As a precautionary measure to ensure no disturbance of the understrata, gravel, to an equivalent weight of the mill buildings, was removed from the site with bulldozers.

As no general contractor from Western Canada with pulp mill experience was uncommitted at this time, it was decided to proceed with the construction on the basis of individual contracts for each phase of the job. H. A. Simons Ltd. agreed to supervise the work and to provide a project field staff under Oliver Laakso, who moved to the site.

Tenders were called in May 1955 for the first stage of the mill consisting of the following:

- a) Construction camp for 1,000 men.
- b) Raw material warehouse.
- c) Main pulp warehouse.
- d) Repair shop and stores.
- e) Reausticizing building foundations.
- f) Horton tank foundations.
- g) Main office and administration building.

The Poole Construction Co. of Edmonton was low bidder and a contract was signed for an immediate start. This work was substantially complete by November, 1955.

In May 1955, negotiations were completed for the addition of the following to their contract:

- a) A temporary water line for camp supply, fire protection and construction water for the main mill.

- b) Three 40 ft. diameter concrete silos, 110 ft. high, for wood chip storage. Both of these jobs were completed by October, 1955. The silos were poured in seven days using sliding forms.

In the summer of 1955 bids were called for the supply and installation of underground fire mains. Poole was awarded this contract and during late 1955 and the spring of 1956 approximately 18,000 lineal feet of 6 in., 8 in., 12 in. and 14 in. cast iron pipe were installed 10 ft. below grade.

The second stage of mill construction began in November, 1955 with negotiation of contracts for foundations of the machine room, pulping group, and power group structures. Excavation, forming, and concrete pouring commenced immediately but a very severe winter hindered progress of these exposed areas.

Contract for the main mill construction, or third stage, was negotiated in the spring of 1956. During the remainder of 1956 approximately 40,000 cu. yd. of concrete were formed and poured in the pulp mill superstructure. Structures included were:

- a) Water treatment plant.
- b) Machine room superstructure.
- c) Reausticizing building superstructure.
- d) Pulping group superstructure.
- e) Power group superstructure.
- f) Wood room.
- g) Concrete log flume.
- h) Overhead conveyor foundations, etc.

All of these structures were completed on or ahead of schedule, in spite of a very tight schedule. A basic crew of approximately 600 men was used and a peak force of nearly 900 men was at work in September 1956.

In general, with the exception of the pulping group, the mill buildings consist of structural steel frame-work on concrete foundation, with concrete floors and insulated, corrugated transite siding on steel girds. This wall construction was also used for walls which would disappear in the event of mill expansion.

The pulping group building is a concrete structure with red brick siding and interior of glazed tile. The machine room building has a steel frame, red brick exterior and glazed tile interior walls. All the buildings have precast concrete roof slabs supported on steel purlins. The administration building and personnel office-clinic are wood frame structures, the outside with rustic finish and the inside in sylvaply.

Start-up Routine

1. A member of H. A. Simons' engineering staff accepted the final card for a major piece of equipment from the contractor when he was satisfied that the work has been completed.

Further work was done by the contractor on this equipment without authorization by H. A. Simons. Once the card had been signed as being accepted by H. A. Simons the equipment was made ready for operation and handling by the mill operating staff.

2. North Western Pulp & Paper operating staff checked and cleared all pipe work where such was involved and signed the card to indicate that the lines were complete and clear.

3. North Western Pulp & Paper operating staff disconnected the suction and discharge on any pump, moved any foreign material, reconnected the pump and then signed the card indicating that the pump was clear.

4. North Western Pulp & Paper maintenance staff lubricated and packed where necessary all driven equipment prior to start.

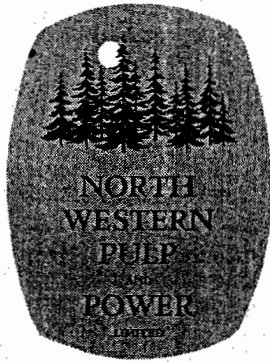
5. After the foregoing items had been completed, coupling alignment was rechecked by the North Western Pulp & Paper mechanical inspection crew and signed by the appropriate inspector.

6. Before power was applied to any driven piece of equipment the card was signed by H. A. Simons' electrical inspector to indicate that the electrical circuits have been checked and that the operation of the equipment would not affect any other electrical work which might still be in progress.

7. Before any piece of equipment was placed into operation the rotation was checked by the North Western Pulp & Paper operating staff.

8. Before any driven equipment was placed into operation the card was signed by the plant engineer and H. A. Simons' staff, or his appointed representative to indicate that the operation of the equipment would not affect or endanger any other construction work still in progress.

9. Before any driven equipment was placed into operation, the card was signed by the North Western Pulp & Paper superintendent or his appointed representative to indicate acceptance for the operating mill.



THE HINTON TRAIL — part 3

Forest Management and Woodlands Operations

Alberta Government Policy

IT IS OUR government's policy to have a comprehensive program of forest management dealing adequately with all phases of a sustained timber supply for the years to come and all the benefits that such a program implies" states the Honorable Norman Willmore, Minister of Lands and Forests in the Alberta Provincial Government. This categorical pronouncement by the minister can leave little doubt in the mind of any one connected with the management group in the pulp and paper industry. The government intend to develop their forests along sound scientific lines and any company wishing to participate in this development will have to work in harmony with this policy.

In the May issue of this magazine we carried an excellent article by R. D. Loomis of the Alberta Department of Lands & Forests and in it we find some of the reasons for this policy. Some years ago it was thought by many in the province that the forest was a deterrent to progress; that it was a barrier to easy settlement of new farms and ranches. In fact, after cutting what was needed for a homestead, most settlers set fire to the woodland and destroyed thousands of acres of a valuable asset.

However, as markets developed for sawn lumber, and latterly for pulpwood, the settlers began to realize that here was an asset which was complementary to farming or ranching and which could provide an additional and welcome cash income dur-

ing the four or five winter months.

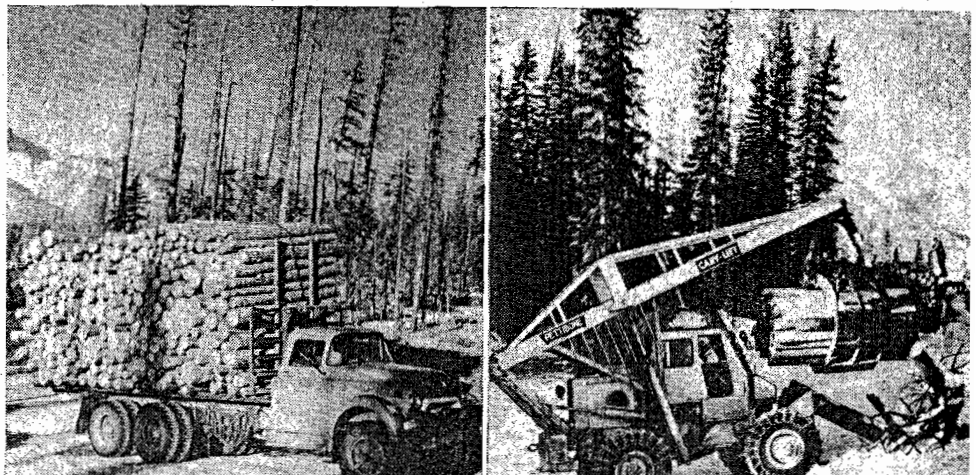
Provincial Control Attained

In 1930 the province took over control of their forest lands from the federal authority and subsequently made certain administrative decisions of initial importance. The first of these was set up, in conjunction with the federal government, a Rocky Mountain Forest Reserve. This is operated by a joint board as a watershed protection area, principally to ensure an optimum yield of water to the Saskatchewan river and its tributaries. The other decision of significance was to set up two major land divisions covering unsettled crown lands in Alberta. These were commonly known as the "yellow" and "green" areas. The former was open to new agricultural development and the latter was reserved for forest exploitation only. This "green" area comprises 142,000 square miles and, at the time when it was established, had no protective services whatsoever. However, a start was made by the

new provincial forestry administration, fires were fought, cutting was done on a diameter limit basis and cut inspection and slash disposal were inaugurated. At the same time the public began to realize the economic importance of this natural resource which nature had so abundantly supplied.

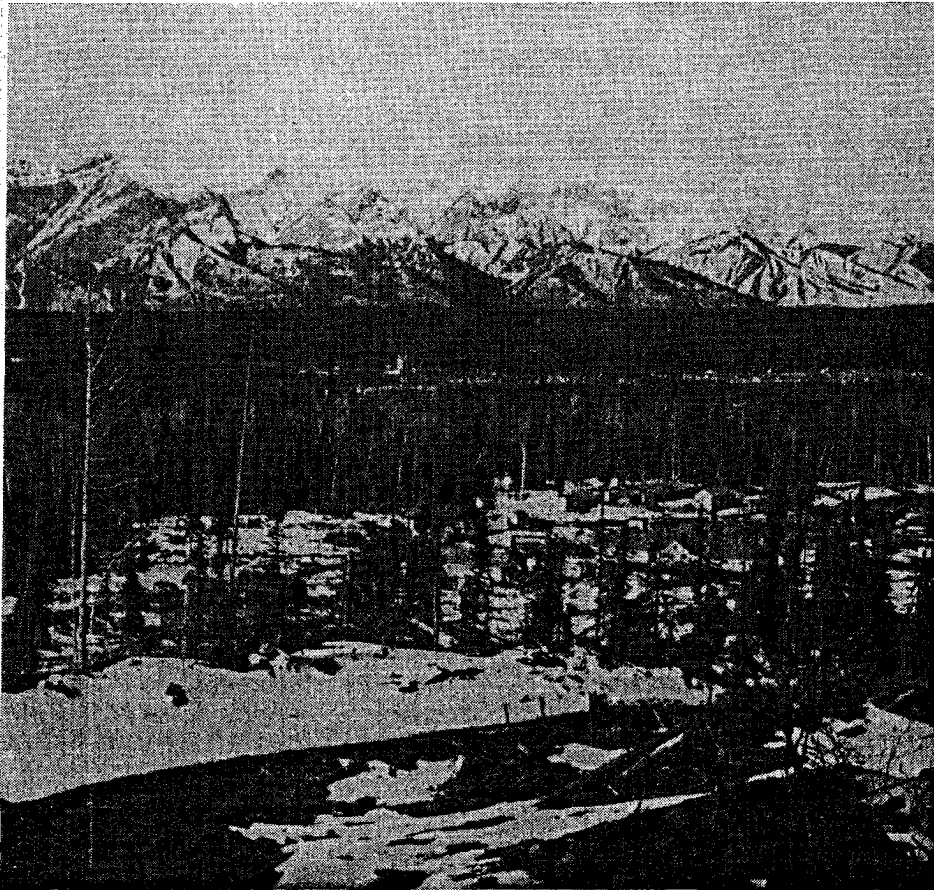
Forest Inventory Taken

During the war years little advance could be made and it was not until about 1948 that the next major step was taken by the administration. This consisted in starting a complete forest inventory of the "green" area. It was undertaken by contract with a private company and the expense was born by the province; later, after 1951, the cost was shared with the federal authority for subsequent work performed. Additional work after 1952 was taken in hand to cover areas north of the 57th parallel and this was carried out jointly by private contractor and by the provincial forestry staff.

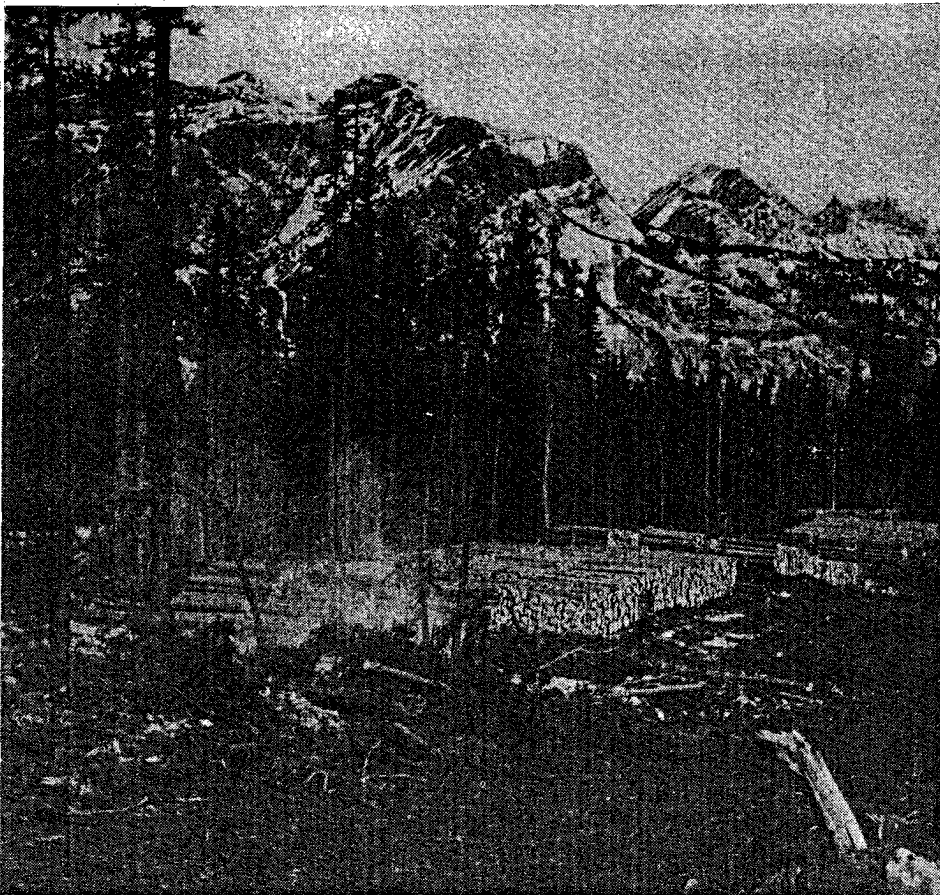


Left) Winter operations in the Alberta foothills.

Right) Winter loading.



A cutting camp in the Alberta foothills. Hinton camp #2.



Operations in the foothills near Jasper National Park.

Today this inventory is complete and consists of two parts: (a) classification of land according to forest growth and (b) estimates of merchantable timber 4 in. d.b.h. and over. Of this 142,000 square miles, 452,000 acres or 43 per cent of the "green" area is classified as productive forest land, 25,598,000 acres or 28 per cent is potential forest land and comprises old and new burn and clear cut areas which have not been seeded. The balance, or 29 per cent is classed as non-productive and consists of water, swamp and barren alpine lands.

The merchantable timber is recorded by species and shows over 10 million units of wood, 4 in. d.b.h. or above. This is divided into 2 per cent white spruce, 3.3 per cent black spruce, 2.1 per cent balsam poplar, 22.3 per cent jack pine, lodgepole pine and 47 per cent aspen, poplar and other deciduous species. In addition, the survey indicated potential agricultural lands in the "green" area which may, at a future date, be removed from the forest and opened up for other use.

With the completion of the inventory it has been possible to prepare tentative management plans for much of the land dedicated to forestry. To facilitate this the "green" area has been divided into units averaging 1000 square miles. The plans include a cutting program geared to a sustained yield, a protection plan with the object of reducing losses to a minimum compatible to the sustained yield target and an improvement program for each management unit to facilitate attainment of these objectives.

Cutting Control Plan

A temporary cutting control plan has been set up for many of the management units where need appears the most urgent and where commercial exploitation was in progress. These plans are flexible and may be changed as new conditions introduced by outside influences have an effect on the forest stand. It is expected that individuals and companies leasing cutting rights on a portion of a management unit will work closely in co-operation with the authorities of the department and will, in their own interest, supplement the work of the department in a rounded fashion. Briefly the work accomplished to date allows the "green" area to be administered under definite policies and with definite objectives.

The operation and welfare of the forests rests with the Forest and Wildlife

life Division of the Department with headquarters in Edmonton. It is broken down into six branches called administration, protection, management, surveys, radio and wildlife. The more important of these branches to the timber operator are the forest management branch which administers all work in connection with the utilization of the forest, the protection branch which is concerned with fire protection and supervision of the forestry field force, the surveys branch which is responsible for providing statistical data and maps on volume, growth, age class and species distribution, and the administration branch responsible for coordinating and administering all the work involved.

Forests Act

The authority for the administration of Crown timber is contained in the "Forests Act". It specifies in great detail the means of obtaining cutting rights, the powers of the Minister, rights of licencees, etc., etc. It provides for the legitimate needs of established industry by giving the Minister authority to offer timber for sale by tender or auction to the public. And under special circumstances, the Lieutenant-Governor in Council may authorize agreements whereby timber is made available for a new industry.

Hinton Lease

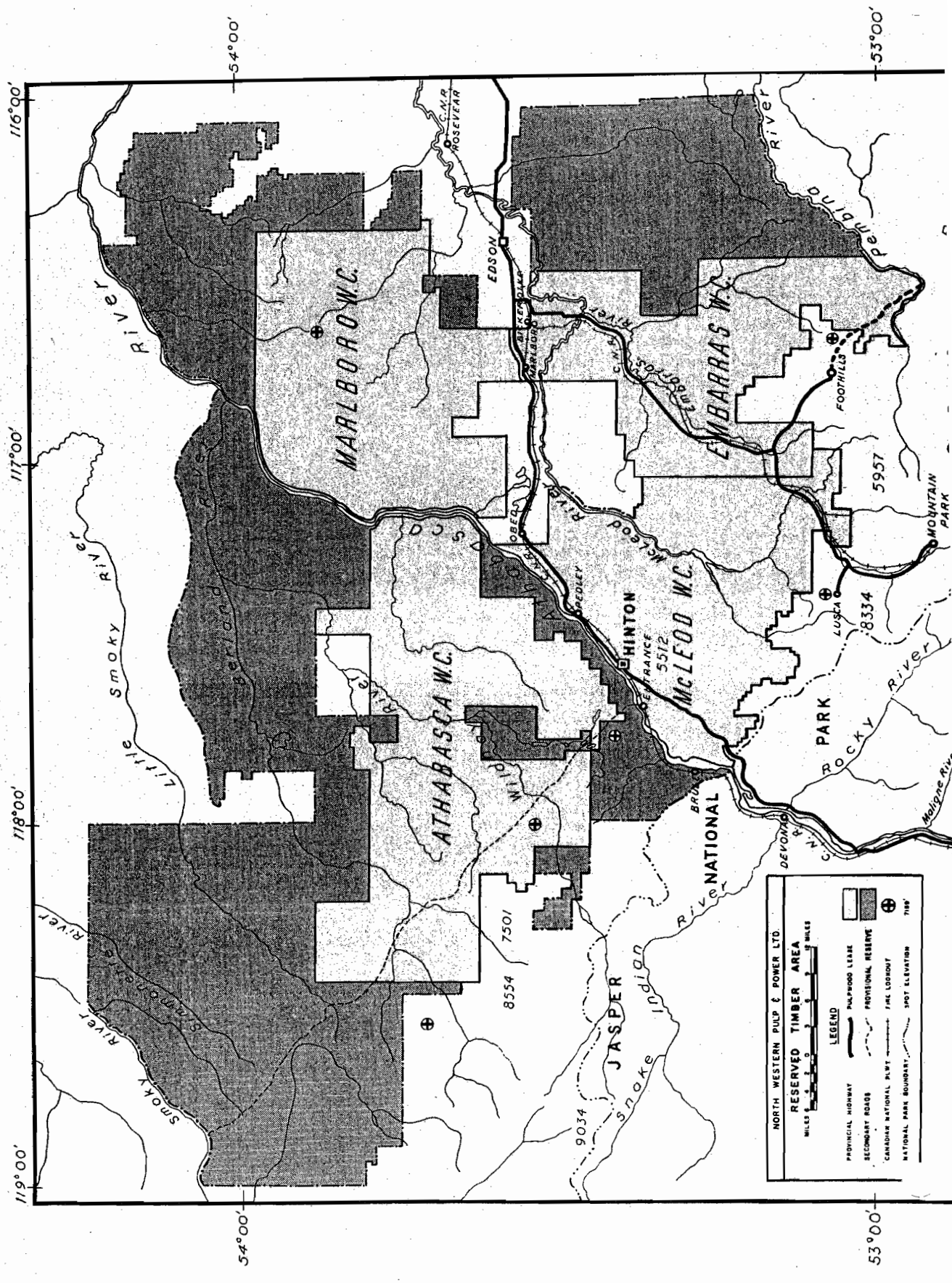
An agreement of this nature was made a few years ago covering a lease of 3000 square miles for the establishment of a new pulp mill at Hinton. In this agreement the company is required to provide a satisfactory forest inventory and management plan for sustained yield of the leased area. The plan may be approved as submitted or altered to suit the department requirements. The company must also provide annual cutting plans for approval by the Minister before operations may commence in any one year. This agreement covers a period of 21 years and is renewable provided the lessee has carried out the provisions of the lease in good faith. In addition to this lease, the government have agreed to hold in reserve an additional 3,000 square miles of woodlands, contiguous to the leased lands, for 14 years for possible expansion of the output from the pulp mill. This is the basis upon which North Western Pulp and Power Ltd. obtained their source of raw material and retention of their lease will be contingent upon a company operation which follows the general policy mentioned in the previous paragraphs.



Foothills terrain around Hinton wood-yard camp.



A pulp wood-yard in the Alberta foothills with cat yarding in progress.



NORTH WESTERN PULP & POWER LTD.
RESERVED TIMBER AREA

WILES 0 1 2 3 4 5 MILES

LEGEND

- PROVINCIAL HIGHWAY
- SECONDARY ROADS
- CANADIAN NATIONAL RLY
- NATIONAL PARK BOUNDARY
- PULPMOOD LEASE
- PROVISIONAL RESERVE
- FIRE LODGENT
- SPOT ELEVATION
- TIM

Woodlands Operations of North Western Pulp and Power Limited

AS COULD BE expected there are many conditions in the woodlands area of western Alberta which differ materially from those existing on the Pacific coast or in Eastern and Central Canada. For instance, timber is generally about the same size as that of virgin species in Eastern Canada but is cut at high altitudes (up to 5000 ft.) as in some Pacific coast operations. There is very little rainfall or snow as compared with the East or West and no large spring run off. The rivers are mostly glacial in origin and very rapid. All this mitigates against using them for driving wood and as a result wood handling in the forest and to the mill is largely done mechanically.

The forests are clean with little or no brush and the stands are good, with yields of 20 to 40 cords per acre common. Roads are easily built except across muskeg but are not normally usable in the warm weather unless improved with gravel or crushed stone.

Cutting takes place all the year around due to the small snowfall and pulpwood cut away from the improved roads is hauled between October and April when the logging roads are frozen and hard.

Pulpwood Supplies

In carrying out its main function of producing adequate supplies of pulpwood for the pulp mill, the operating department draws on three main sources of supply. The largest amount of wood is produced by company-supervised, independent pulpwood logging contractors. The cutting areas for these contractors are laid out by the company. The company provides the camp buildings and the main access roads to the campsites. Camp buildings are of portable frame construction, fully insulated and wired. Certain of the buildings are equipped with running water and plumbing. The

amount of pulpwood produced by this type of camp varies from 8,000 cords to 25,000 cords annually. Each camp is so situated as to have a 2 to 4 year supply of pulpwood available to it from one location.

A second important source of raw material for the pulp mill is termed "Purchased Wood". For the most part, this wood comes from settlers, farmers and small landowners who are located within a 100 mile radius of Hinton. Much of it is cut on the seller's own land. In this type of operation, the company provides nothing in the way of camp buildings, roads, etc., although forestry advice is available upon request.



H. V. HART, general woodlands manager, northern woodlands division of St. Regis, and woodlands advisor to North Western.



STAN HART, assistant woodlands manager of North Western.

Inasmuch as there was a forest industry in the area prior to the arrival of the company, a third major source of pulpwood is available. This originates out of tree tops and small logs produced in conjunction with sawmilling and tie-cutting operations. These timber producers conduct their operations on "Timber Berths" or leases awarded by the Provincial Government, outside the areas reserved for the company. Again, the company in this instance provides nothing to these independent operators except advice when requested.

