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Looking beyond the stumps

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The Foothills Model Forest
Adaptive Forest Management/History Program
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of a 1970s Environmental Campaign

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A Forest Resource Improvement Program
Open Funds Report

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CONTENTS

OVERVIEW OF PROJECT

During the late 1960s and early 1970s, the environmental group "Save Tomorrow Oppose Pollution" (STOP) was casting a critical eye on forest industry practices in Alberta. One of its members, Arnim Zimmer, was a critic of forestland management and forestry practices. During the period of 1971–72, he compiled a pictorial essay exposing what he claimed to be environmentally destructive logging practices and regeneration failures of clear-cut logged areas in the Forest Management Agreement area (FMA) of North Western Pulp and Power Ltd. near Hinton. His claims were highlighted in a 1972 report, which precipitated a number of meetings between STOP, mainstream media and the Minister of Forestry, Lands and Wildlife.

Mr. Zimmer's findings and the resulting adverse publicity in the media resulted in a number of actions by the Department of Lands and Forests, as well as the Company, which included the identification of ground photopoints and specific examination of the issues raised.

In 1972, Dr. Kare Hellum, head of silviculture for the Alberta government, examined the individual logged areas described in Mr. Zimmer's report, and prepared a document in response.

In the mid 1990s, Steve Ferdinand, a government forester and former head of silviculture for North Western Pulp and Power Ltd., was driving through the forestlands south of Hinton when he came upon a reforested cutblock that sparked memories of the same block in the 1972 STOP report. This stimulated the idea of revisiting the old reports and establishing their status from the perspective of decades of elapsed time.

Thirty-five years after these events, the individual logged areas have been revisited and re-photographed, and their silvicultural status determined. The result is this status report on their current condition relative to the assertions in the STOP report.

The authors of this report have made every effort to accurately and faithfully identify the blocks contained in this report through careful review of the earlier reports, maps and records. Both Mr. Zimmer and in particular Dr. Hellum, while omitting to identify the individual blocks by number, provided enough information in the text of their reports and in the accompanying maps that we are confident in our selections. Naturally, the passage of time and rapid growth of regeneration have made individual cutblocks hard to segregate, as one blends into the next, but landmarks, topography, roads and trails have remained and these facilitated the process.

ACKNOWLEDGEMENTS

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DISCLAIMER

The views and statements expressed in this report are those of the authors, and should not be construed as statements or conclusions of, or as expressing the opinions of, the Foothills Model Forest or its partners or sponsors.

FOREWORD

By Dr. Peter Murphy
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The timing and allegations of the STOP 1971 report came as a surprise to foresters in Alberta. By that year most foresters felt that at long last they had been able to get sustained-yield forest management well established in Alberta. Rates of logging were being set by forest management plans based on inventory and knowledge of tree growth. There was also a universal requirement to promptly reforest logging areas. It had been a long struggle, dating back a full 100 years to 1870, when these lands became part of the Dominion of Canada.

For 200 years prior to 1870 the fur trade dominated this country led by the Hudson's Bay Company (HBC), which was established in 1670. In 1867, when the four eastern provinces formed the Dominion of Canada, the new nation arranged to purchase the HBC lands while Britain transferred its adjacent North Western Territories to the Dominion. These additional lands became the North West Territories, from part of which the Province of Alberta was established in 1905.

Timber supplies in the forests of future Alberta were not a major concern at that time, but the extensive forest fires were. The fires were dangerous and destructive, resulting in tangled windfalls in many burned areas making travel extremely difficult. The perceived waste of timber combined with the concerns about maintaining water supply for the prairies led in 1899 to the creation of the Dominion Forestry Branch (DFB). For the next 31 years the DFB set up forest reserves and attempted to control forest fires and understand the extent of the forest lands. However, it did not have enough resources to do any reforestation.

In 1930, the forests and other resources were transferred from the federal government to Alberta, thus giving birth to the Alberta Forest Service (AFS), now part of the department of Sustainable Resource Development. At that time Alberta was a "have-not" province with a sparse population and little income. Conditions worsened during the drought and economic depression of the 1930's, then the wartime years to 1945 meant that there was still no money and no labour available to do much in the way of "forestry" except to try to prevent forest fires. However, post-war recovery improved appreciably in the 1950s when petroleum activity increased. At this time the prevailing hope for reforestation was that "nature" would eventually regenerate burns and cutovers, which was often a long and slow process.

In 1949, Alberta passed a new Forests Act that gave forest management and reforestation a higher priority. The Act also enabled the province to negotiate long-term 'pulpwood leases' with a condition that the areas be managed to grow "continual and perpetual" crops of forest products – which meant regulated management and ensure reforestation.