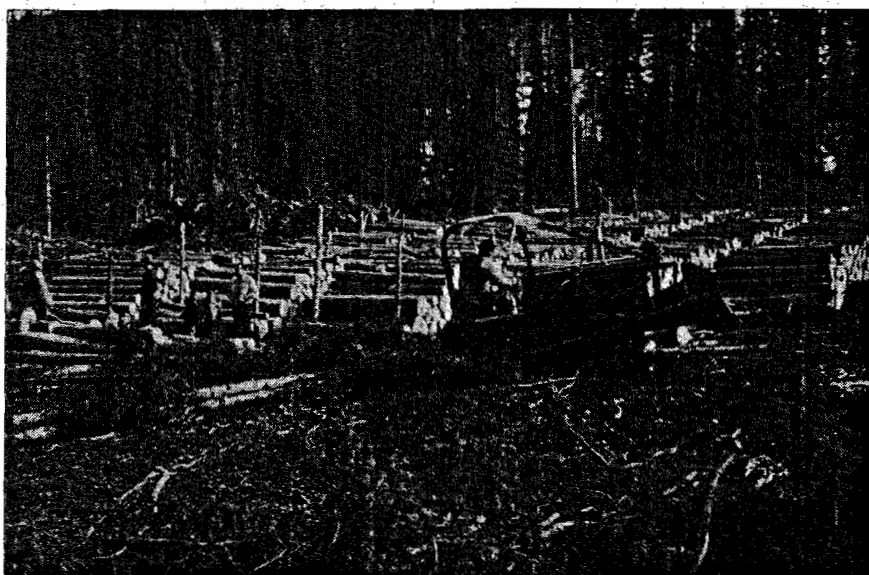
All contracts and agreements covering the above-mentioned major sources of pulpwood are made on the basis of wood delivered to the mill yard. The company is prepared to accept wood delivered by either trucks or railroad cars at any time of the year, and it is the pulpwood producer's direct responsibility to deliver his wood by the most desirable method. By far the greatest amount of wood will be brought into the Hinton mill yard by trucks of various types and sizes.

Fire Protection System

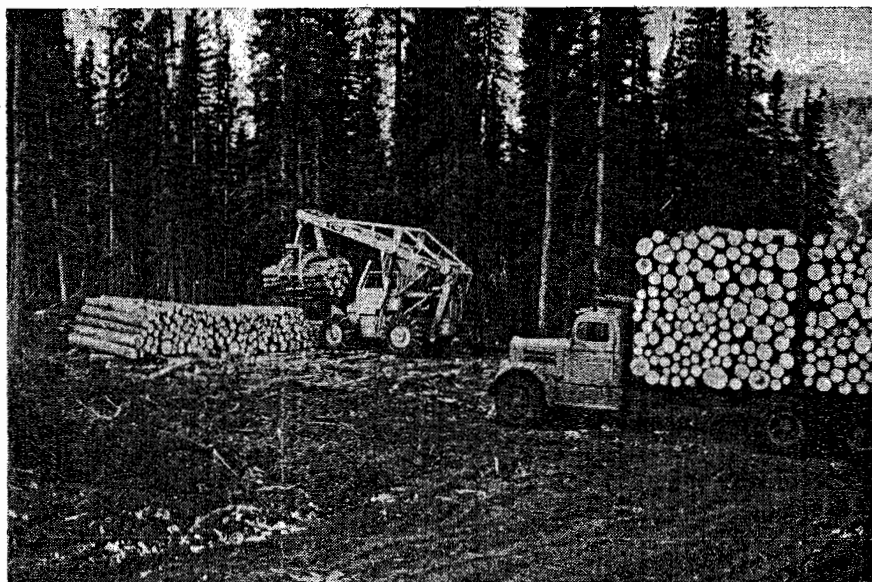
Although the Provincial Government does have a forest fire detection organization of its own, as well as a certain amount of fire-fighting equipment, the Woodlands Division finds it necessary and advisable to maintain its own separate fire protection system. This consists of a fire marshal in charge of all fire protection on operating area, a number of mechanized fire-fighting units and a large supply of the usual hand tools. In addition, the Woodlands Division 2-way radio communication system, connecting the headquarters office at Hinton with mobile sets throughout the operating area, serves as a valuable aid in forest protection. A radio tie-in with the Alberta Forest Service system has also been installed by the company.



John Deere cat skidding at Hinton camp #2.



Yarding at camp #2.



Loading at camp #2.

As pulpwood from all sources must at one time or another be skidded, so that payments or advances can be made, a crew of skidders is maintained by the operating contractor. For the most part, these skidders work directly in the pulpwood camps, measuring wood for payment of wages. Their work, by its very nature, also controls and regulates the quality of wood produced.

A safety supervisor in the pulpwood camps is directly in charge of providing safe working conditions and instructing in safety practices and first aid treatment. There is at least one qualified first aid man in each of the company contractors' camps.

A road construction crew is maintained by the Woodlands Division to build main truck hauling roads and access roads to camps. Equipment used in this work is for the most part rented on an hourly basis, although the company does have a few pieces of its own.

In line with minimizing cost as much as possible, the Woodlands Division does not operate any central warehousing facilities, nor does it invest any money in camp equipment. Deliveries from wholesale suppliers are made directly to the camps by the logging contractors and are used to equip their camps with such things as beds, blankets, stoves, lighting plants, etc.

Separate Accounting System

The Woodlands Division, being a separate operating unit in the company, has its own accounting organization. Its representatives in the field are the camp clerks and auditors. All data from the various operations concerning payrolls, production reports, requisitions for supplies, etc., is channeled through to the Woodlands accounting office in Hinton, where it is processed by the office staff.

This accounting section is responsible for cost accumulation of the Woodlands Division and is an extremely large business in itself.

The staff not only keeps books for this division, but also keeps books for each of our twelve independent logging contractors. They maintain a payroll for the pulpwood cutters that number from 100 to 1200 men. They process and pay for all supplies for all contractors. They prepare detailed cost statements for each contractor. This information is necessary to the contractor and the company for two main reasons:

1. This information enables the Woodlands Department management

control the costs of producing pulpwood in each camp area.

2. It also ensures that Woodlands management is constantly aware of the cost of producing pulpwood in each given area.

New Methods Tried

Although it is expected that most of the pulpwood used by the company during the first few years of operation will be produced by conventional methods, i.e. horse or tractor skidding combined with hand piling, experimentation and trial of new mechanized equipment is continuously underway. In this connection, the Woodlands Division is currently exploring to the fullest extent the suitability of high-lead cable yarding of tree length timber to local operating conditions. This operation is combined with mechanical slashing of the tree-length material into 100 inch pulpwood lengths, and automatic loading of trucks. It is of particular importance where the steep and precipitous terrain prohibits more conventional methods.

While the company does not directly employ cutters, skidders and other bush workers, it does attempt to see that the best type of labour possible is obtained by the individual independent pulpwood logging contractors. To this end the contractors are paid a high enough price for delivered wood to enable them in turn to pay excellent wages.

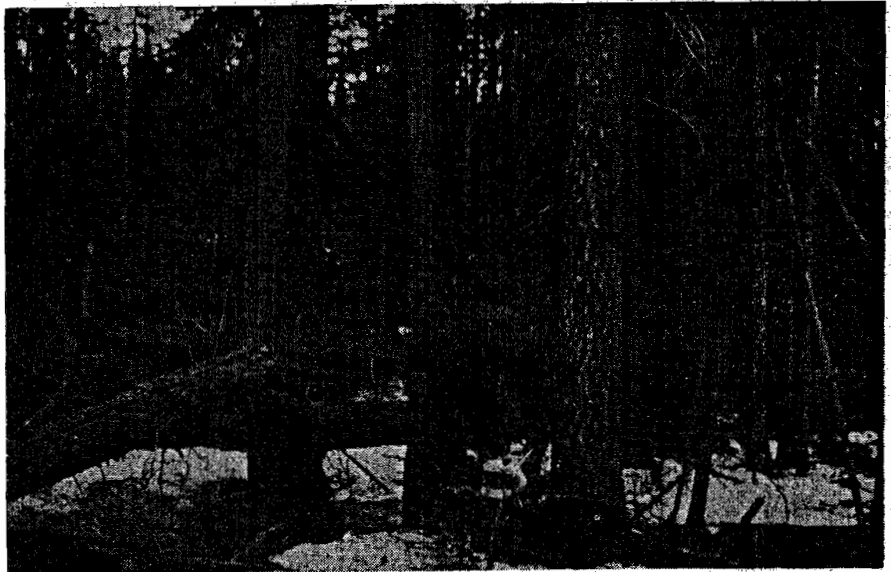
The company sites the camps in pleasant surroundings and encourages the workers to bring in their own families and live in trailers or portable bungalows. In general, an attempt is made to obtain the maximum number of year-round woods workers and to see that they are trained in all phases of the woods operations. To this end the company expects to set up one company owned and operated camp. It will be used as a training centre for all new workers where they will be indoctrinated in safe and efficient working methods and taught to use gasoline saws, tractors and other bush equipment.

Seasonal workers are being recruited from the farms of the province and it is hoped that this source will provide the extra men needed during the late autumn and winter months. Early experience seems to indicate that this will prove true and that men will return to the company each autumn after the crop is in.

All in all the Woodlands Division has proved itself in its two years of life and is currently providing the 300,000 or more cords per year required for the mill consumption.



Camp #1 at Hinton.



Cutting man at camp #1.



Horse skidding near camp #1.

Forestry Department of North Western Pulp and Power Limited

IN ORDER to assure continuous and perpetual operation of the pulp mill and to comply with the conditions of the woodlands lease from the government, the company must manage its timber holdings so as to prevent liquidation of the source of raw material. This is known as "sustained yield forest management" and it is the function of the forestry department of the woodlands division to provide all necessary data and information required to carry out this policy.

The department is divided into three main sections (a) the Inventory and Management (b) Photogrammetry and Drafting and (c) Cruising and Cut Layout. Each section operates under a section chief responsible to the chief forester.

Inventory and Management

The prime function of the Inventory and Management Section is to collect information and data on the leased area of woodland so that a "management plan" can be drawn up for the area. This involves, first of all, taking an inventory of the forest so that a starting point can be determined.

In the case of North Western Pulp & Power a government inventory was available. However, this was only part of the general "green" area inventory and did not supply nearly enough detailed data upon which to formulate long range cutting plans.

As a start the leased area was divided into four "working circles" or administrative areas of about 500,000 acres each. Each working circle is treated as a separate forest to be managed to give a sustained yield and in turn is divided into a number of compartments. The size of each compartment may vary but it is generally determined by the number of cutting camps which can operate efficiently in its area and the allowable annual

cut for the working circle. Each compartment is organized so that it requires 20 years to cut over and with the general topography and tree stand in the North Western limits approaches 25,000—30,000 acres in extent.

The growth rates of the various species of trees in various environments are also studied and cutting cycles for spruce, pine and poplar have been based on a tree maturity of 90 years, 100 years, and 50 years respectively. A study of disease and probable fire loss has been made and with all the above data a projection can be made and the probable condition of the forest in any working circle determined at any future date. Knowing this future condition, growth rates, ages of maturity, disease and fire losses, etc. suitable plans can be made to harvest the growth to give perpetual yield.

Photogrammetry and Drafting

The Photogrammetry and Drafting Section specialize in producing accurate maps and in their interpretation to give an estimate of volume and species of wood in any given area.



DESMOND CROSSLEY, chief forester for North Western, formerly senior research officer with Dept. of Northern Affairs.

The maps have been made from original air photographs oriented to all possible ground check points. Interpretation of volume and species is becoming more accurate as land cruising figures become available as checks for the photogrammetry work.

In addition, the air-photographs provide stereoscopic coverage of the woodlands and are valuable in the initial planning for roads, campsites, fire protection activities, etc. in each working circle.

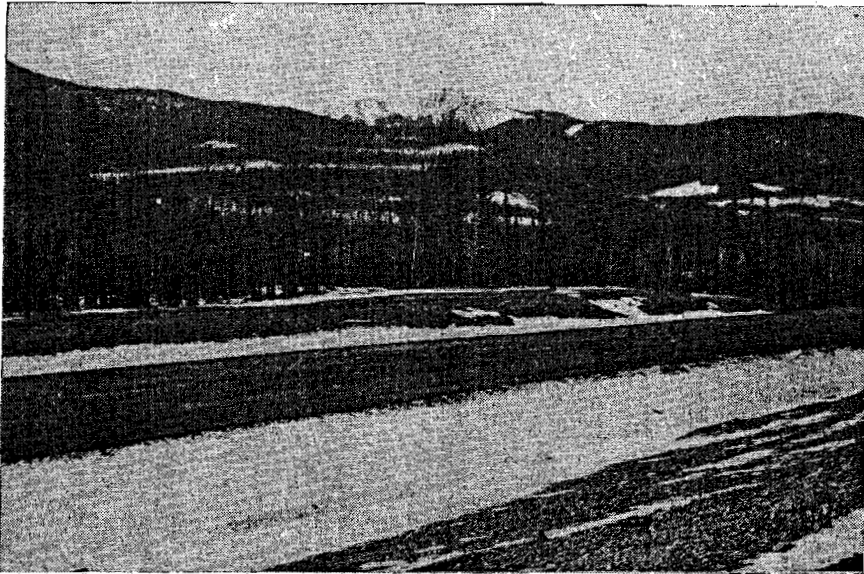
Cruising and Cut Layout

The Cruising and Cut Layout section provides, as its name implies, detailed information on specific areas earmarked for early cutting. This work requires constant activity of field parties who feed information obtained from their surveys, in to the central forestry office. This embraces a detailed count and measurement of tree stands, condition of trees and all other relevant data. This information is used by the Operating Department in finalizing camp locations, size of camps and routes of logging roads. It also provides an accurate count of the timber in the cruised area and enables annual cutting plans to be finalized and cutting areas delineated on the ground.

The Cruising and Cut Layout section work very closely with the Photogrammetric section and the results of the former are correlated closely to the activities of the latter.

The work required on the government presentations involves all sections of the Forestry Department. It has resulted in the installation of a continuous forest inventory with an I.B.M. card system to record data obtained from trees growing in sample

Top right) Strip cutting. Cutover area near Hinton camp #2.
Bottom right) Scarifying for seed bed near Hinton camp #1.



Strip forest cutting from Edmonton-Jasper highway.



Inventory plot.



Winter cruising.



Woodyard near Hinton camp #2.

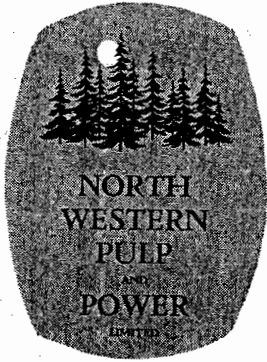
plots. These plots are being lished as rapidly as possible. are laid out on a mechanical basis and are $\frac{1}{5}$ acre square or section of leased forest. They are grouped for convenience at set line intersections and every tree in each plot is marked with an aluminum tag. They will be checked every 10 years.

Annual Cutting Plan

The annual cutting plan for a compartment also involves much preliminary work. The first requirement is a reasonably detailed census to determine the timber available to provide information for laying out the yearly cut over a twenty year period. Then campsites must be located and a study made of the timber method of cutting. This depends upon the topography of the country, the species in the area, the direction of the prevailing wind. The normal types of cutting used are strip cutting, block cutting and clear cutting with patch stands left for seeding. In strip cutting, which is much used, the longitudinal direction of the strip is made to correspond to the direction of the prevailing wind as far as possible. Block cutting gives a checker board effect and is not used as frequently. Clear cutting with reseeding patches is also used to some extent and all methods are being tried on an experimental basis. After some years of further experience it will be possible to determine the natural regeneration obtained from each method and which type of cutting gives the greatest protection from windfall. Eventually, experience will dictate when and where each method of cut should be used.

Natural Regeneration

Natural regeneration is, of course, the most desirable manner of replenishing the forest area depleted by cutting. This is the prime reason behind each method of cutting. However, little experience has yet been obtained in natural regeneration in this country. One adverse factor is felt to be the low precipitation rate and, in order to provide a better than natural seed bed, scarification is being tried in several areas. This work is of paramount importance as a new crop of seedlings must be developed over areas, both for future mill supply and to conform with the terms and conditions of the government lease. If necessary, seedling plantations will be used but this is a very costly procedure in mountainous terrain and will be used only as a last resort.



THE HINTON TRAIL — part 4

Salient Features and Mill Operations

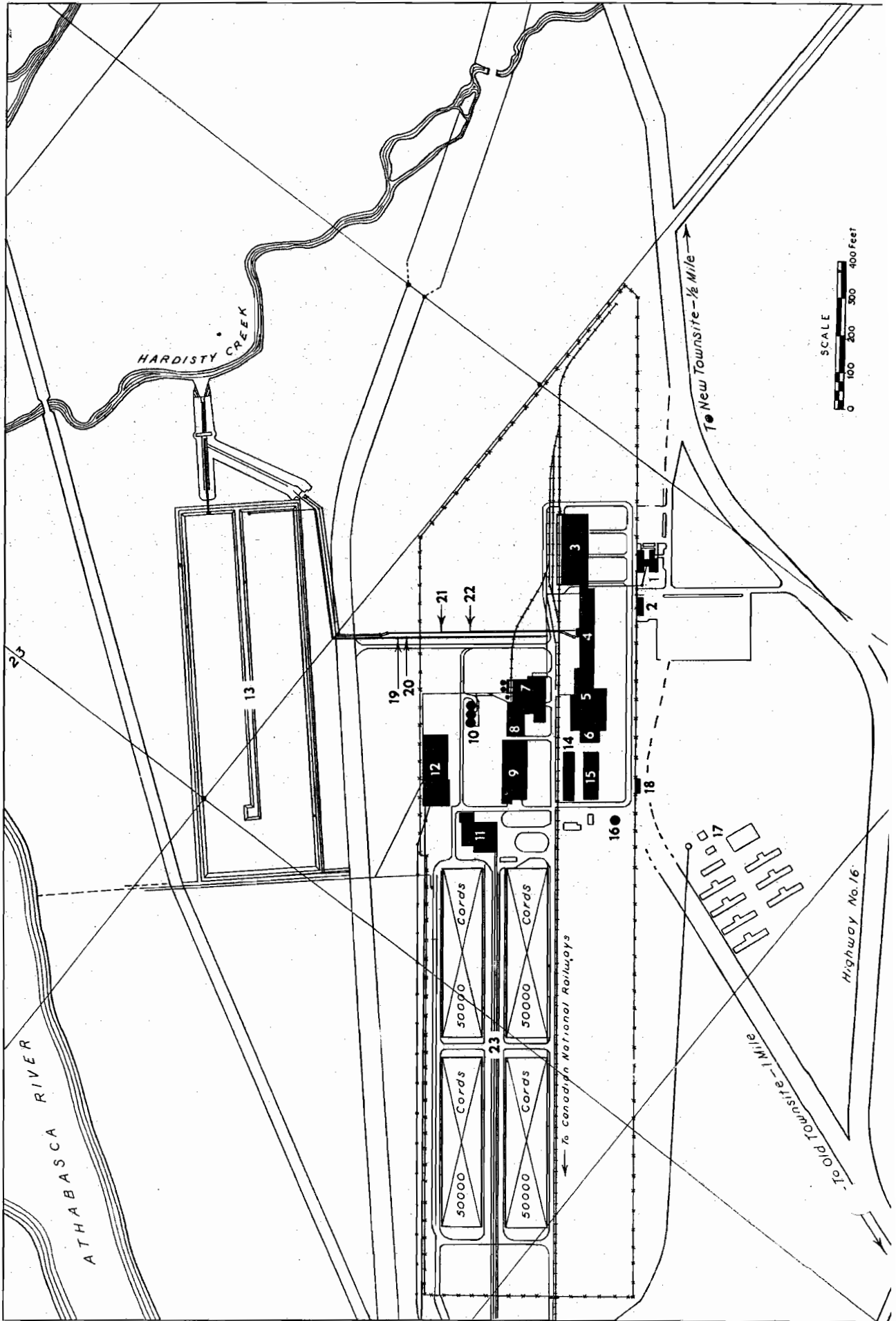
TO PRODUCE top quality bleached sulphite pulp consistently it was necessary to exercise careful consideration in the design of the mill and in the selection of the production facilities.

This is evident from the major items of equipment used, such as Norman-type chippers for production of uniform chips; Kamyr continuous digesters to produce uniform high-strength pulp; a 6-stage ClO_2 bleaching system for high brightness with low degradation; the use of fine screens as well as centri-cleaners ahead of the pulp machine to eliminate dirt; the use of a Minton dryer to produce a clean finished product; and last and by no means least, a water treatment and filtration system to eliminate impurities and to supply consistently pure clean water to the mill.

As water is the primary material handling vehicle in a pulp mill, and as much a necessity as the wood, a description of the water supply and filtration plant is an excellent point of departure in the description of any pulp mill.

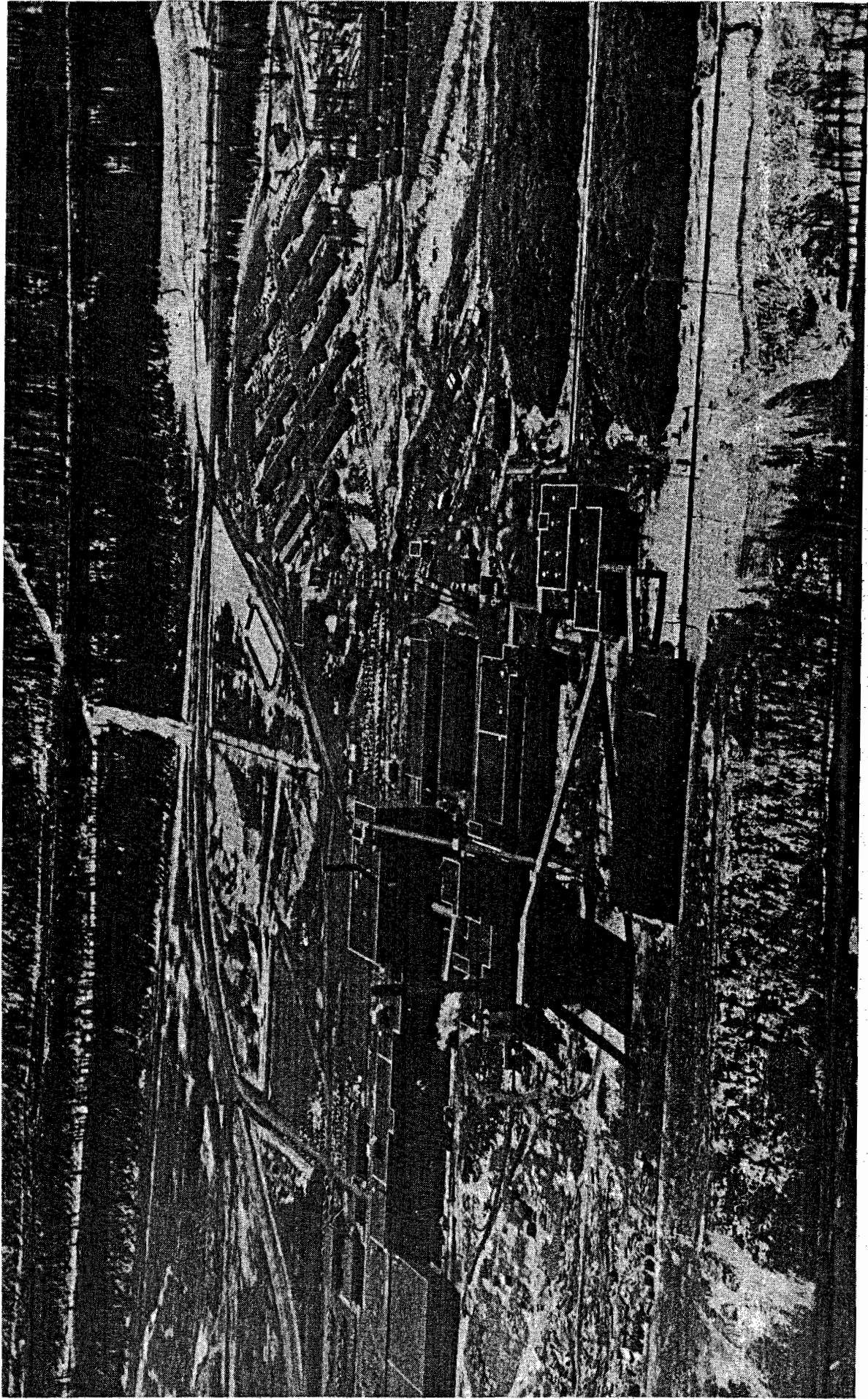
Steam and power plant with recovery group on the right.





LEGEND FOR MILL SITE (above): 1. Woodlands and main office; 2. Clinic and personnel office; 3. Pulp warehouse; 4. Machine room; 5. Bleach plant; 6. Digester room; 7. Boiler and power plant; 8. Recovery building; 9. Recaulicizing plant; 10. Chip silos; 11. Wood room; 12. Water treatment plant; 13. Effluent pond; 14. Raw material warehouse; 15. Shops and stores; 16. Fire protection tank; 17. Construction camp.

▲ Aerial photo showing effluent disposal pond in foreground and woodyard to right.



Water Filtration and Effluent Disposal

THE PUMPHOUSE for the water treatment plant is situated on the bank of the Athabasca River. At present it houses four Byron-Jackson influent water pumps of 7,000 g.p.m. driven by 350 h.p. motors. One of these pumps is a spare. Water flows to the water treatment plant through a 48-inch creosoted wood-stave intake line which is approximately 4,000 feet long.

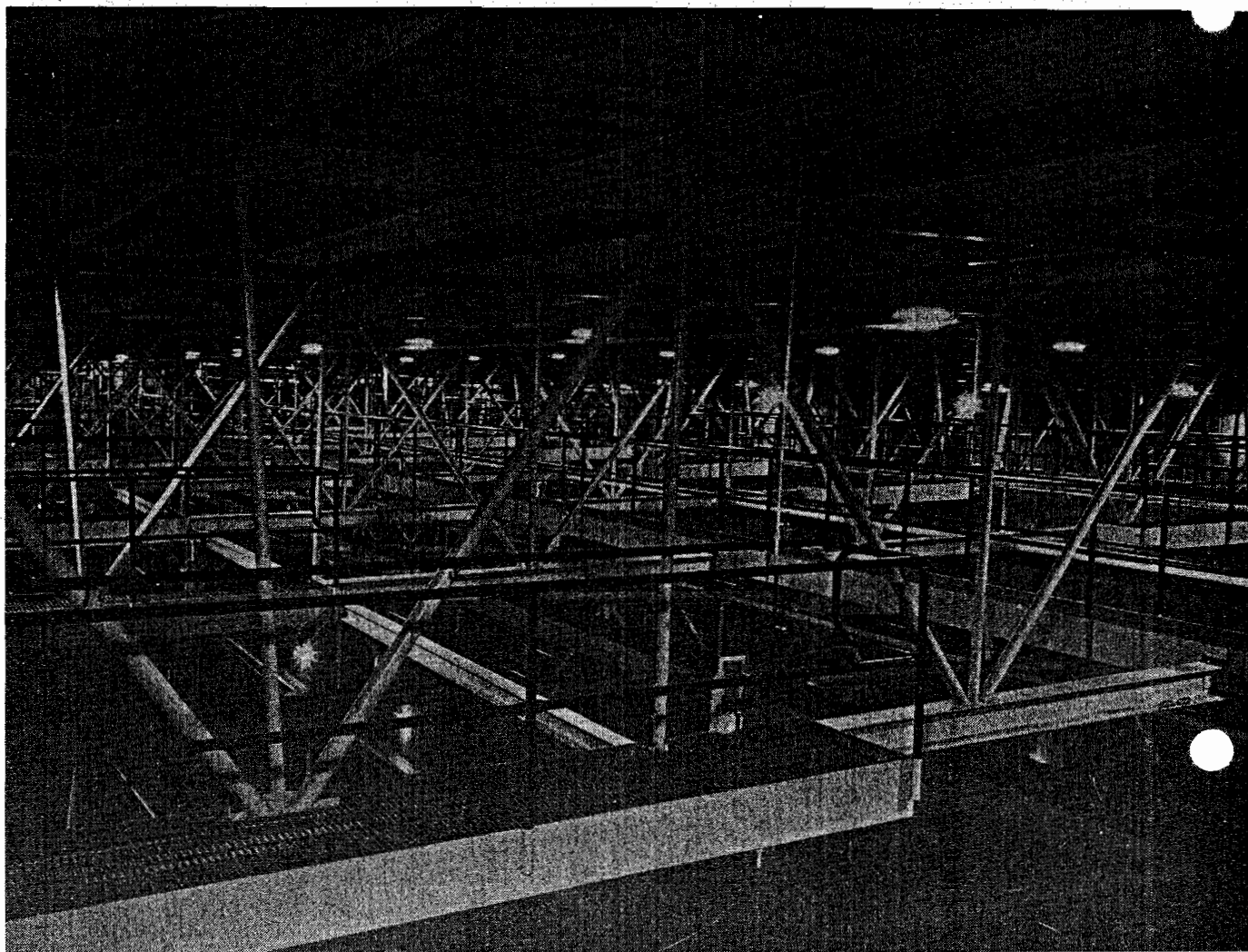
Water Treatment Plant

The water treatment plant was de-

signed by Northwest Filter Company Inc. The plant is approximately 120 feet wide and 368 feet long. It has treating facilities for 30,000,000 gallons of water per day. The water is treated with chlorine, alum, caustic and milk of lime. After chemical treatment, the water enters twelve 19-foot, 8-inch by 19-foot, 4-inch by 20-foot deep mixing and coagulating basins and passes through 38 venturi slots into two settling basins. These settling basins are 179 feet long, 60 feet wide and 18 feet deep. Each

basin holds a volume of 1,450, U.S. gallons of water. Contin-
ing valves with 4-inch operating
cylinders and one master timer. A
settling, the water is recarbonated
ing flue gas from the natural
fired power boiler. The flue gas
compressed by an Ingersoll-Rand C
compressor driven by a 100 h.p. 1

The settling basins in the filter plant



tor. After recarbonation, part of the water goes to the filters for further treatment; the rest flows to the treated water clearwell where it is pumped to the mill by three Byron-Jackson pumps with a capacity of 5,000 gallons per minute each.

The water that passes through the filters is stored in the filtered water clearwell and is also pumped to the mill by three Byron-Jackson pumps of 5,000 gallons per minute capacity. There are six sand filters each 50-feet long by 14-feet wide filled with graded sand having a total capacity of 15,000,000 gallons per day. The wash water is supplied by a vertical deep well Worthington pump having a capacity of 12,000 gallons per minute. An automatic back wash system has been provided for the filters. Taylor instruments are used throughout the system.

The mill and townsite domestic water supply is chlorinated. Two Fischer and Porter chlorinators are used to chlorinate both raw water and domestic water.

Two emergency dry chemical feeders of the Wallace and Tiernan type for lime addition and a dry alum feeder are also provided. A 48-foot, 8-inch Redler elevator having a capacity of 350 cubic feet per minute is used to load the dry feeders.

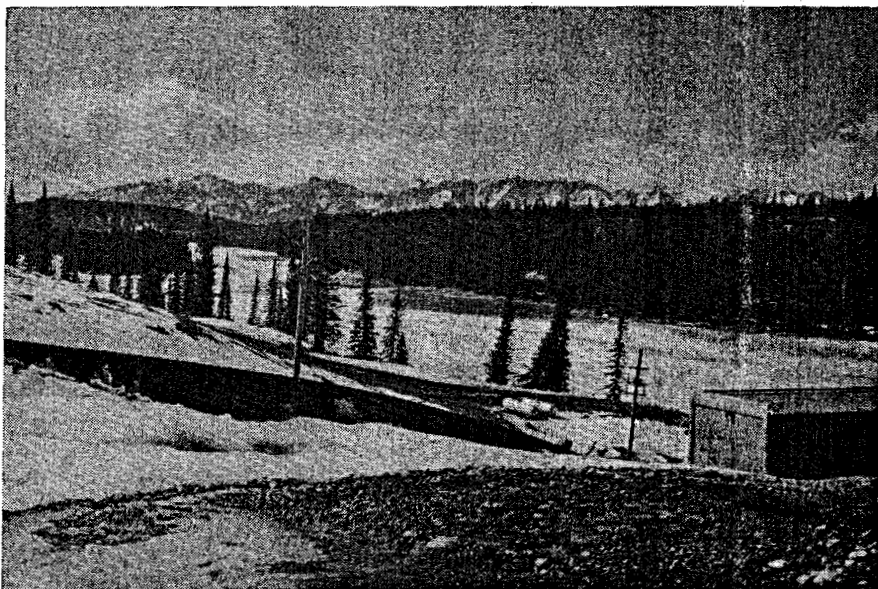
Waste Disposal

North Western Pulp & Power Co. Ltd. has very adequate facilities available for the treatment of the wastes in order to minimize stream pollution. The waste disposal system consists of three out-falls. The general sewer takes high b.o.d. waste water and settleable solids from drains in all departments. The caustic sewer handles the wastes from the two caustic stages of the bleach plant. The acid sewer handles the wastes from the other four stages.

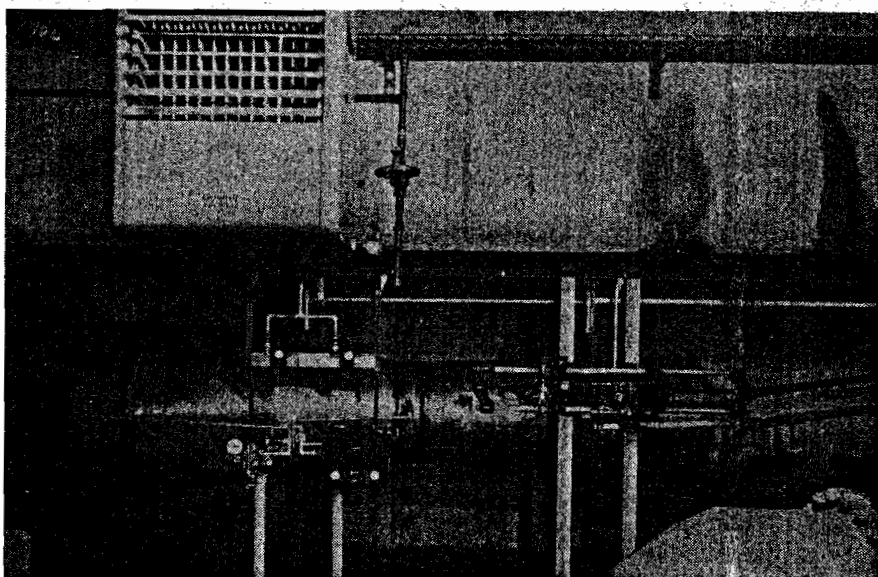
The general sewer enters a pond having a retention time of 72 hours at a flow of 8500 gallons per minute, which is 1,820 feet long, 520 feet wide, 5 feet deep. The sewer is also equipped with a gate so that the pond may be by-passed for cleaning purposes. The pond effluent flows over a wooden weir and down a rock bed to the river. The rock bed helps aerate the waste.

The caustic and acid sewers flow through Parshall measuring flumes down a rock-bed trench joining with the pond effluent.

All the underground sewer piping is vitrified pipe. The acid sewer piping in the bleach plant is fibre-glass reinforced polyester. The caustic sewer is stainless steel.



Athabasca River, pump house and wood stave pipe to filter plant.



Venturi tube water meter at filter plant.



Pump house intake.

Wood Handling at the Mill

PULPWOOD in 100-inch lengths is delivered to the mill by both truck and rail. White spruce and lodgepole pine, in approximately equal quantities, are the principal species used. Mixed hardwoods, principally poplar, will be processed separately. Wood is stored in four 50,000 cord piles which are stacked rather than straw piled. Wood is unloaded from the truck and rail cars by three, series 3900 B, Manitowoc cranes equipped with 110 foot booms. The maximum height of piles is 45 feet. In order to provide maximum fire protection, the woodyard is

protected by thirty 50-foot high fire towers complete with monitor nozzles strategically located throughout the yard.

Log Flume

Since the climatic conditions are such that wood can be hauled only during the winter months, adequate lighting is provided for night work by high intensity flood light units. During the spring, summer, and fall, wood is reclaimed from the storage area by a concrete, steel-lined log flume, approximately 1800 feet in

length and 3 feet in width. Recirculating water for the flume is provided by two Byron-Jackson vertical pumps handling approximately 1000 gallons per minute each. A g collector, supplied by the Chain B Company, and two 10-foot diameter disk screens, supplied by the Li Belt Company, are utilized in the flume to remove solids and bark from the recirculating water. Additional cleaning of flume water is achieved by the use of five model 70 Dill bark screens having a capacity of 1000 gallons per minute each. In order to ensure strict control of effluent, any water sewerer from the flume must first pass over these Dill screens.

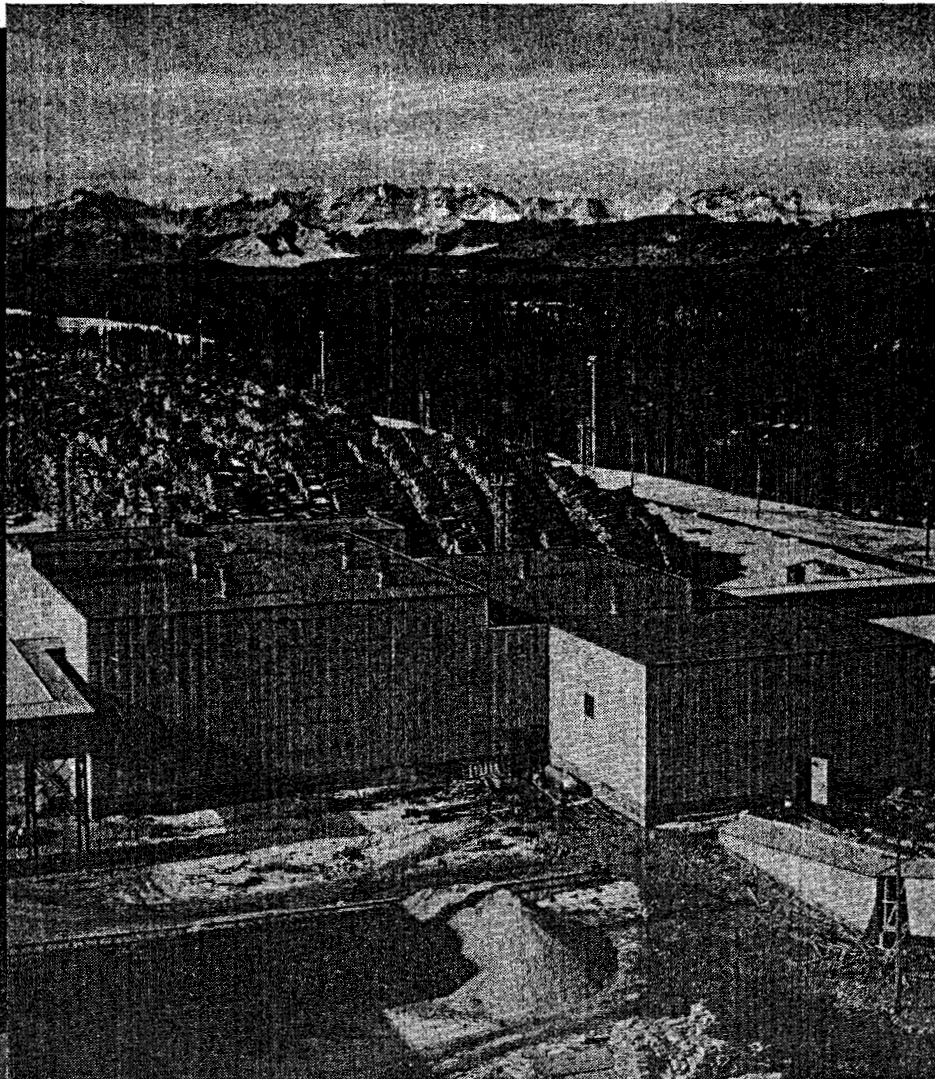
During the winter months there are times when the log flume cannot be operated due to the low temperature. Fortunately, this coincides with the hauling season and part of the trucked wood coming into the mill may be diverted directly to a winter wood conveyor system located adjacent to the point where the log flume transfers wood to the jack ladder. The winter wood handling system has some storage capacity in its transfer decks and wood from the trucks is fed continuously from these transfer decks to the conveyor feeding the drum barkers.

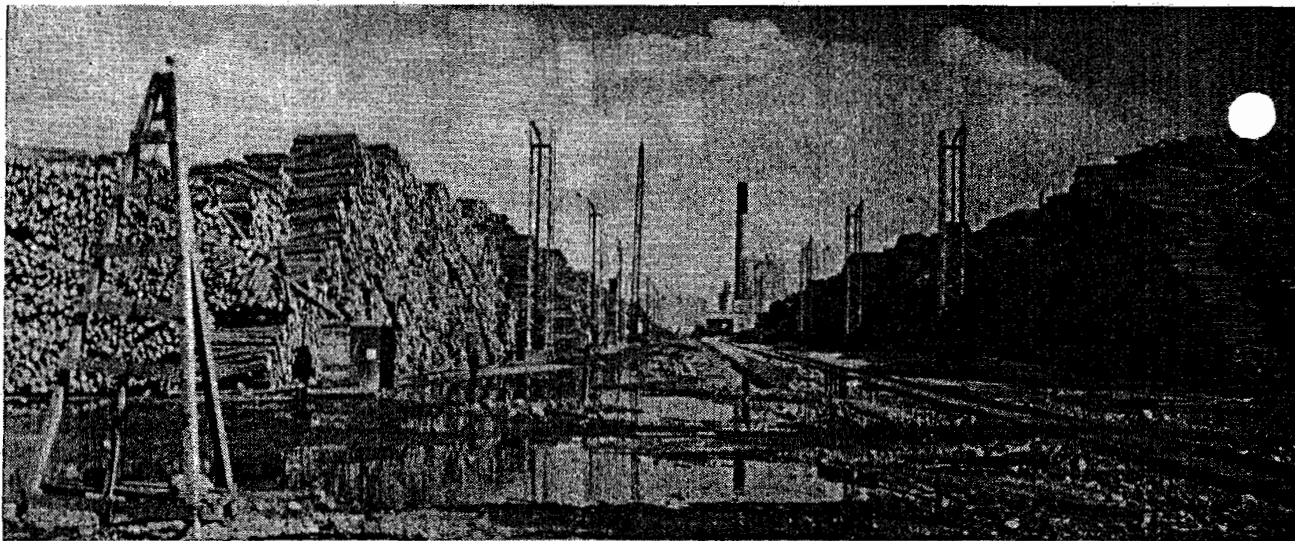
Barking and Chipping

Wood is barked by three Fibe Making Process Company drum barkers, 12 feet in diameter by 67½ feet long, built by Horton Steel Works. Each drum is divided into three sections. Between the second and third sections a bulkhead is provided to allow submerged barking to the degree required to accomplish full barking.

Wood room and wood yard at Hinton

WOOD HANDLING MONTAGE (right)
Right from top to bottom) Barking drums; chips on way to chip silo; bark screens; chip screens at rest. Left from top to bottom) Wood sorting after barking; loading wood from pile into flume; chipper with top lifted.





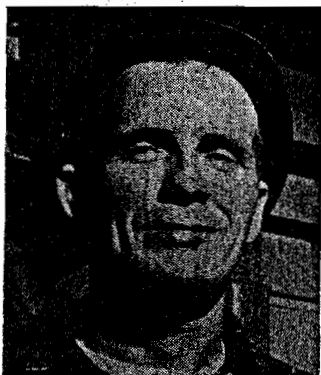
Wood yard with mill at far end and flume between log piles.

Bark which is discharged from the drum barker is conveyed to a Gruendler hog of the swing-hammer shredder type. The shredded bark is then de-watered in a Hymac-Fulton bark press with a rated capacity of 18,000 lbs. of dry bark per hour. The bark is then conveyed directly to the spreader stoker of a combination gas

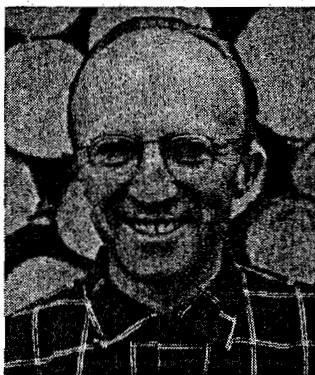
and bark burning boiler in the powerhouse.

The logs discharged from the barkers are transferred by conveyor and speed rolls to a 72-inch flat belt sorting conveyor where logs are inspected. Culled logs are recirculated to the barker infeed conveyor for re-barking.

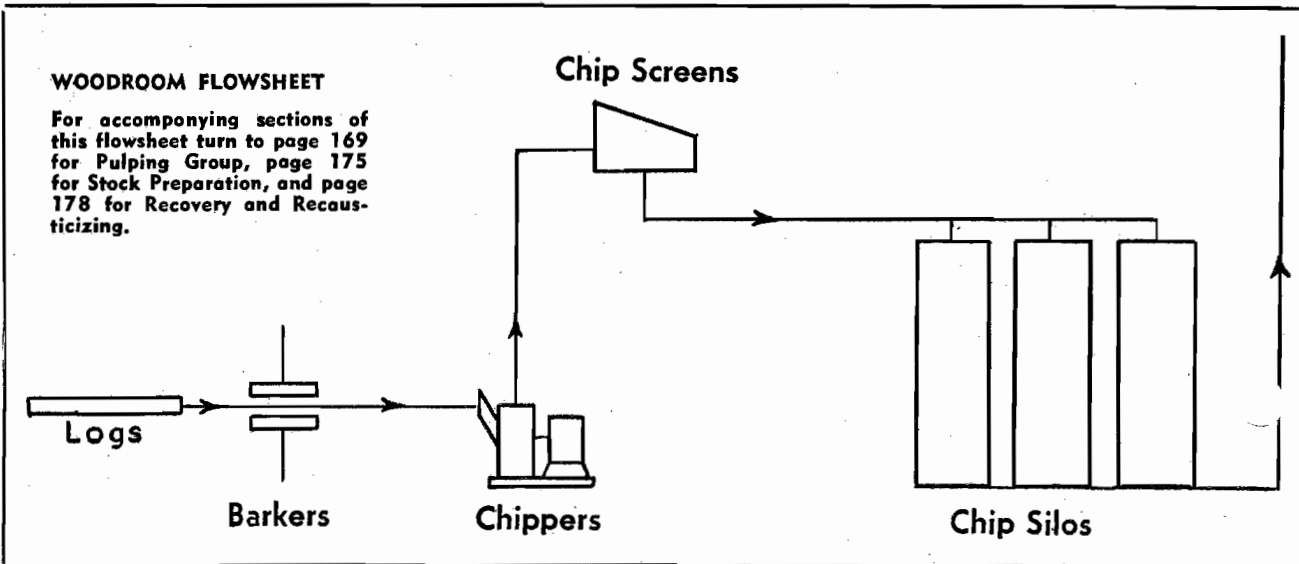
Clean logs are conveyed to two 5 inch Carthage Norman chippers with twelve 21-inch knives. These chippers, rotating at 400 r.p.m. have 8 h.p. drives and have a feed speed 250 feet per minute. The knives are set to cut a uniform 5/8 inch chip. The chips are screened over four Rotex chip screens, manufactured by the Orville Simpson Company. The screens have a capacity of twenty units per hour each. Oversized chips from the Rotex screens are returned to a 36-inch Sumner re-chipper which in turn discharges directly to the Rotex screens. Sawdust and fines from the screens are rejected directly to the waste bark conveyor to the boilers. Accepted chips are conveyed by a 42-inch belt conveyor to three concrete chip storage silos. These silos have a volume of 97,000 cubic feet each, and are equipped with steel hopper bottoms. Chips are reclaimed from the silos by three Link Belt rotary plate feeders which discharge at a uniform rate directly to a belt conveyor feeding the digesters.



VERN HANSON, woodyard and wood-room superintendent at Hinton.



H. SANDOMIR, chief mill scaler at Hinton.



The Pulping Group

THE PULPING group building at Hinton houses the digesting, brown stock washing, screening, bleaching and chemical preparation all under one roof. All operations on these units are controlled from the fourth floor of the building with all of the panels and operators located at this level.

The chips are cooked by the Kamyrr continuous method. This process was perfected by Kamyrr Inc. in Sweden after fifteen years of research, engineering, and pilot plant practice. The

name continuous is self-explanatory, the system having a continuous feed of chips in and pulp out.

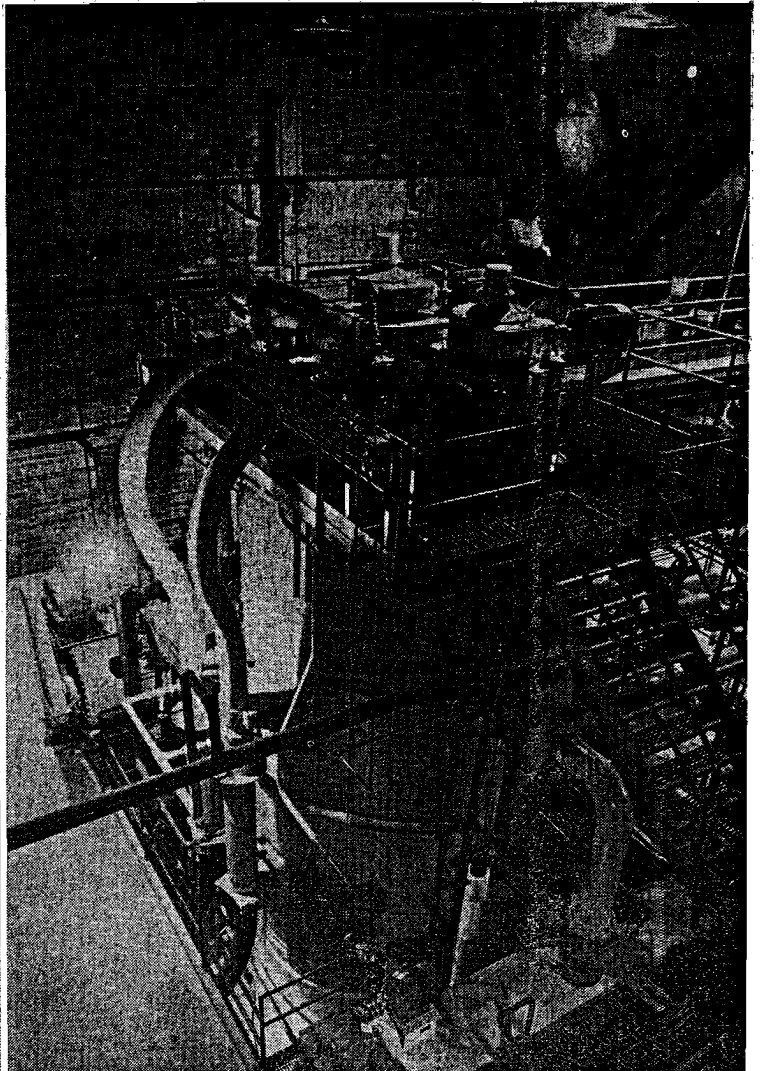
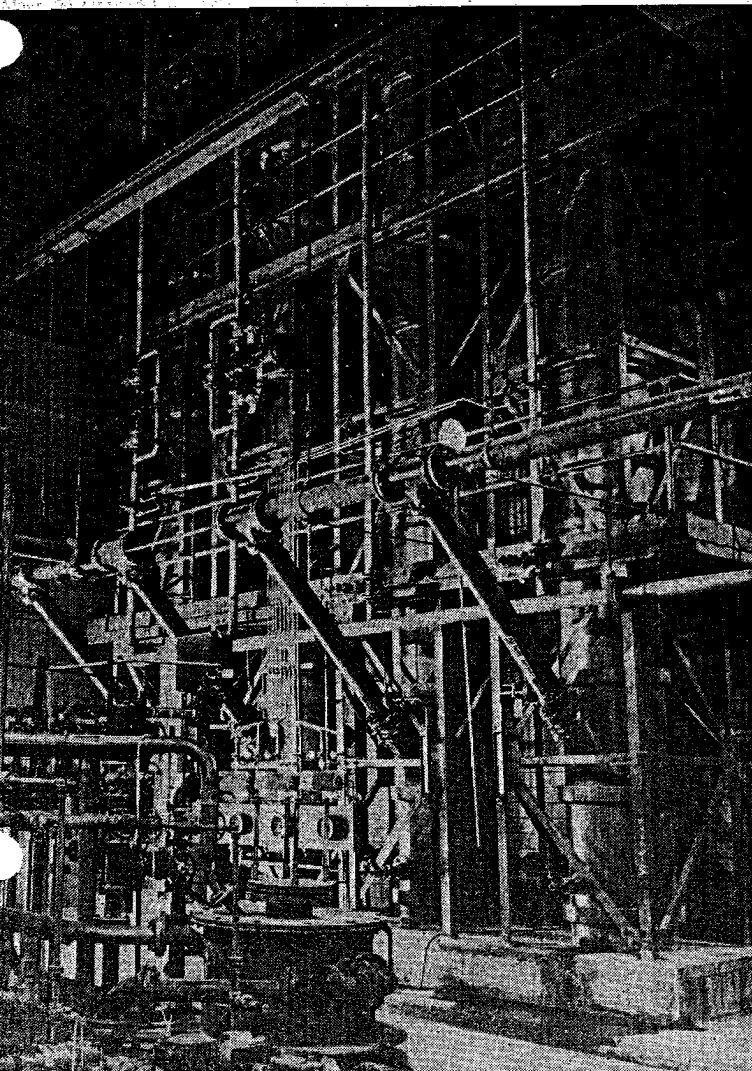
Digesting Units

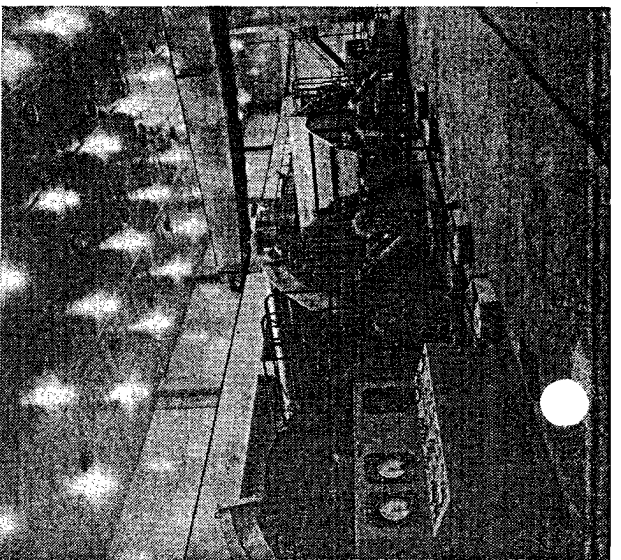
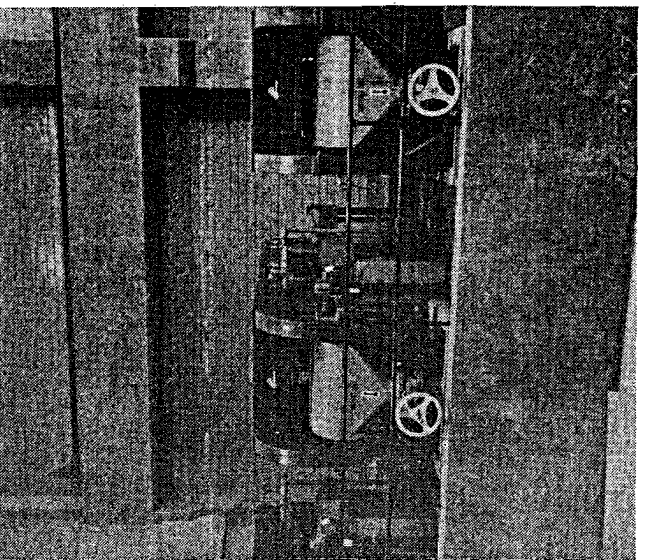
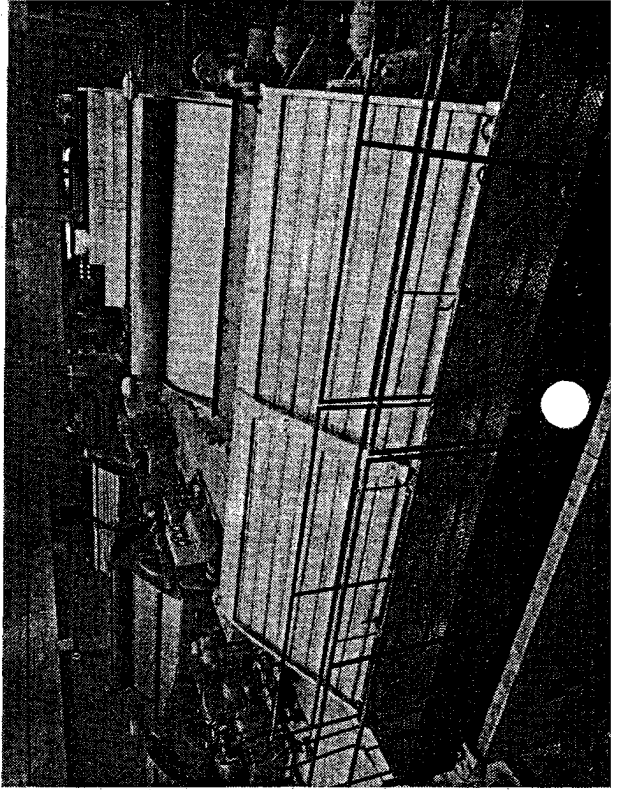
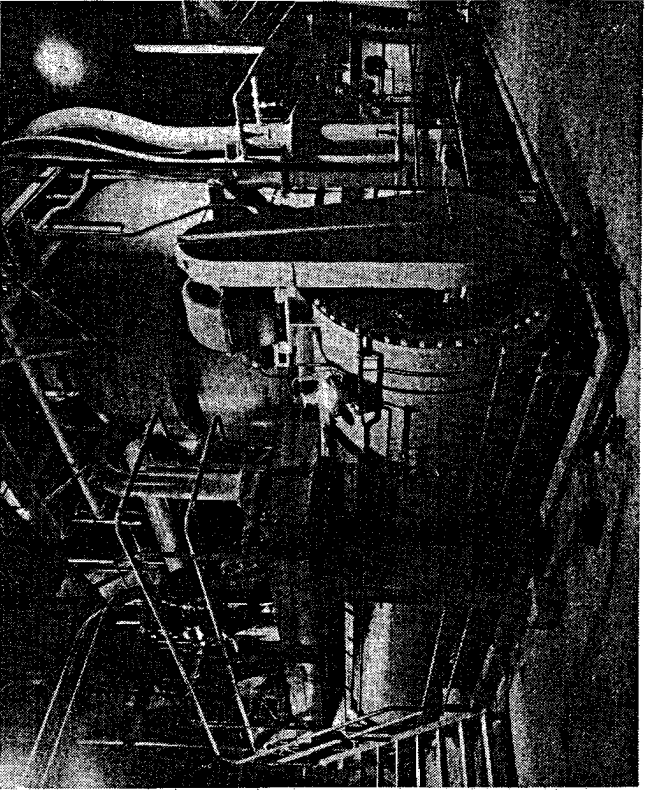
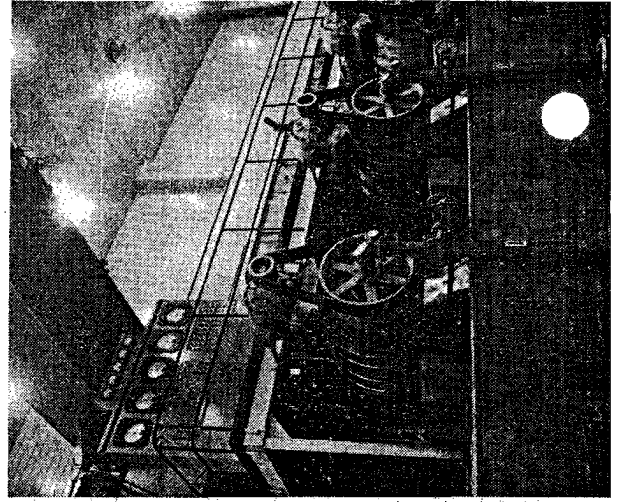
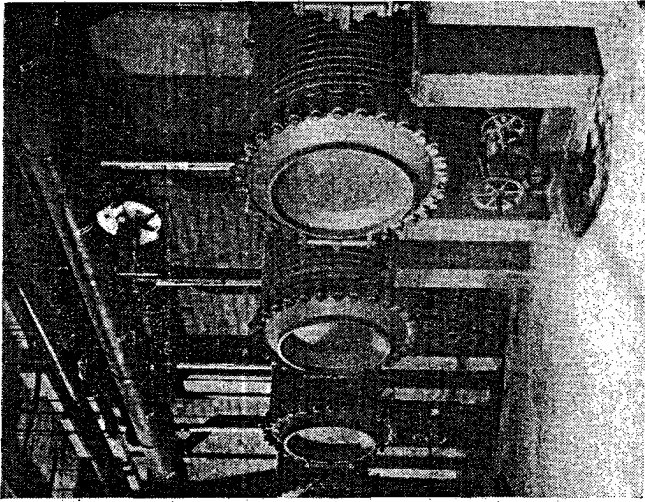
There are two digesting units installed, each with an ultimate rated capacity of 250 tons per twenty-four hours. The complete system including the digesters, piping and allied equipment, was designed and installed by Kamyrr Inc., Hudson Falls, New York. The digesters, which are 95 feet high, 13 feet in diameter and

have a volume of 10,800 cubic feet each, were built by Dominion Bridge Company to Kamyrr specifications.

The chips from the silos are fed by a 36-inch belt conveyor to a chip hopper located at the roof elevation of the digester section of the building. The bottom of the hopper shapes into four spouts, each equipped with a Syntron vibrator. Attached to each

Left) Chemical preparation. Right) Top of digesters.





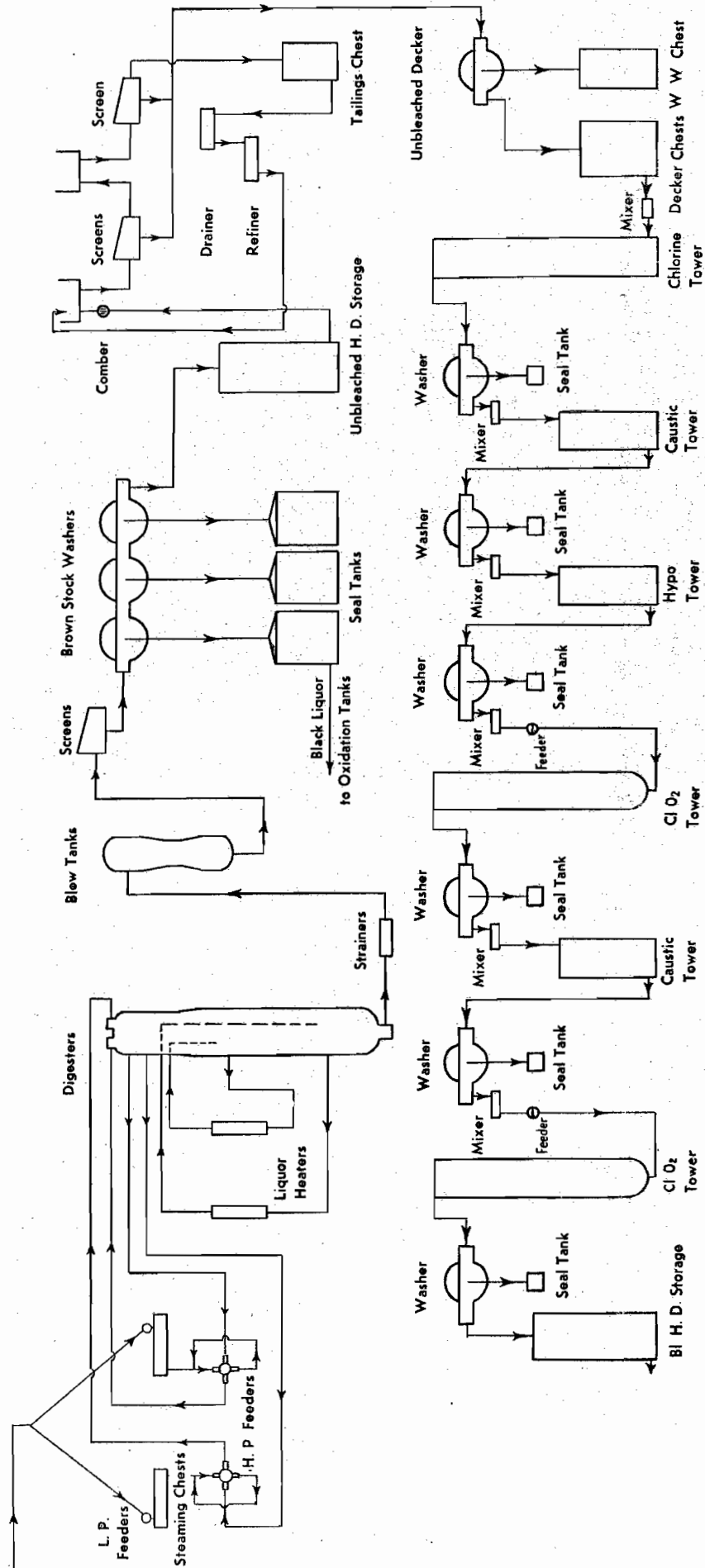
PULPING GROUP MONTAGE (above)

Top left to right) The knotters; low pressure chip feeders and digesters; heat exchangers.

Bottom left to right) Brown stock washers, tile walls, polished metal ceiling; brown stock washers in foreground, bleach washers to left, main control in background; brown stock screens.

For accompanying sections of this flowsheet turn to page 166 for Woodroom, page 175 for Stock Preparation, and page 178 for Recovery and Recausitizing.

PULPING GROUP FLOWSHEET





J. K. SUTHERLAND, assistant pulp mill superintendent at Hinton.



DENNIS SMITH, pulp mill superintendent at Hinton.

of these spouts is a chip meter with a pocket volume of 4.75 cubic feet. These meters are equipped with a variable speed drive and each one feeds chips through the Kamyrlow-pressure feeder into four presteaming vessels (60-inch in diameter by approximately 24 feet long) equipped with screw conveyors. In these vessels the chips are pre-heated by relief steam from the blow tank. The steaming vessels are operated at a pressure of approximately 15 pounds. Each digester has two steaming vessels operating in parallel.

Chips from the steaming vessels are discharged directly into Kamyrlow-pressure feeders, at which point the liquor is added to the chips. The mixture is then pumped continuously into the top of the digesters. The steaming vessels and high pressure feeders are supported by a platform which is attached directly to the shell of the digester. In this way, expansion problems are minimized since

the feeder and vessels will travel with the expansion of the digester.

The digesters are equipped with a distribution mechanism at the top to assure uniform distribution of the chips. The upper section of the digester acts as an impregnation zone and the true cooking actually commences about one-third the distance down the digester.

Cooking Zones

There are two separate cooking zones, each one with its own liquor circulation and heating system. Heating of the digesters is handled by two indirect Esco black liquor heaters, each one heating a specific zone. The liquor circulation pumps were supplied by Bingham Pump Company. A third Esco heater has been installed in parallel at each digester. This acts as a spare unit so that it is not necessary to shut down the continuous cooking while any one heater is being

cleaned. This gives a total of six ers since there are three with digester.

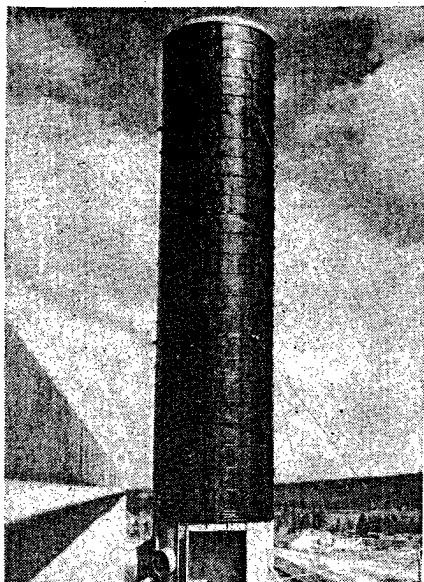
At the bottom of the digester chips are discharged through devices aided by a heavy revolving discharge scraper. The pulp discharged from the bottom of the digester is diluted by black liquor. The stock from both digesters, which operating in parallel, is discharged into an hour-glass-shaped blow tank measuring 27 feet in height and having a maximum diameter of 9 5½ inches.

This blow tank is designed for a maximum operating pressure of 15 pounds but is actually operated at approximately 15 pounds pressure. The stock at the bottom of the blow tank is diluted by black liquor being flowing by gravity to five Jonsson knotters supplied by the Canadian Ingersoll-Rand Company. These knotters are equipped with ¾-inch perforations on the first half of the plate and 5/16-inch perforations on the last half.

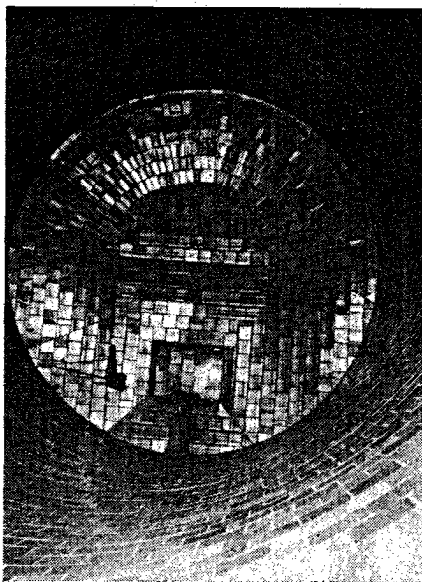
Since the blow tank is operated at approximately 15 pounds pressure it is necessary to cool the black liquor which dilutes the stock at the bottom of the blow tank in order to prevent flashing at the knotter. This is handled by six stainless steel Rotolad heat exchangers which, in turn, heat water for use elsewhere in the mill.

The stock from the Jonsson knotters flows by gravity to a three-stage counter-current Sherbrooke Imperial brown stock washer. The molds in these washers are 13 feet, 6 inches in diameter by 20-foot face. Stripped liquor from the brown stock washer is passed through three B.C. Research Council black liquor oxidation tanks before being sent to the black liquor storage tanks.

Rejects from the knotters are conveyed by an oversized Redler conveyor to the chip hopper above the digester for reprocessing. Stock from the discharge of the brown stock washer-shredder is handled by a 12-inch belt conveyor which distributes stock to one of three hi-density storage tanks constructed by Canadian Steelbins Engineering Co. Ltd. These storage tanks hold 34 tons of brown stock each, giving a total storage capacity of 100 tons. The hi-density storage tanks are equipped with Inco high-pressure dilution nozzles, agitators and have a sloping bottom to aid sluicing of the stock to a pump suction. Stock is transferred from the hi-density storage tanks to the brown stock screening system which consists of four mark



Exhaust from blow pit.



Tile stock storage tank.

Cowan screens with .085 perforations and one Junior Cowan screen with .070 perforations. The Junior Cowan screen acts as a secondary screen. The tailings from the brown stock screening system are stored in a concrete tile-lined chest from which they are metered to a Canadian Ingersoll-Rand Haug refiner. This is a two-roll unit equipped with a 75 h.p. drive. The refined stock is then returned to the brown stock primary screens. Accepted stock from the primary and secondary Cowan screens flows by gravity to a Sherbrooke Impco vacuum decker which has an 11-foot-6-inch diameter by 20-foot face mould. This decker also acts as a fourth stage in the washer system. Deckered stock is stored in two concrete, tile-lined chests each with a capacity of 7,500 cubic feet. Stock from these decker chests is then metered to the bleaching system.

Bleach Plant

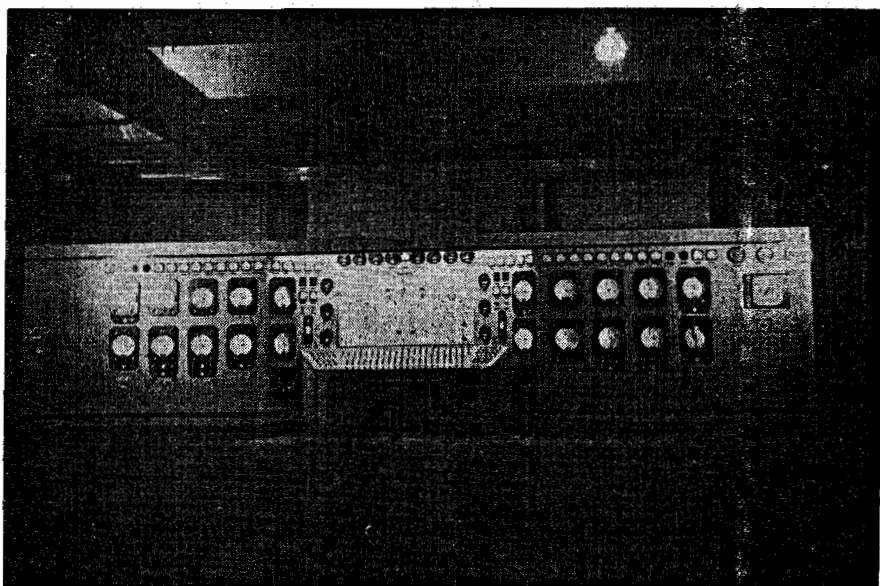
The bleach plant at Hinton is designed for 480 tons per day of unbleached stock to the chlorine tower and 430 tons per day of bleached stock out of the system. The bleach cell equipment was supplied by Kamy Inc.

The Kamy system consists of the following stages:

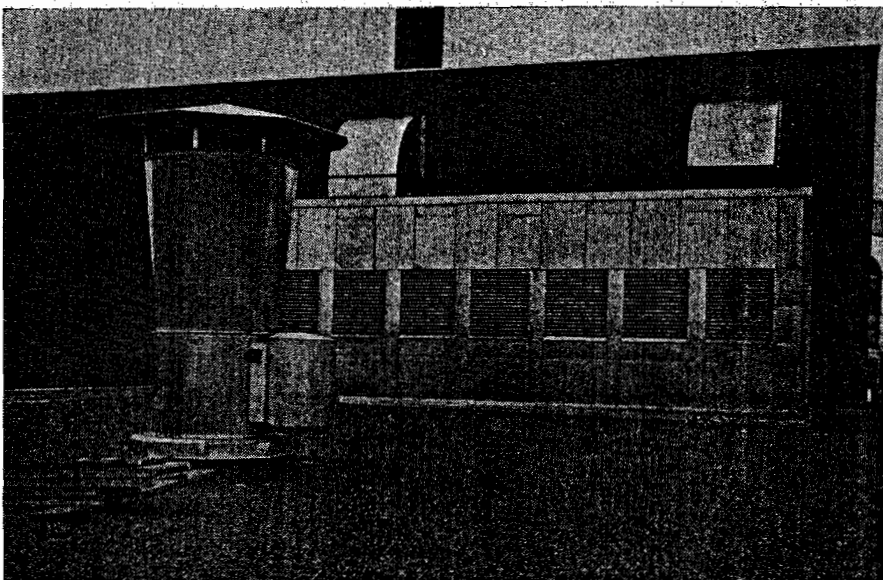
1. Low-density, upward-flow chlorination stage. Tower size 16-foot diameter by 86-foot-6-inch height.
2. High-density downward flow caustic extraction stage. Tower size 16-foot diameter by 39-foot high.
3. High-density, downward-flow hypochlorite stage. Tower size 16-feet by 39-feet high.
4. High-density, upward-flow chlorine dioxide stage fed by a Kamy rotary air feeder. Tower size 18-foot diameter by 85-feet high.
5. High-density, downward-flow caustic extraction stage. Tower size 16 foot diameter by 39-feet high.
6. Second chlorine dioxide stage identical to that in (4).

All tower shells were supplied by Horton Steel Works. Tile linings have been installed by Canadian Stebbins Engineering. All bleach washers are of Sherbrooke Impco manufacture, and are 11-foot 6-inch diameter by 20-foot face. Washer material is 316 stainless steel for the two caustic stages and hypochlorite stage and 317 E.L.C. stainless steel for the remainder.

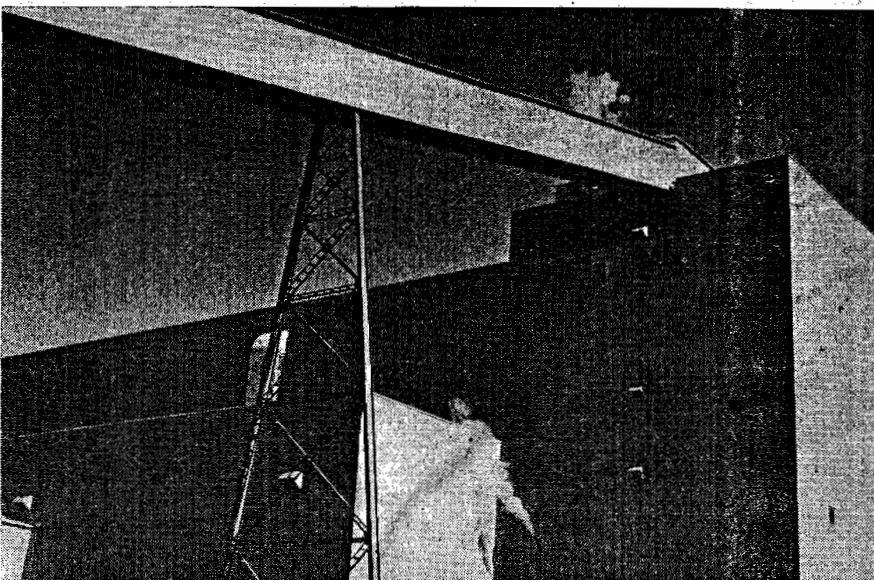
Chlorine dioxide is manufactured by the Mathieson process and the mill has a continuous soda-base hypochlorite bleach-making system.



Main control panel.



Ventilating and air supply equipment.



Chip conveyor to digester building.

Stock Preparation, Drying and Shipping

STOCK PREPARATION for the machine consists of seven Ingersoll-Rand Vibrotor screens, four stages of Bauer centri-cleaners, and a decker. Stock is pumped

from the bleach high-density storage to a screen chest, where it is agitated by a Brinkley 60-inch propeller-type agitator. Stock is then pumped to the Vibrotor screens, the accepted

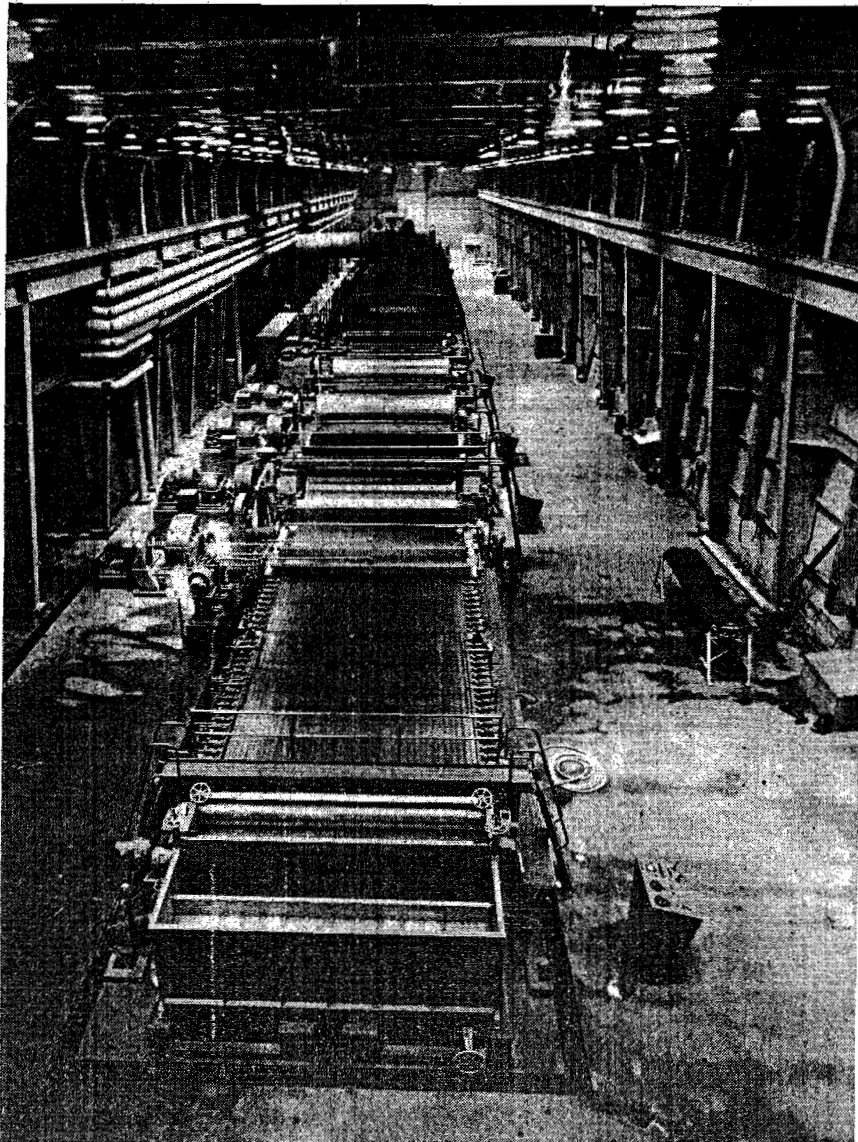
stock going to the Bauer chest, where the stock is diluted for feeding Bauer centri-cleaners. Accepted stock from the centri-cleaners goes to the Sherbrooke-Impco valveless decker which discharges the stock into the machine chest. The chests in this system are reinforced concrete with tile linings by Canadian Stebbins Engineering.

Stock at 3 per cent from the machine chest is diluted with white water to 2.5 per cent and is pumped by an Allis-Chalmers stock pump to a stainless steel stuff box which is 30 feet above the wet end of the pulp machine. The pH of the stock entering the machine head box is adjusted by a Taylor recorder-controller, metering the amount of sulphur dioxide solution entering the intake of the pump.

Pulp Drying Machine

The complete pulp drying machine was designed and manufactured by Dominion Engineering Ltd. and installed under the supervision of Dominion Engineering by Dominion Bridge Co. Ltd. The stainless steel machine headbox is a 3-pound type equipped with a perforated, 13-inch diameter, 304 stainless steel rectifying roll. The lip is all stainless steel with two vertical adjustment hand wheels and fourteen individual lip adjustment hand wheels.

The wet end is a non-shaking, non-removable fourdrinier. The 17-inch wide, 95-foot long wire runs over 22-inch diameter bronze breast rolls



Machine from wet end.

and over thirty-three 7-inch diameter, steel, rubber-covered table rolls, and a 36-inch diameter, bronze suction couch roll equipped with two suction boxes. Two, 18 $\frac{1}{8}$ -inch diameter, rubber-covered presser rolls run in contact with the couch roll.

The vacuum in the couch roll is produced by a Roots-Connersville, two-stage-type RCV vacuum pump. The wire is returned by five rolls equipped with one Nash automatic and one manual wire guide, and two wire stretchers. Water is removed through the wire by five 12-inch suction boxes, four of which are oscillated, and one Evans Rotabelt. Also, there are two hot water weir boxes and one dandy roll. The weir boxes, the four suction boxes and the dandy-roll are so mounted that they can be positioned. The suction box vacuum and the Rota-belt vacuum are produced by individual Roots-Connersville vacuum pumps.

Presses and Dryers

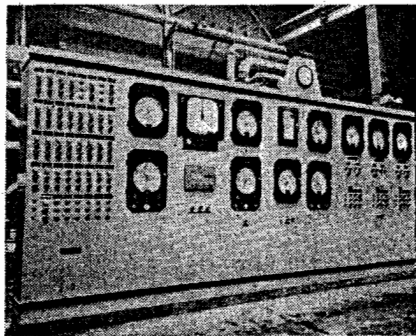
To further condition the sheet before the Minton dryer, there is a section consisting of three presses and two dryers. The first, third and fifth units of this section are presses. The first is a suction press. The bottom perforated roll is 36 inches outside diameter and is rubber-covered. The top roll is a 32-inch bronze-covered roll. This press assembly is capable of exerting a maximum pressure of 300 pounds per linear inch. The third and fifth units are straight presses without suction. The bottom rubber-covered rolls are 36 inches in diameter and the top bronze-covered rolls are 32 inches in diameter. The third unit (the second press) is capable of exerting pressures up to 750 lb. per linear inch and the fifth unit (the third press) up to 1,500 lb. per linear inch. All these presses are equipped with felts, felt rolls, felt stretchers and felt conditioners.

The second and fourth units consist of two dryers each. They are similar in construction. The bottom and top rolls are 60 inches in diameter and operate off an 80-pound steam header.

The fourdrinier is equipped with an automatic system controlling the basis weight of the sheet. A Toledo continuous weighing scale between the pre-drying section and the Minton dryer controls the amount of stock flowing from the stuff box to the fan pump.

The dryer used in this mill is a 164-inch Minton. It has sixty-six, 60-inch dryer rolls, and is divided into two sections each having its own top and bottom felts. These felts are

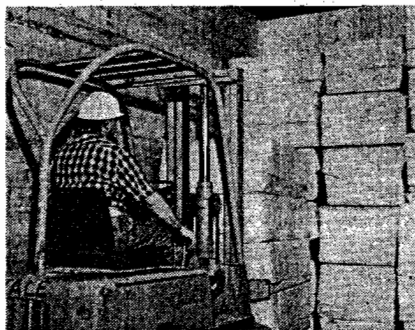
manufactured by Aston Hill Co. Ltd. and by Ayers Co. Ltd. The 28 inches of vacuum in the Minton dryer is supplied by a network of jet condensers, a steam ejector and two Ingersoll-Rand piston-type, positive displacement vacuum pumps.



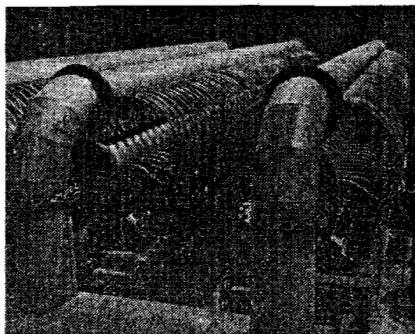
Stock preparation control panel.



Wrapping bales.



Loading freight cars with baled pulp.



The centri-cleaners.

The ingoing and outgoing seals each consist of two chromium-plated rolls and one moveable rubber-plated roll. The seal between the chromium-plated roll and the dryer frame is maintained by a rubber strip. The rubber roll maintains the seal between the pulp sheet and the chromium-plated rolls.

The pulp machine and dryer are driven by a magnetic amplifier Westinghouse drive.

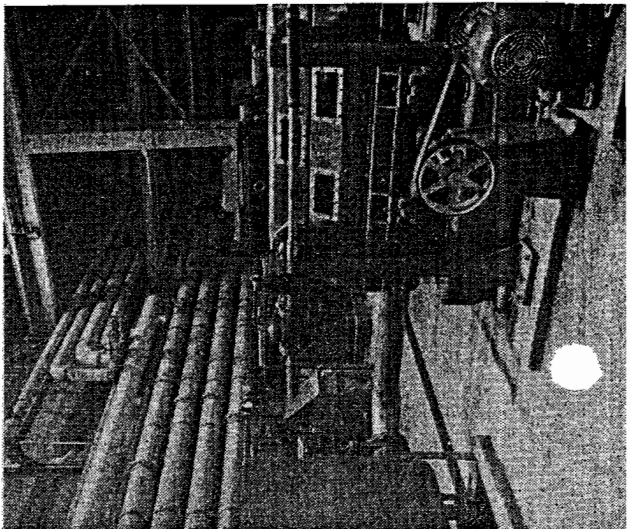
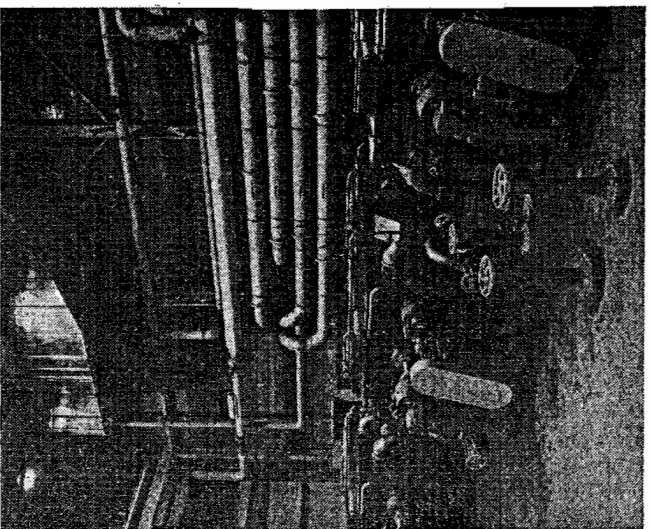
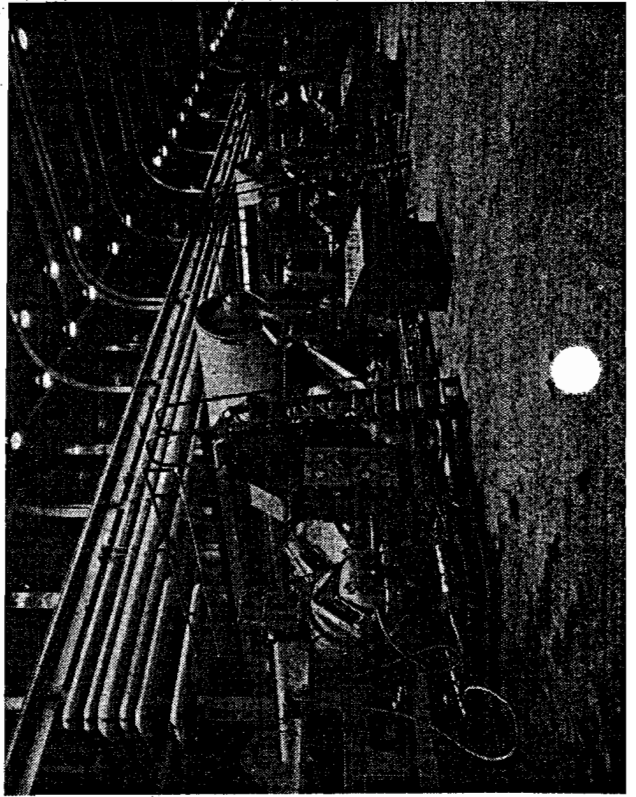
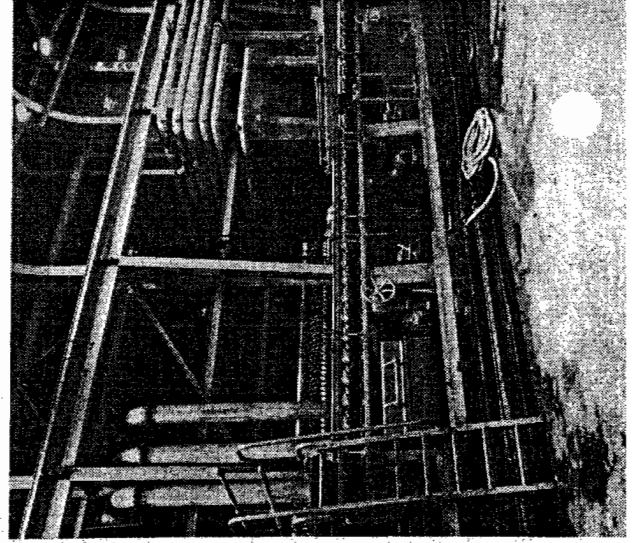
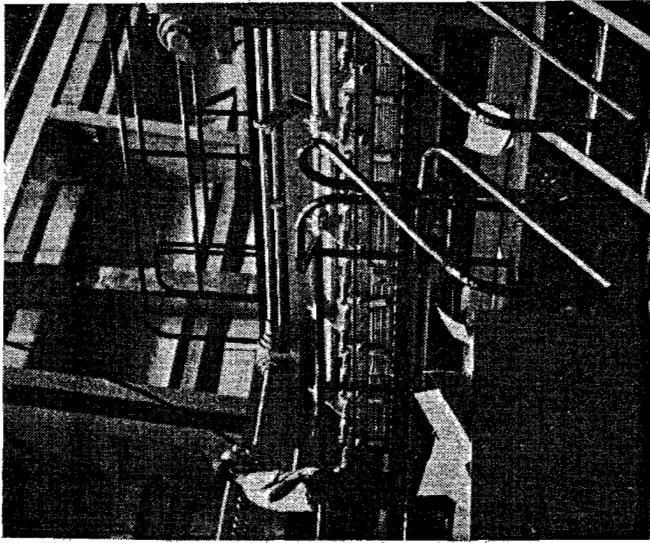
Finishing Equipment

The finishing equipment was supplied by Lamb-Grays Harvour Co., Hoquaim, Washington. The 1,000-ton baling press was manufactured by Washington Iron Works Company. The equipment was installed by the Lambs-Gray Harbour Company. The pulp sheet is fed into a heavy-duty pulp cutter which will cut either pulp or wrapper sheets. It is then discharged to a continuous automatic lay-boy which stacks the sheets into 500-pound bales. The swing table transfers the stacked sheets to a storage belt conveyor with wrapper pickup section. The pulp stacks feed through a Toledo scale with discharge unit to the Washington Iron Works 1000-ton baling press. The bales are tied on an automatic wire-tying machine and discharged to a 30-in. belt conveyor 170 ft. long which carries the bales to an automatic lowerator-stacker in the Pulp Warehouse. All the equipment is tied together with conveyors electrically, making the whole system automatic.

The pulp storage building is approximately 350 feet long and 150 feet wide having an inside spur line in the storage house which makes continuous loading with fork trucks into box cars possible.

The finished product of the mill is prime bleached kraft pulp. The trade name is *Hi Brite* in line with the fact that the pulp is bleached to such a degree it has 89 G.E. at the end of the dryer and 88 G.E. when received by the customer. The pulp is not only very white but is free from any dirt specks and meets in quality the top grade pulps being offered on the market at this time.

Turn to the 'Affiliated Industries' section of this issue at the back of the magazine for a comprehensive listing of principal equipment suppliers to the Hinton mill of North Western Pulp and Power Ltd.

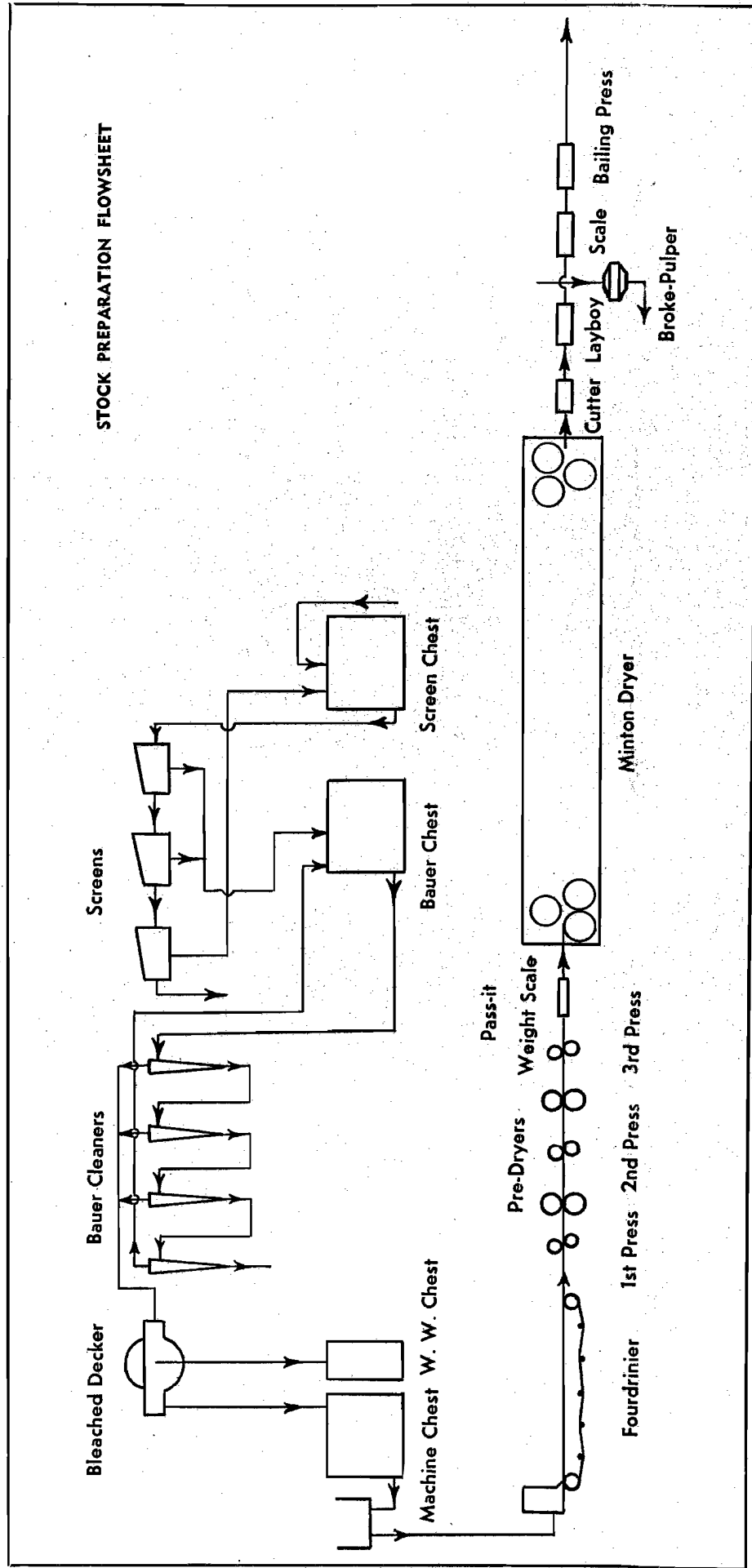


MACHINE ROOM MONTAGE (above)

Top from left to right) Wet end of machine room showing flat screens; Minton dryers looking towards wet end; Layboy.

Bottom from left to right) Wet end of machine room showing process piping and Ahlffors screens; Press section of machine showing couch, presses and inter-dryers; Fourdrinier showing centri-cleaners in background.

For accompanying sections of this flowsheet turn to page 166 for Woodroom, page 169 for Pulping Group, and page 178 for Recovery and Recoustitizing.



The Recovery System

WEAK BLACK liquor at 15 per cent solids is pumped from the oxidation towers to two 35-foot diameter by 30 feet (216,000 gallons each) feed liquor storage tanks constructed by Horton Steel Works Ltd. The weak black liquor is then pumped from the tanks by a 900 g.p.m. Worthington pump to the evaporators.

The sextuple effect evaporator, furnished by the Swenson Evaporator Co., is equipped with six La Bour pumps; four being interstage black liquor transfer pumps, one a contaminated condensate pump and one a clean condensate pump. Plain steel tubes are used in Nos. 3, 4, 5 and 6 effects while stainless steel tubes are used in Nos. 1 and 2 effects.

Black Liquor

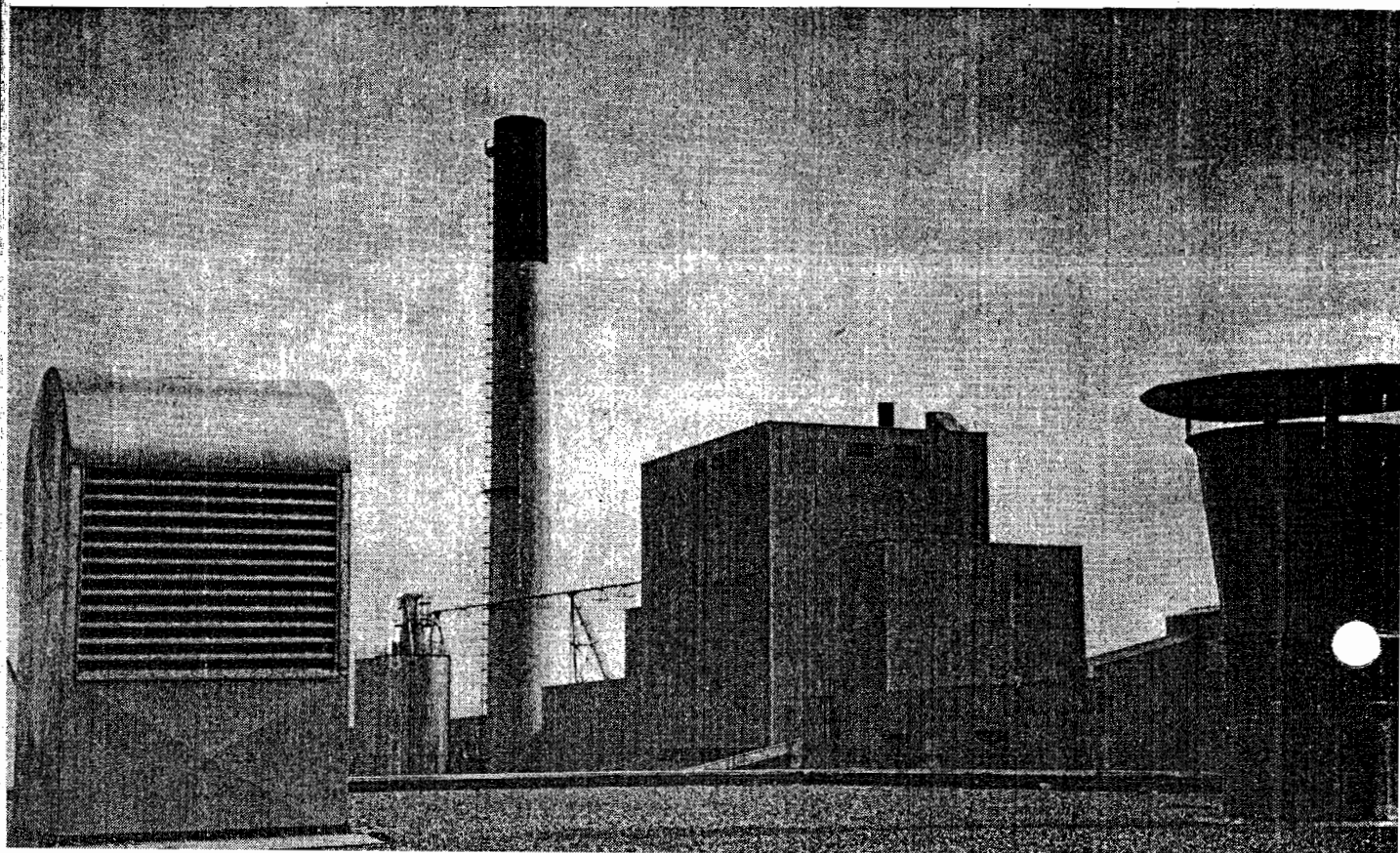
A mixed type of weak black liquor feeding is used. The liquor is fed into the 4th and 5th effects. From the 5th it flows into the 6th and then liquor from the 6th effect joins incoming feed into the 4th. Then it goes to the 3rd, 2nd and 1st effects and two-stage flash tank successively. This type of feeding is designed to cut down liquor carryover and increase overall efficiency. A La Bour pump is used to transfer strong black liquor at the rate of 252 g.p.m., from the second stage of the flash tank to two 22 feet by 23 feet 9 inches high (66,500 gal. each) storage tanks.

Steam enters the chest of the first effect, condenses, and the clean con-

densate is then flashed in a 42-inch by 8-foot high (85 p.s.i. design pressure) flash tank. A La Bour pump transfers the clean condensate at the rate of 135 g.p.m. to the deaerating heater in the power plant. The flash goes to the condensate drainage tube of the third effect.

The vapour from one effect is used in the chest of the next. Condensate is collected in a common header and is pumped at the rate of 600 g.p.m. by a La Bour pump to the causticizing hot water tank. Vapour from the sixth effect is pulled into a six-pass surface condenser at the rate of 1,000 g.p.m.

Recausticizing plant, recovery building and steam plant seen from wood room roof.



000 lb. per hour. Filtered mill water enters the shell side of this condenser at a rate of 2,800 g.p.m. and 55 degrees F. and leaves at 100 degrees F. to be used in the Bleach Plant. Stainless steel tubes are used to resist corrosive sulphur vapours which are present in the vapour leaving the last effect. A two stage Schutte and Koerting ejector system and a hogging ejector draw off any non-condensable vapours and help to create a vacuum in the sixth effect. Any water vapour which has not condensed in the surface condenser is condensed in a barometric condenser. The ejector systems and barometric condenser drain into a 5 feet by 6 feet high (885 gallons) seal tank which overflows to the sewer.

Liquor is transferred from the strong black liquor storage tanks by a Worthington pump at the rate of 224 g.p.m. to the troughs of the dual chamber Koppers Electrostatic precipitator. The precipitator, designed to handle 200,000 cubic feet of gas per minute is 34 feet long, 40 feet wide and 32 feet high and is equipped with twenty vibrators for removing dust from the electrodes and perforated plates. A drag scraper at the bottom of each chamber scrapes the dust into the liquor flowing through the troughs. From the troughs, the liquor



JOHN SERAFIN, assistant chief chemist at Hinton.

drops into a 7 feet by 7 feet diameter (2000 gallons) precipitator salt cake mixing tank.

A Worthington pump delivers liquor from the precipitator salt cake mix tank to the upper cascade evaporator at the rate of 224 g.p.m. The two cascade evaporators furnished by Combustion Engineering are the tubular type and are operated in series. Liquor at 50 per cent solids and 190 degrees F. enters the upper cascade and overflows to the bottom one. A DeLaval pump recirculates at 300 g.p.m. from the upper cascade to two chemical ash hoppers of the recovery furnace and boiler. Gases leave the cascades at 325 degrees F. and go to the Koppers precipitators.

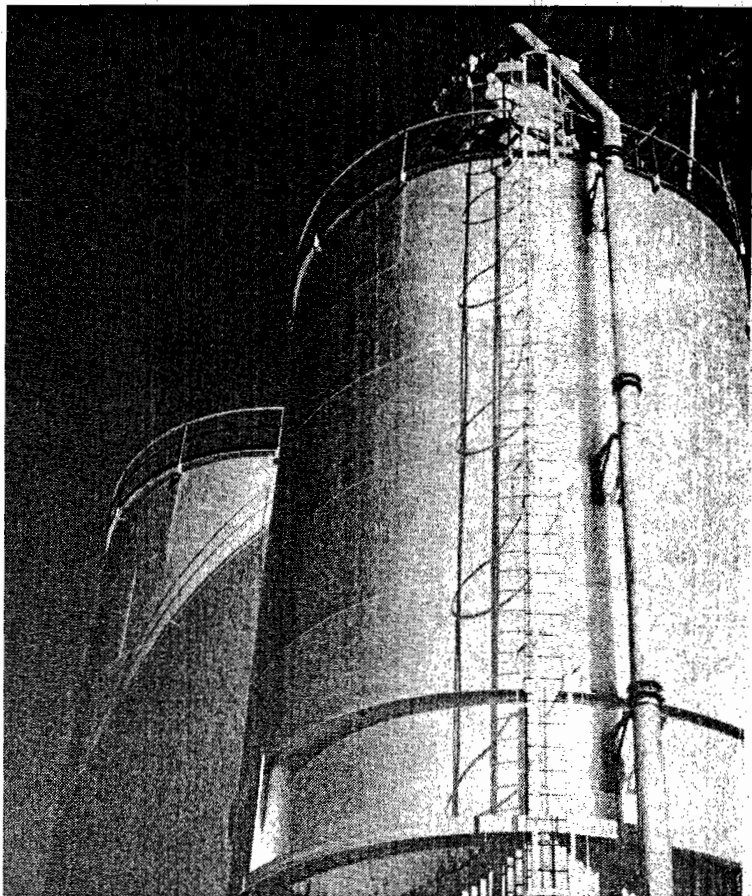
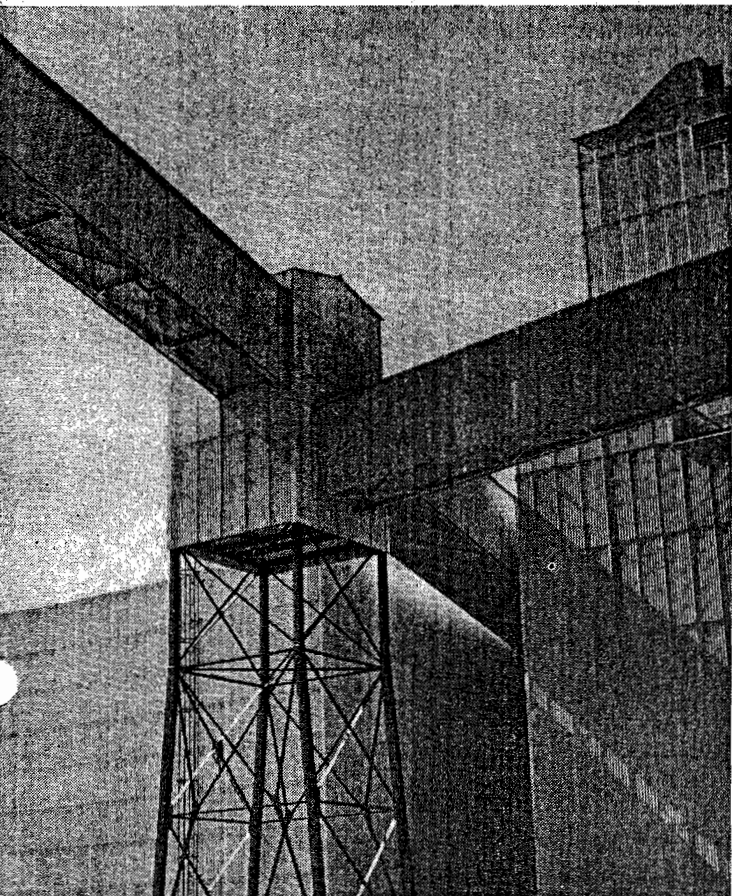
Lumps or particles above 3/8-inch size are removed from the liquor leaving the lower cascade by a screen in

the mechanical flow box. The screened liquor flows into a 5 feet by 13 feet high salt cake mixing tank. Salt cake is added to this tank and the liquor is stirred by a Lightnin mixer mounted on top of the mixing tank. Two 15 feet diameter by 14 feet dump tanks are used to drain the cascade evaporators in case of failure or shut-down. These dump tanks are provided with stainless steel steam coils to keep the liquor from solidifying and a Worthington pump is provided to empty these tanks when necessary.

Liquor from the salt cake mixing tank is heated in two pre-heaters furnished by Combustion Engineering to 240 degrees F. A DeLaval pump is used to pump liquor from the primary heater, at 155 g.p.m. and 68 per cent total solids, to the secondary heater and then to the burners. A Fuller Airveyor system unloads salt cake from box cars, delivers it to silos at the rate of 10 tons per hour, recovers it from the silos, and delivers it to a 20-ton service bin above the salt cake mixing tank. There are two salt cake silos which are 25 feet in diameter and 40 feet high with a capacity of 800 tons each. A 7-foot diameter No. 6 Airveyor filter is mounted on top of the silos to prevent salt cake from getting into the Roots-Connorsville rotary blower which creates the suction used to move the salt cake. When unloading salt cake, a flexible metal hose with a submersible nozzle on its end is inserted into the box

Left) Chip and refuse conveyors and power plant on right, recovery building on left.

Right) Black liquor storage tanks.



car. The salt cake is drawn up into the filter and it falls directly into the first silos or it is carried by a 12-inch 30-foot long Canadian Jeffrey Heliroid screw conveyor into the second silo.

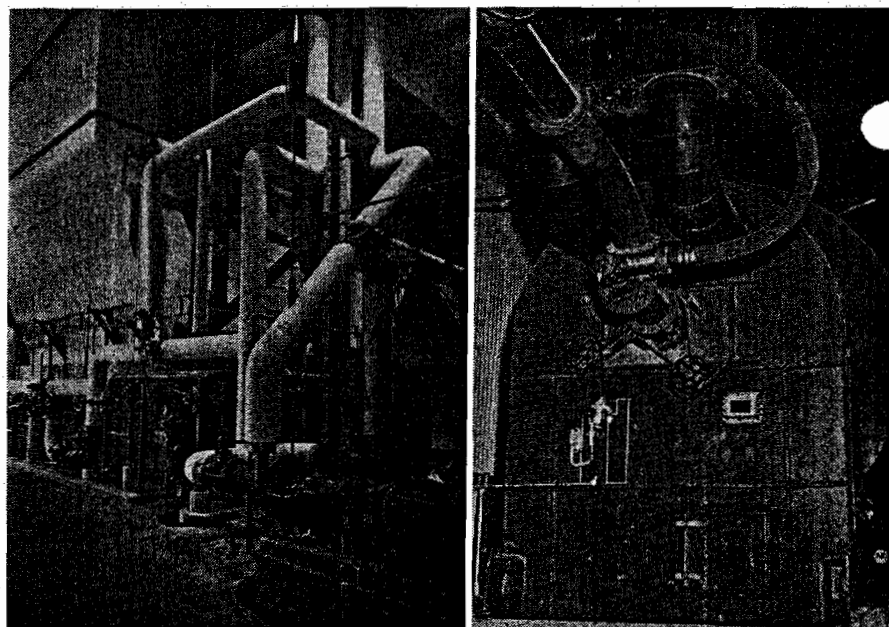
When salt cake is being reclaimed it falls directly into a 24-inch by 18-inch type "A" Canadian Jeffrey swing hammer pulverizer from No. 1 silo and is conveyed by another 12-inch Canadian Jeffrey Heliroid screw conveyor from No. 2 silo. The salt cake is then carried to a 4-foot diameter, single-stage cyclone receiver mounted above the storage bin in the Recovery Section.

The Combustion Engineering recovery unit is designed to handle 1,400,000 lb. of dry solids per day. Ten spray nozzles are used for spraying black liquor into the furnace. Smelt runs into the dissolving tank below the unit through three water cooled smelt spouts.

A Canadian Sirocco No. 665 induced fan is used to draw gases at the rate of 168,000 c.f.m. from the furnace into the cascade evaporators and then into the Koppers precipitators. A steam air heater is used to heat the draft air to the furnace to 300 degrees F. This air is then blown to the primary and secondary air ports by a No. 593 Canadian Sirocco forced draft fan at the rate of 75,100 c.f.m.

Green Liquor

The smelt dissolving tank constructed by Horton Steel Works Ltd. is 13.5 feet high and 21 feet in diameter (32,800 gallon capacity). The inside of the tank is lined with 4 inches of concrete to prevent corrosion. There are steam shatter nozzles at the end of each of the smelt spouts to break



Left) The recovery boiler. Right) End of lime kiln.

up the stream of smelt flowing into the tank. Weak wash is pumped from the causticizing section to the smelt dissolving tank at the rate of 400 g.p.m. and green liquor is formed. Two Worthington pumps are used for recirculating the green liquor in the smelt dissolving tank and transferring it to the green liquor clarifier at the rate of 400 g.p.m.

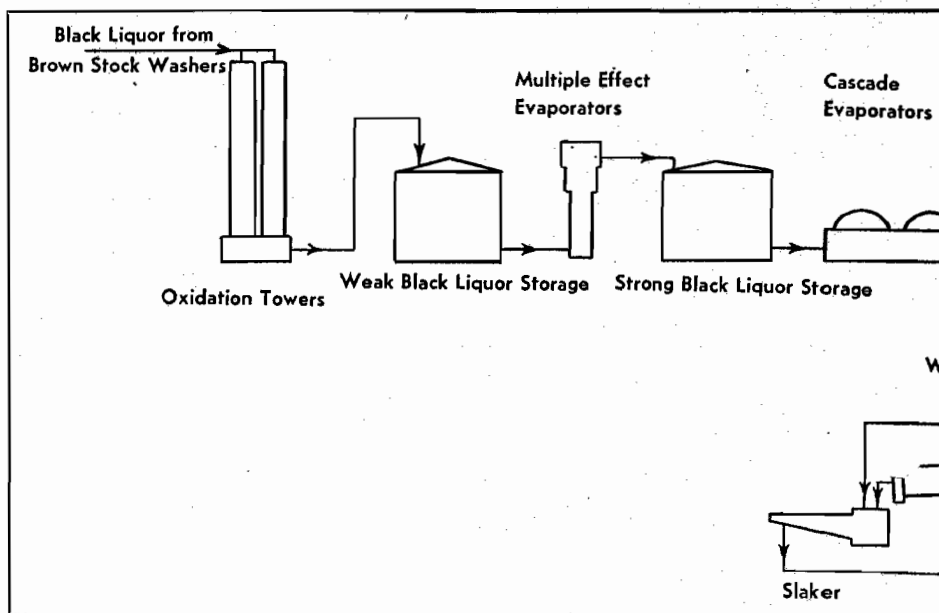
The green liquor clarifier is a steel tank 40 feet in diameter by 15 feet high and has only one compartment. The dregs from the green liquor clarifier are removed by a Dorrco No. 2 mud pump through a Dorrco valve assembly to an 8-foot diameter by 7-foot high dregs mixing tank from where they are pumped to a 20-foot

diameter by 10-foot high dregs washer.

The green liquor overflow from the green liquor clarifier flows into the green liquor storage tank. This tank has a diameter of 35 feet and is 30 feet high. Green liquor is pumped by a Worthington centrifugal pump to a Dorr-Oliver lime slaker. Reburned lime from a 3170 cubic foot lime silo is fed to the slaker by means of screw conveyor controlled by a Reeves variable drive. The slurry from the slaker flows to three continuous causticizers having 15-foot diameter and a 10-foot height and operating in series. A Worthington centrifugal pump then pumps the slurry to a Dorr-Oliver white liquor

RECOVERY AND RECAUSTICIZING FLOWSHEET

For accompanying sections of this flowsheet turn to page 166 for Woodroom, page 169 for Pulping Group, and page 175 for Stock Preparation.



000 lb. per hour. Filtered mill water enters the shell side of this condenser at a rate of 2,800 g.p.m. and 55 degrees F. and leaves at 100 degrees F. to be used in the Bleach Plant. Stainless steel tubes are used to resist corrosive sulphur vapours which are present in the vapour leaving the last effect. A two stage Schutte and Koerting ejector system and a hogging ejector draw off any non-condensable vapours and help to create a vacuum in the sixth effect. Any water vapour which has not condensed in the surface condenser is condensed in a barometric condenser. The ejector systems and barometric condenser drain into a 5 feet by 6 feet high (885 gallons) sewer tank which overflows to the sewer.

Liquor is transferred from the strong black liquor storage tanks by a Worthington pump at the rate of 224 g.p.m. to the troughs of the dual chamber Koppers Electrostatic precipitator. The precipitator, designed to handle 200,000 cubic feet of gas per minute is 34 feet long, 40 feet wide and 32 feet high and is equipped with twenty vibrators for removing dust from the electrodes and perforated plates. A drag scraper at the bottom of each chamber scrapes the dust into the liquor flowing through the troughs. From the troughs, the liquor



JOHN SERAFIN, assistant chief chemist at Hinton.

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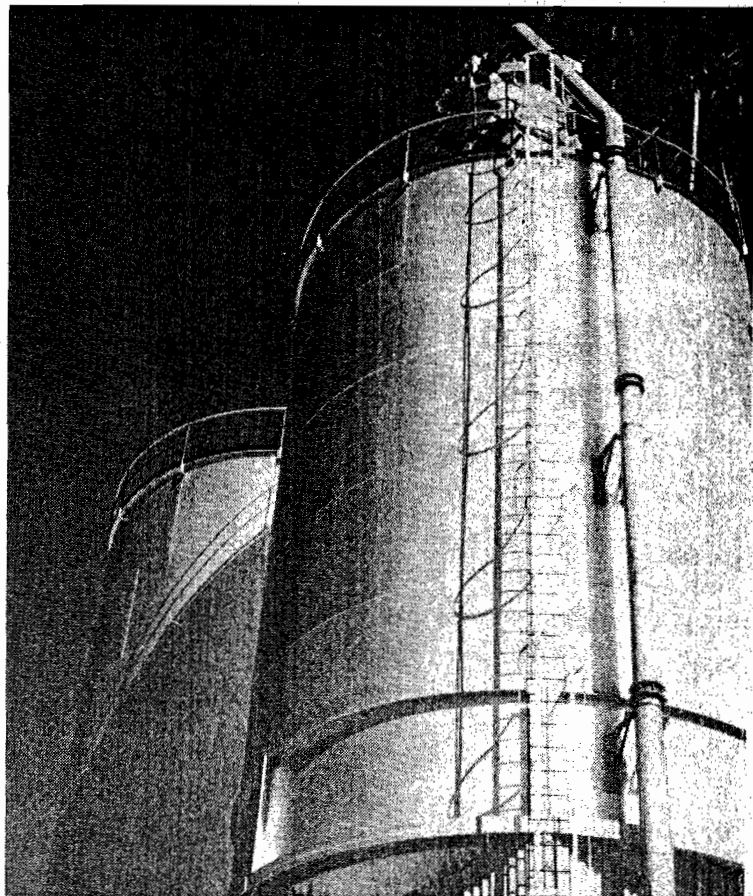
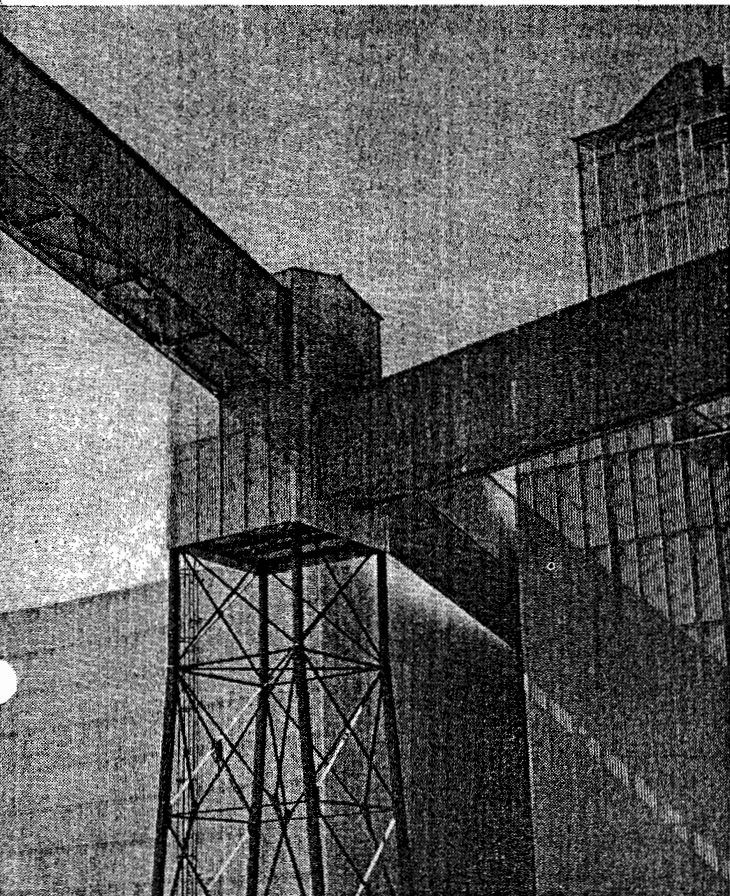
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the mechanical flow box. The screened liquor flows into a 5 feet by 13 feet high salt cake mixing tank. Salt cake is added to this tank and the liquor is stirred by a Lightnin mixer mounted on top of the mixing tank. Two 15 feet diameter by 14 feet dump tanks are used to drain the cascade evaporators in case of failure or shutdown. These dump tanks are provided with stainless steel steam coils to keep the liquor from solidifying and a Worthington pump is provided to empty these tanks when necessary.

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Left) Chip and refuse conveyors and power plant on right, recovery building on left.

Right) Black liquor storage tanks.



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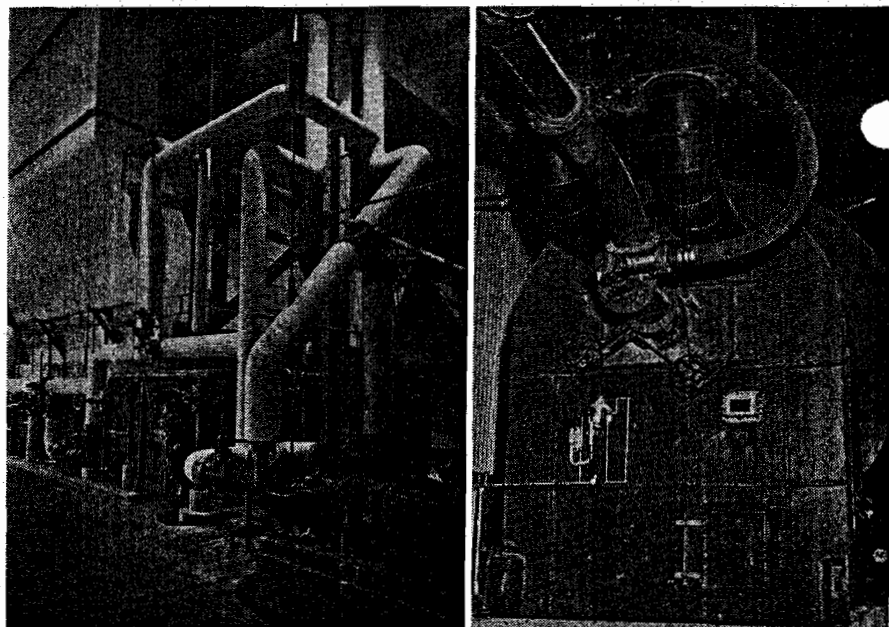
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Left) The recovery boiler. Right) End of lime kiln.

up the stream of smelt flowing into the tank. Weak wash is pumped from the causticizing section to the smelt dissolving tank at the rate of 400 g.p.m. and green liquor is formed. Two Worthington pumps are used for recirculating the green liquor in the smelt dissolving tank and transferring it to the green liquor clarifier at the rate of 400 g.p.m.

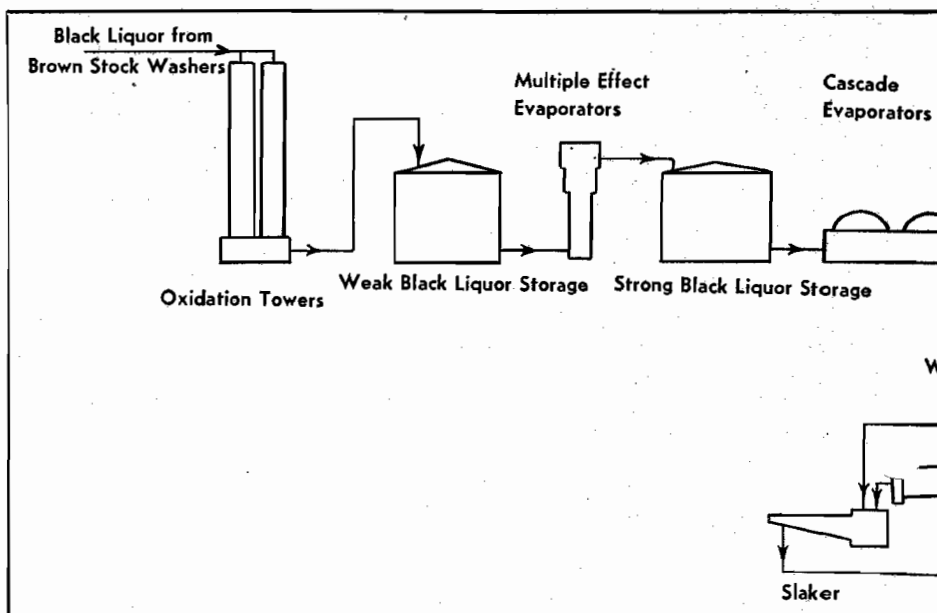
The green liquor clarifier is a steel tank 40 feet in diameter by 15 feet high and has only one compartment. The dregs from the green liquor clarifier are removed by a Dorrco No. 2 mud pump through a Dorrco valve assembly to an 8-foot diameter by 7-foot high dregs mixing tank from where they are pumped to a 20-foot

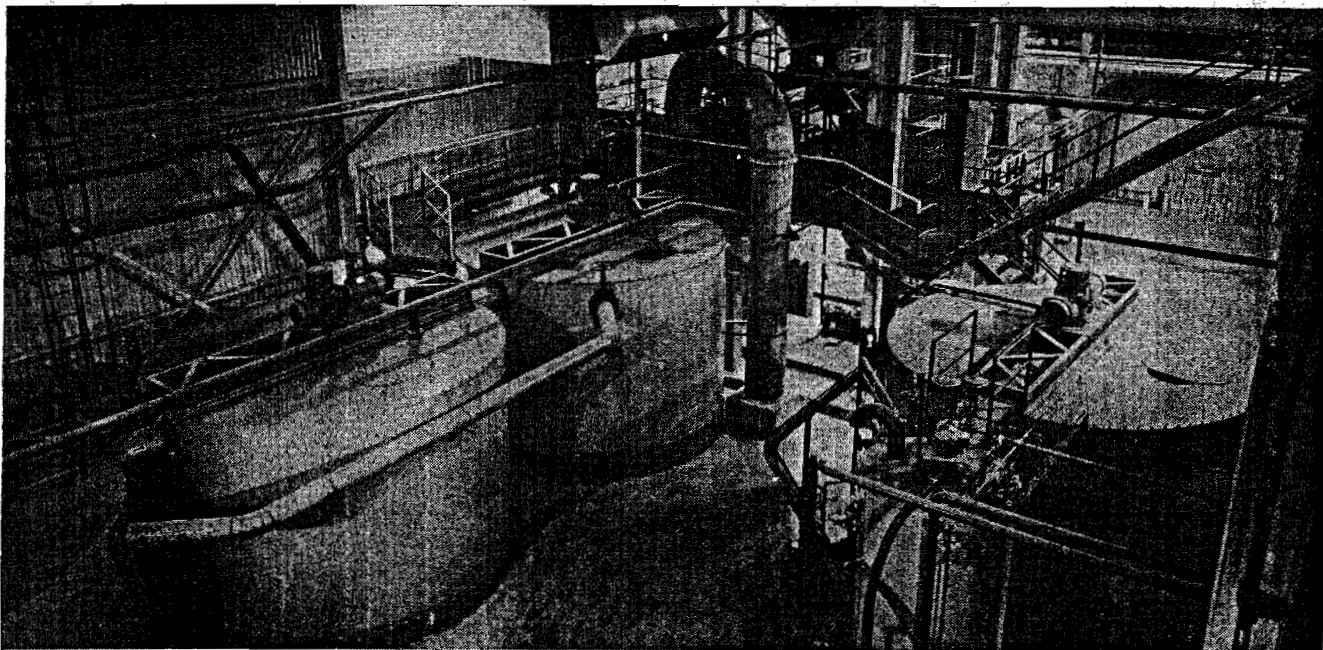
diameter by 10-foot high dregs washer.

The green liquor overflow from the green liquor clarifier flows into the green liquor storage tank. This tank has a diameter of 35 feet and is 30 feet high. Green liquor is pumped by a Worthington centrifugal pump to a Dorr-Oliver lime slaker. Returned lime from a 3170 cubic foot lime silo is fed to the slaker by means of screw conveyor controlled by a Reeves variable drive. The slurry from the slaker flows to three continuous causticizers having 15-foot diameter and a 10-foot height and operating in series. A Worthington centrifugal pump then pumps the slurry to a Dorr-Oliver white liquor

RECOVERY AND RECAUSTICIZING FLOWSHEET

For accompanying sections of this flowsheet turn to page 166 for Woodroom, page 169 for Pulping Group, and page 175 for Stock Preparation.





The recausticizing plant.

clarifier. This clarifier has 4 trays, and is 35 feet in diameter and 25 feet high. Clarified white liquor overflows to a storage tank.

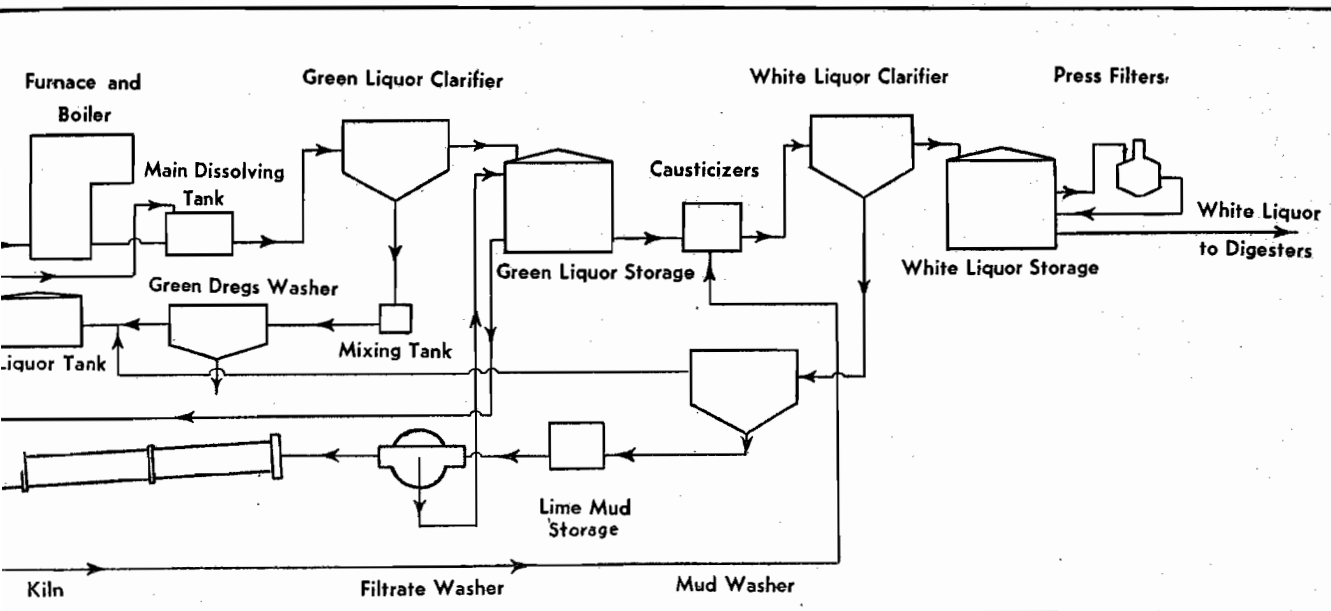
White Liquor

The lime mud from the white liquor clarifier is pumped by a No. 6 Dorrco mud pump to a mud washer which is a Dorr-Oliver four-compartment thickener of the combination type and is 35 feet in diameter and 25 feet high. The washed mud is pumped by another No. 6 Dorrco mud pump to a 20-foot diameter by 18-foot high lime mud storage tank. It is then pumped to a "ferris wheel" variable speed slurry feeder which

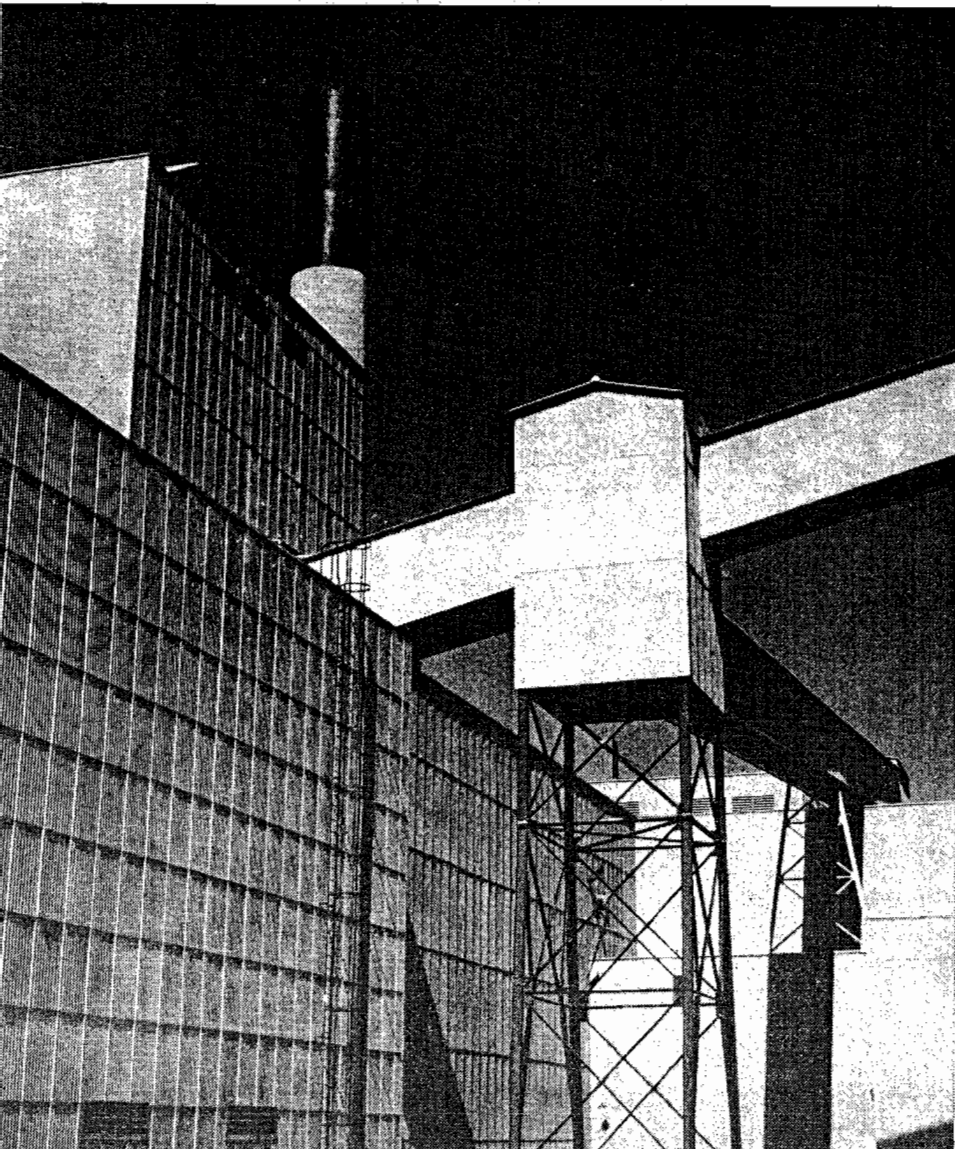
feeds it to an Oliver rotary drum filter supplied by Dorr-Oliver Inc. A Nash Hytor vacuum pump, size L8 and having a 75 h.p. Canadian Westinghouse drive is used to provide a vacuum. Lime mud from the filter is fed by a screw conveyor to a 9-foot diameter by 250-foot long Canadian Allis-Chalmers lime kiln with a 37-foot, 4-inch, chain section. The kiln is driven by a 100 h.p. Canadian Westinghouse type H.S. induction motor coupled with a Kennedy-Falk speed reducer. Natural gas is used to fire the kiln. The kiln flue gas is passed through an 18-foot, 6-inch by 8-foot, 6-inch diameter, Peabody kiln gas scrubber before passing out of the stack.

The reburned lime is carried by a drag chain lime conveyor to a lime bucket elevator which conveys it to the lime silo. The lime bucket elevator is 84-feet 4-inches high and has a 7½ h.p. drive.

Clarified white liquor from the white liquor storage tank is treated further by passing it through the white liquor polishers. These are anthracite filters made by the Roberts Filter Manufacturing Company. The white liquor then flows to one of two polished white liquor storage tanks. All the storage tanks in the caustic room, with the exception of the mud storage tank, are 35 feet in diameter, have a height of 30 feet and a storage capacity of 28,900 cubic feet.



Steam and Power Plant



REGENERATION of steam takes place in one recovery boiler, fired with black liquor, one power boiler fired with natural gas and bark and one power boiler fired with natural gas only. In these three boilers the steam pressure is 625 p.s.i.g. at 750 deg. F.

Three Boilers

The capacity of the recovery unit is 210,000 lb. of steam, per hour, while the others generate 200,000 lb. per hour each. The two power boilers are manufactured by Foster Wheeler and the recovery boiler is designed and erected by Combustion Engineering.

The combination bark and gas-fired boiler has pneumatic spreader stoker equipment for firing the bark and intertube gas burners built in the sides of the boilers are fabricated by Riley Stoker Co. This boiler has forced draft and induced draft fans which can be either turbine or electric driven. The bark-burning boiler is equipped with Diamond soot blowers and a pneumatic installation to reinject the partly burned fly ash into the furnace. Multiclones are installed under the air pre-heater to separate the particles of ash from the gases. A Nuveyor ash-removing system is installed so that ashes can be

pneumatically disposed of into an ash-bin. The unit was supplied by the United Conveyor Corporation of Canada.

Feedwater is pumped by one of the three Byron-Jackson 1000 g.p.m. feedwater pumps to the three boilers. Two of them are electrically-driven and the remaining one has a turbine drive. The electric drives are 700 h.p. and turbine is a 600 h.p. Terry. The feedwater regulators and combustion controls were furnished by the Bailey Meter Co.

Extraction Turbine

Power is generated in a 21,760 h.p. hydrogen-cooled generator at 13,800 volts, driven by a double automatic extraction turbine operating at 600 p.s.i. and 750 deg. F. at the throttle and 1.5 in Hg. abs. at the exhaust. This unit was manufactured by General Electric Co.

The extraction takes place at the 180-lb. stage to the 180-lb. system, at the 80-lb. stage to the 80-lb. header and automatic extraction valves are installed to regulate the pressure at these stages. The steam admitted to the turbine and not taken off for extraction, goes through all the stages and is exhausted into the surface condenser — a Foster Wheeler product with a surface of 16,000 c. feet.

The full load figures at maximum extraction are:

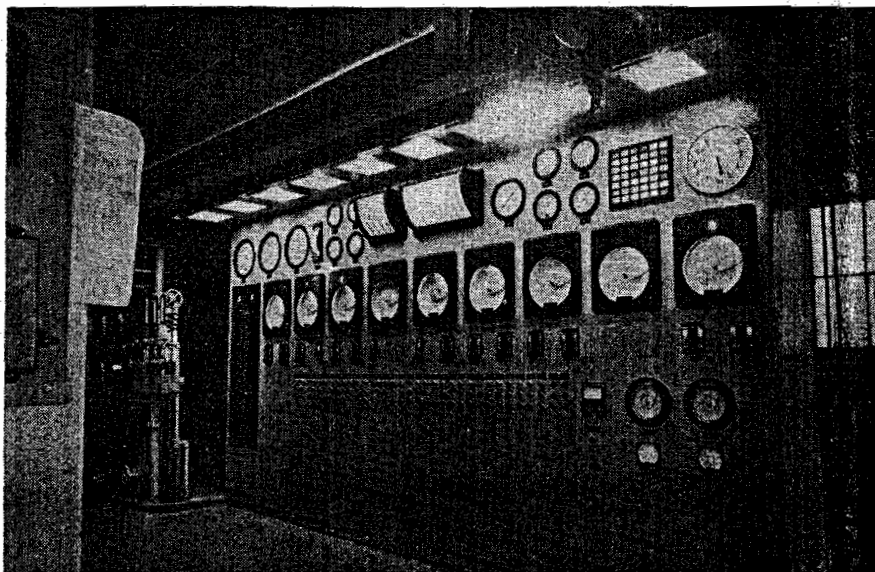
119,000 lb. through 180 lb. extr.
336,000 lb. through 80 lb. extr.
15,000 lb. to the condenser

This of course, can be adjusted to meet operating requirements.

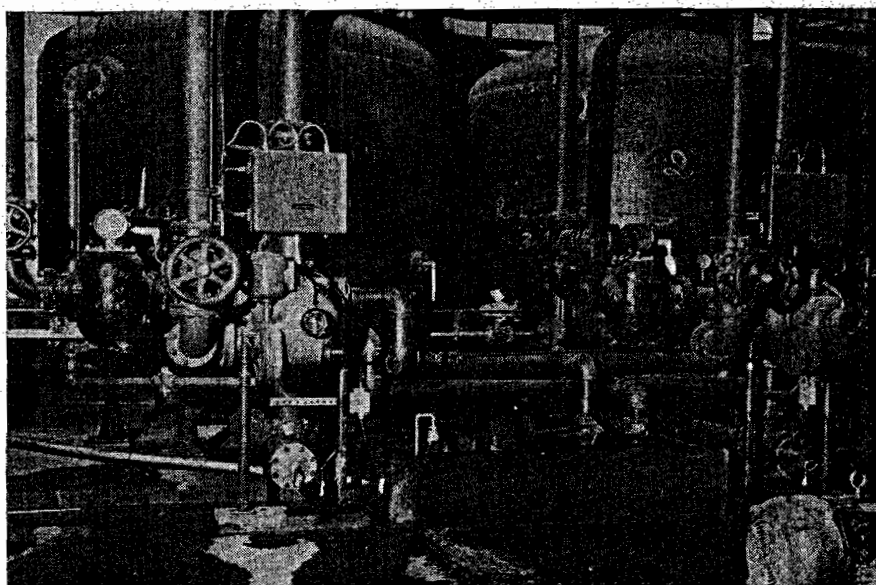
Air is removed from the condenser by a two-stage air ejector and the condensate transferred by a 150 g.p.m. condensate pump into a deaerating water.

The cooling water pumps are able to pump 6,500 g.p.m. of water through the condenser and are driven by 125 h.p. and 1,175 r.p.m. motors, against a 45-foot head pressure. The power supplied is 550 volts.

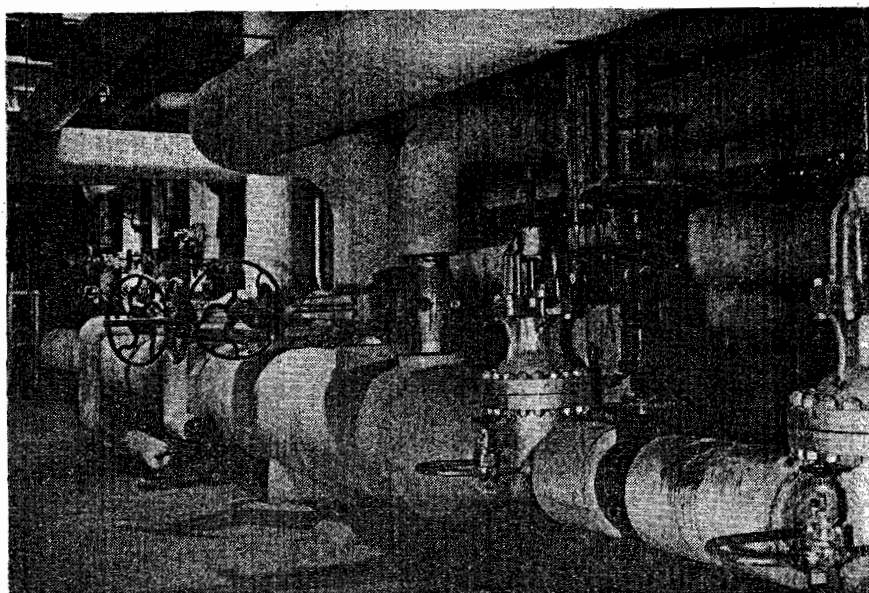
Two stand-by engine-driven generators of 1,000 k.w. are installed. Both are 2,300 v, 720 r.p.m. units driven by 16 cylinder, V-type engines. One uses diesel oil and the other uses natural gas or diesel fuel. Both engines were manufactured by General Motors. The power to the plant is delivered through the main switchboard. For distribution, 13,800 volts are used, 550 volts are used for power and 110 volts for lights.



Boiler operating panel.



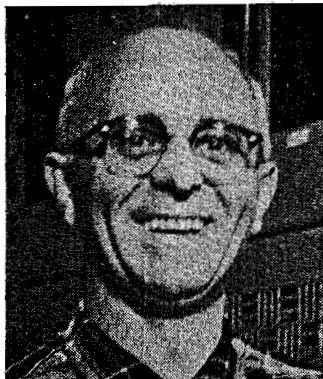
Two exchange units — boiler feedwater.



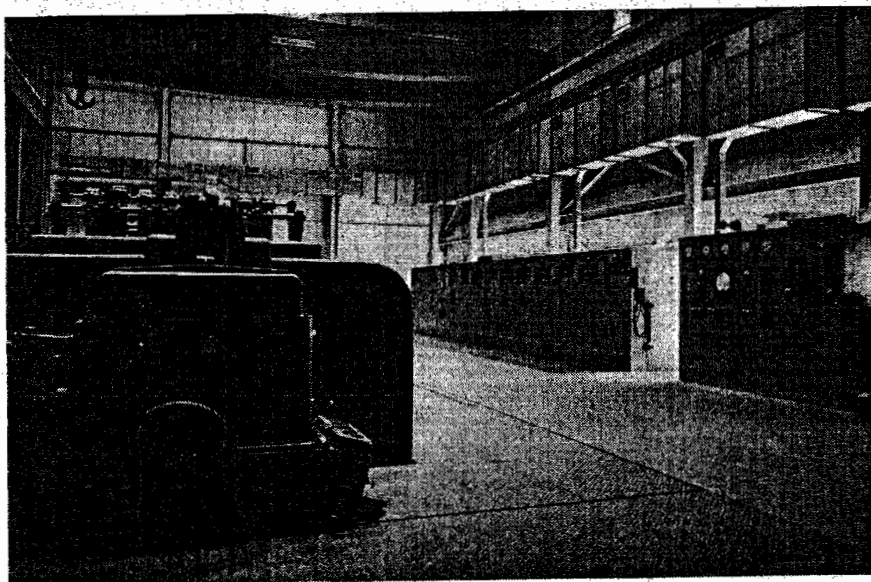
Steam header.



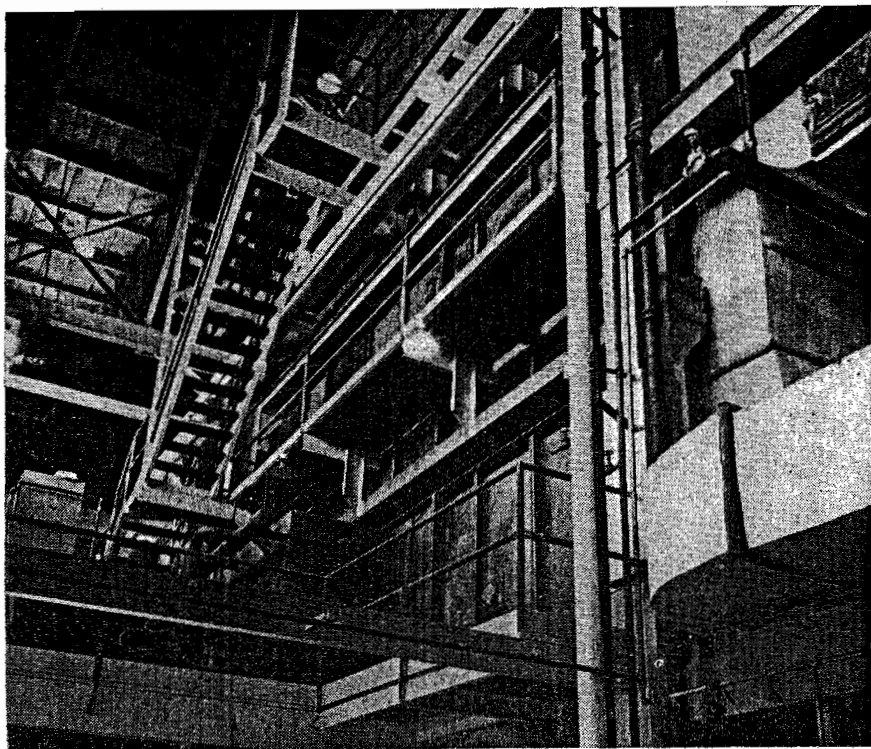
J. MARSH, chief power engineer at Hinton.



J. STEINGRUBE, chief electrician at Hinton.



Turbo-generator and panel board in power plant.



Vertical view of boiler.

Headers

The extraction steam from the turbine is discharged into a 24-inch, 80 lb. header and into a 14-in. 180 lb. header. The steam used in the process is taken from these headers. The auxiliary turbine drives also exhaust into the 80 lb. header. In cases where condensate returns may become contaminated, a combustion sample cooler conductivity cell and quick-opening valves are installed so that, should the condensate become contaminated, it is automatically dumped to sewer.

According to its temperature and nature, the condensate returns to flash tanks or to the deaerating heater. Flash steam from the flash tanks is led to the treated water storage tank in which the make-up of demineralized water is pumped. The water from the treated water storage tank can be transferred to the deaerating heater by one electric or one steam turbine drive pump capable of discharging 600 g.p.m.

The deaerating heater receives steam from the 80 lb. header that will be reduced to about 35 p.s.i. A low and a high temperature condensate connection is hooked into the top and the heating steam enters from the side. Underneath this heater is a 19,000 gallon surge tank.

Water for desuperheating the 80 and 180 p.s.i. steam is taken off the side of the surge tank to avoid chemicals entering the steam and the take-off for the boiler feed pumps is underneath. The sulphite is introduced into this suction line. Boiler water treatment consists of a demineralization unit supplied by the Permutit Company. This unit has a maximum capacity of 660 g.p.m.

Air Compressors

Compressed air for the entire mill is supplied by five electric-driven air compressors. Two of these units have a total capacity of 1350 c.f.m. compressed to 100 p.s.i.g. This air is used as general mill compressed air. Two of the remaining compressors supply 65 p.s.i.g. air to the bleach plant, their total capacity being 1060 c.f.m. Instrument air is supplied by the fifth unit which compresses 496 c.f.m. to 100 p.s.i.g. This air is filtered and dried immediately after compression.

Fire Pumps

For fire protection purposes water can be supplied by two turbine-driven and one electric-driven 250 h.p. fire pumps, at 110 lb. pressure having a capacity of 2,500 g.p.m. each.

Service Departments

THERE ARE TWO principal service departments which exist primarily to maintain mill operations and product quality at a high level. They are the Engineering and the Control departments.

Engineering Department

The Engineering Department consists of three sections; power, maintenance and design. It is headed by a chief engineer who is responsible to the resident manager and, from a functional point of view, co-ordinates the activities of the three groups with the general superintendent of the pulp mill.

The power section of the department produces the steam and electric energy required by the mill processes and has a chief power engineer in charge of its activities.

The maintenance section is headed by the plant engineer who has the responsibility of planning and carrying out the mill maintenance. Under him we find a master mechanic, a chief electrician and a chief instrument mechanic. The functions of the latter assume primary importance with the mill processes controlled in great measure by instruments.



R. S. WELCH, chief engineer at Hinton.



B. C. HOY, chief chemist at Hinton.

The plant engineer also assists the chief engineer in supervision of the direct engineering functions of design. In this section of the department there are a senior engineer, junior engineer and draftsmen.

In summing up, the Department's basic function is to develop, plan and apply ideas on sound engineering practice and to furnish engineering aid and advice to the plant as required. It must keep abreast of the development of new equipment and processes in the industry and bring them to the attention of management when they have an application to the plant.

Control Department

The Control or Technical Department concerns itself mainly with direct control of the product being manufactured and it aims at maintaining the quality at a top uniform standard. Secondly, it works towards improving the processes used to produce the product. It is headed by a chief chemist responsible to the resident manager. As with the chief engineer, the chief chemist and the general superintendent functionally con-



WALTER CHILDS, junior engineer.



PAUL GORA, senior engineer at Hinton.



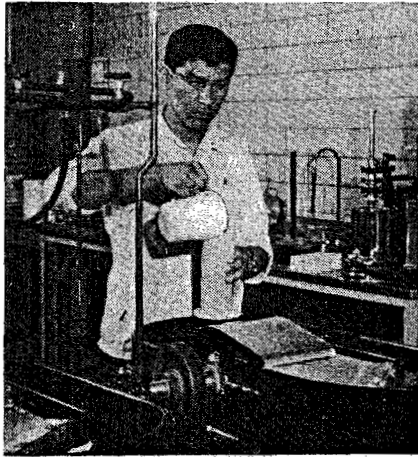
CLIFF. DICKINSON, engineering staff assistant.

trol the activities of the technical staff working on testing at various stages of the process.

This staff consists of the shift chemists, and various shift testers and technicians working on process or product tests. In the case of the chief chemist the control of these men is exercised for him by an assistant chief chemist who is also responsible for the conduct of the plant laboratory.

In addition to the staff mentioned, there is a project chemical engineer and an analytical chemist who are available for work in connection with new processes and products or who may be used to investigate current mill problems.

In brief, this Department concerns



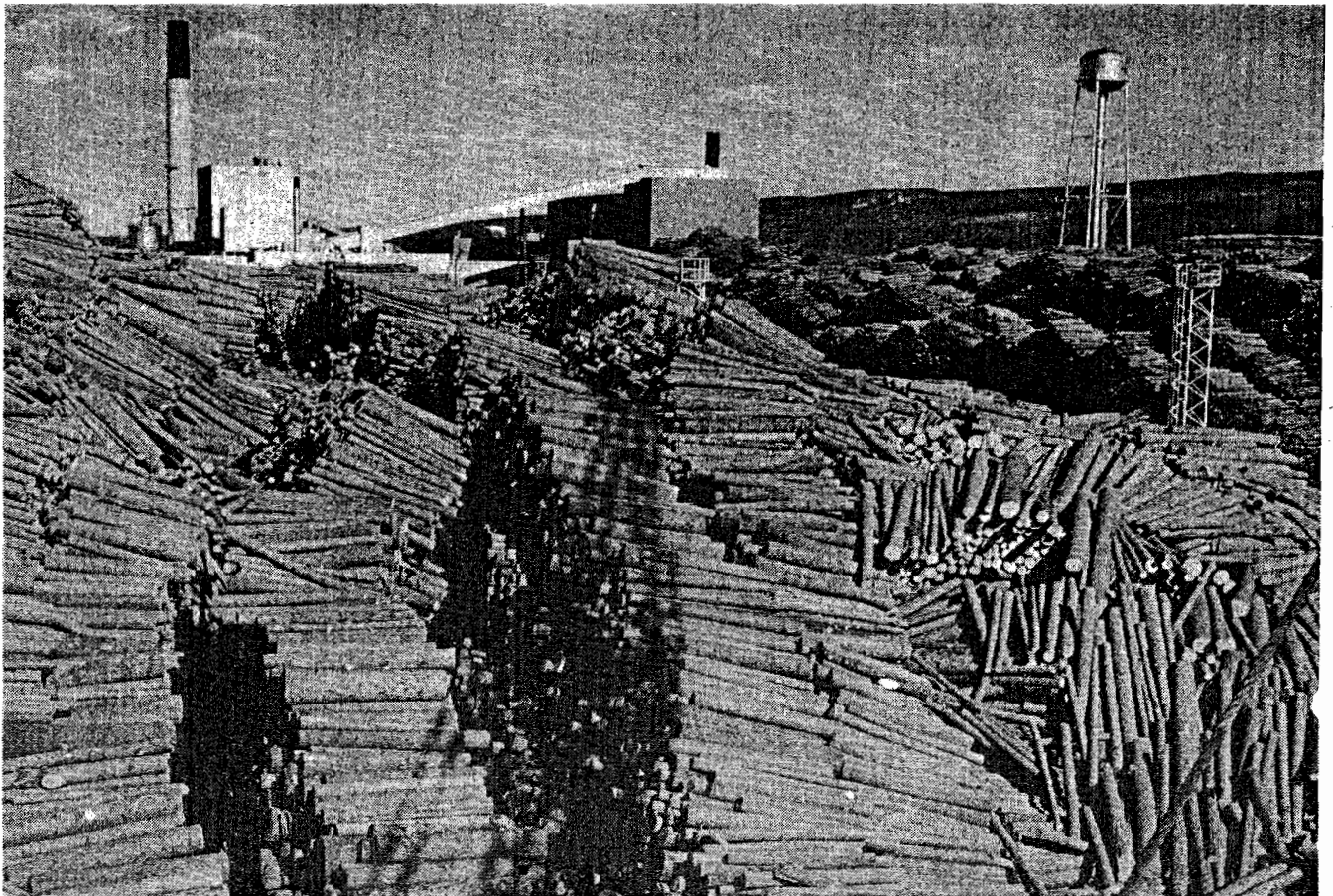
Control laboratory, showing miniature beater.

itself with maintenance of a uniform high quality product and at the same time is constantly searching for improved methods of production.

Before leaving the discussion of the Service Departments it should be recorded that each of them has access to advice and guidance from their corresponding staff departments of the St. Regis Paper Company.

In the case of the Engineering Department, the staff engineering group at St. Regis consists of specialists in their field and is headed by a vice-president of engineering. In the case of the Control Department, advice and assistance is furnished from the Control Technical Department of St. Regis at Deferiet, New York State.

Hinton Mill From Woodyard



Industrial Relations and Training

THE DEPARTMENT of industrial relations is a company service organization performing functions for all company employees. It embraces personnel work, safety, first aid, plant security, labour relations and training. It is headed by a manager, directly responsible to the resident manager, and who delegates many of his duties and responsibilities to a personnel supervisor. Assisting, and responsible to the personnel supervisor, are a housing co-ordinator, plant nurse, chief guard and safety supervisor.

The main work of the department may be broken down into the following headings —

1. Employment of suitable personnel for job vacancies available.
2. Salary and wage administration, job evaluation, hours of work, etc.
3. Working conditions.
4. Employer-employee relations such as labour contracts, etc.
5. Safety program.
6. Health, including first aid. The company has arranged to have two doctors available on a part time contract basis — one for the woodlands personnel and one



WAYNE SMITH, director of training for St. Regis Paper Company, and advisor on training at North Western.



WAYNE SAWYER, manager of industrial relations at North Western.

- for the mill personnel.
7. Training of employees to upgrade their knowledge in all fields and to prepare them for promotion.

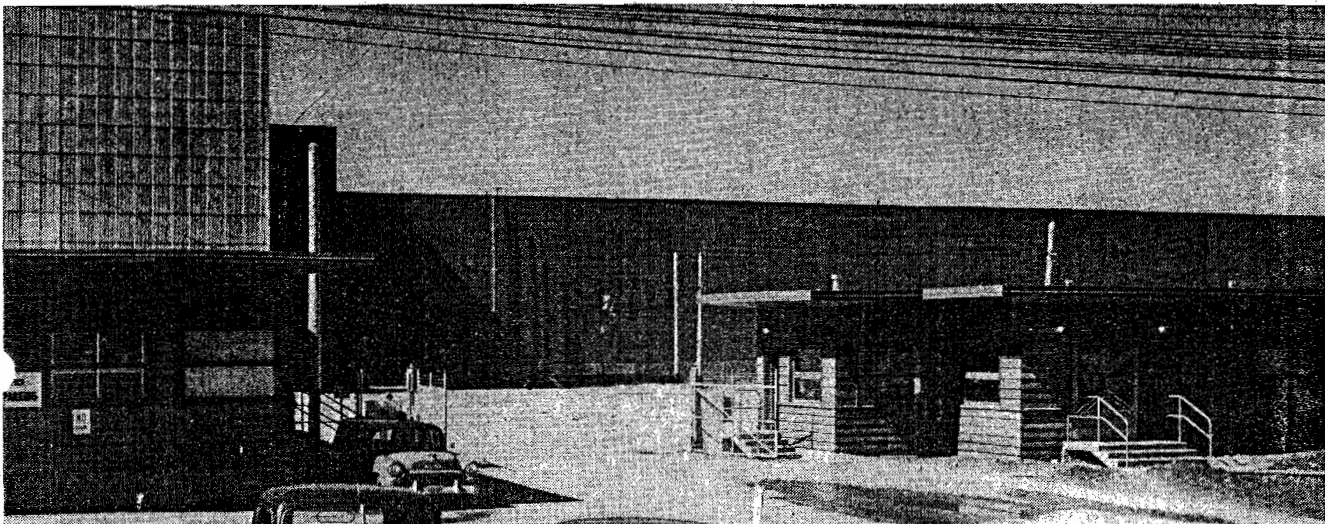
The policy of the company in respect to its employees follows that of the St. Regis Paper Company. It emphasizes that a good company union attitude is necessary for any successful enterprise and that company union co-operation is a prerequisite to efficient overall operation.

This policy is reflected in the existing good relations prevalent at the mill and in the woodlands operation.

The company has inaugurated the usual "fringe benefit" plans, such as group insurance, etc., and has seen that reasonable accommodation has been provided for single or married men. In the case of the latter, the company will help in various ways in the purchase of suitable houses.

Mill Seniority Rule

Due to the desire of the company to employ as many Albertans as possible it was necessary to inaugurate a far-reaching training plan. After much thought and discussion it was decided to adopt mill seniority in the operating department, in lieu of the usual



Main entrance to mill yard. Industrial relations and first-aid building on left, guard house at right.

department seniority. This decision in effect meant that junior helpers, starting in the wood room, would progress with promotion to helpers in the pulping operation and machine room. Eventually they would become equipment operators in one department after another and, if capable, eventually become a pulp group operator, the highest paid hourly job. This departure from accepted practice has necessitated a far-reaching training program, as every man working on an operating job must be trained to do the job next on the line of promotion.

Before initiating this program the personnel department and the operating supervisors were receiving applicants for employment.

Each application was acknowledged and carefully investigated. Teams of supervisors travelled to various areas, interviewing applicants and selecting them for employment. In so far as possible, each supervisor was given the opportunity to employ his own crew. A detailed schedule of employment and starting dates was drawn up. Generally, the more skilled personnel reported first, followed by the semi-skilled, and then those with little or no training.

Personal Briefing

Operating crew reported in Decem-

ber, 1956. Employees were met by their immediate superiors, aided in obtaining living accommodations, clearing through the personnel department and made to feel as welcome as possible. Groups were formed and the resident manager and the general superintendent met each new employee personally and welcomed him to Hinton. They were briefed on the background and history of the company, and its policies.

Thorough Training Program

Detailed training and a step-by-step study of the operation followed on a department level. Employees were acquainted with operating instructions, equipment manuals and design specifications for each phase of the job. Detailed process flow charts were prepared. In addition, a considerable amount of time was spent in the mill itself examining equipment and actually tracing the process flow charts. A final period of classroom-type of discussion reviewed the findings, answered questions, and rounded out the program.

As the various units of the plant were completed, the operating crews inspected each department and its equipment and, together with the engineering department, made recom-

mendations for changes where needed. All equipment was thoroughly tested, pumps were checked for packing and direction of rotation, gaskets inspected, conveyor lines operated, and completed circuits were tested using water and simulated operating conditions.

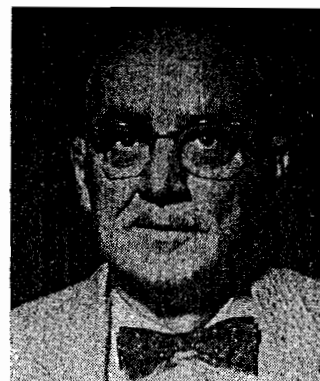
Training and indoctrination into company policy were slated not only for the hourly rated employees. The mill's complete administrative and supervisory staff were assembled in Hinton by November 1, 1956, and a week later, a comprehensive training program was instituted. All members were acquainted thoroughly with all aspects of the operation, and carefully reviewed company policies, practices and organization. These sessions also enabled staff members to become fully acquainted with one another and to define their respective areas of responsibility and authority.

Four weeks of formal training on each aspect of the operation of the mill, together with open group discussions, question and answer periods, and written materials, equipped each supervisor with a solid background of information on his own particular job and likewise enabled him to serve as the instructor for his own operating group.

KEY MEN AT THE HINTON MILL



Left: A. THOMAS EASLEY, resident manager at Hinton, formerly acting as resident manager of the northern New York paper mills of St. Regis.



Right: A. C. McCORRY, superintendent at Hinton, formerly pulp superintendent at the St. Regis mill in Tocoma, Wash.

Administration

THE NORTH WESTERN Pulp & Power Ltd. establishment at Hinton is managed and administered by a resident manager responsible to St. Regis Paper Company. He is assisted in his duties by the various senior mill and woodlands supervisory personnel and by the office administration group.

Supervisory Personnel

The former consists of the general superintendent of the mill, the pulp mill superintendent, the chief engineer, the chief chemist, the resident woodlands manager, assistant woodlands manager and the chief forester.

The general superintendent is responsible to the resident manager for

all aspects of the mill operation from and including the wood yard to loading the baled pulp into cars for shipment. His main function is co-ordinating the various departments under his charge and seeing that a steady flow of uniform high quality pulp is produced at an acceptable cost. He is assisted by a pulp mill superintendent, a wood room superintendent and a chief scaler.

For staff assistance he can count on the chief chemist and control department head and upon the chief engineer and his maintenance and power sections.

The resident woodlands manager is responsible to the resident manager for the operation and supervision of

his department. It is his responsibility that the mill requirements for wood are met on schedule and that wood costs delivered at the mill stay within the budgeted figure. He is responsible for carrying out the company's obligation to the Alberta government in respect to the management of the leased forest areas.

He is assisted in these duties by the assistant woodlands manager in charge of operations and by the chief forester.

Administrative Personnel

The latter group consists of the industrial relations manager, the public relations manager, the office manager, the purchasing agent and the traffic



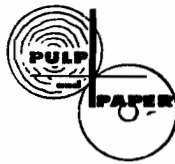
Management representatives of the new Hinton mill of North Western Pulp & Power Limited are shown here in the conference room at the mill.

Left to right — Far side of table: A. T. Easley, resident manager; Mrs. M. Rows, secretary; G. D. McNab, resident woodlands manager; R. S. Welch, chief engineer; W. H. Sawyer, industrial relations manager; D. Smith, pulp mill superintendent B. C. Hoy, chief chemist; A. C. McCorry, general superintendent.

Left to right — Near side of table: D. I. Crossley, chief forester; W. C. Allen, office manager; L. A. Veats, purchasing agent; S. G. V. Hart, assistant woodlands manager; G. L. Moorhouse, traffic manager.

Note: — R. Huth, public relations manager, absent at time of photograph.

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