When the first pulpwood lease agreement for a mill was signed at Hinton in 1955, it contained those strict requirements that successful reforestation must be achieved. The company, North Western Pulp & Power, Ltd., hired a nationally renowned research forester, Mr. Des Crossley, to head their forest management program. Crossley had been doing research on lodgepole pine and spruce regeneration in Alberta during the late 1940's and 1950's and had developed techniques that worked. Applying those scientifically demonstrated treatments at a working scale was a challenge that he and his team tackled with enthusiasm and skill. Simply put, lodgepole pine typically seeded-in after forest fires from seed stored in its fire-resistant cones. These seeds, falling on the exposed mineral soil germinated and thrived in the open sunlight. White spruce, on the other hand, regenerated well in the forest where bare soil would receive the annual and periodic seed fall from the adjacent trees. In both cases the cut blocks were designed to take advantage of the natural seed sources and the cutover areas were "scarified" to expose mineral soil and mix it with the organic litter to provide suitable seed beds. The cutover blocks therefore appeared "messy", some would say "terrible" in appearance. In response, Chief Forester Crossley would respond along these lines "no, it is not terrible. It's exactly what we want, starting a new crop all the same age. Leaving the stumps and the terrain rough like that means the young seedlings can get a start in some sort of shelter among the hollows and crannies. It stops erosion. If water starts to move it will hit this junk left there and won't carry a silt load very far."

Seeing the resulting regeneration was also rewarding. Crossley delighted in taking visitors to cutovers to see for themselves the young seedlings throughout the logged and scarified areas. A companion forest nursery program provided seedlings that could be planted to fill in areas that did not regenerate naturally – this was done after the cutovers were roughly checked.

This was the first time in Alberta that deliberate efforts had been made to successfully re-establish forests after logging. Foresters were pleased with the results. In fact, all new leases for Alberta's forests that followed included the same basic reforestation requirements, along with other practices needed to ensure sustainable forest management. By 1966, mandatory forest regenerations had been accepted by the entire forestry sector, including the extensive sawmilling industry. Regeneration standards had been set up with periodic field inspections to check on success and remedial treatments as needed.

So, it was a surprise when the STOP report was released with its sweeping allegations and criticisms about forestry practices.

Since this was the first large-scale forest harvesting operation in Alberta, the scope and appearance of the cutovers were undoubtedly a surprise to the STOP members as well. The logged areas, bereft of trees and featuring stumps and slash, were certainly in stark visual contrast to the remaining forest. However, these cutovers actually represented well-prepared seed beds with reduced fire hazards, whose appearance was soon softened by a new green of thousands of seedlings. It is unfortunate, in retrospect, that the concerns were expressed as confrontation, but the STOP submission was effective in stimulating discussion, through which a large measure of public understanding was generated. In 1972, company and government foresters already had a system in place to monitor forest renewal on cutover areas, so were perplexed about the reported findings in the STOP submission. They immediately went back to the forest to find those specific photo locations illustrated in the report to see for themselves.

This is the story about what they found and did. With aid of comparison photographs taken at a time and at later intervals to the present, this story shows how the inherent resilience of the forest; along with applied forest management practices can, indeed, result in successful forest renewal and sustainability.

1. INTRODUCTION

During the late 1960s and early 1970s, the environmental group "Save Tomorrow Oppose Pollution" (STOP) was casting a critical eye on forest industry practices in Alberta. One of its members, Arnim Zimmer, was a critic of forestland management and forestry practices. During the period of 1971–72, he compiled a pictorial essay exposing what he claimed to be environmentally destructive logging practices and regeneration failures of clear-cut logged areas in the Forest Management Agreement area (FMA) near Hinton. These were presented in a 1972 report, which precipitated a number of meetings between STOP, mainstream media and the Minister of Forestry, Lands and Wildlife. (Appendix I)

The findings of Mr. Zimmer were subsequently refuted through actions of the Forest Service and this went a long way towards deflating the controversy at the time, although it is often easier to heighten concerns through inflammatory charges than it is to put the concerns to rest through pragmatic investigation and factual reporting.

In this review, we present the assertions of Mr. Zimmer and STOP along with the 1972 field review and report of Dr. Hellum in his never-before-published study, in conjunction with subsequent photo reviews conducted in 1997 and 2006.

2. THE 1972 STOP REPORT (ZIMMER REPORT)

Following Mr. Zimmer's 1971 field trip and photography project on North Western Pulp & Power Ltd.'s Forest Management Agreement area (now West Fraser's Hinton Wood Products' Forest Management Agreement area), he prepared a written report and posters detailing his findings and his assertion of environmental degradation and failed reforestation. These were presented to the Minister of Lands and Forests and to the news media in June 1972. The photo essay together with the written and tape-recorded commentary became known as the Zimmer Report (Appendix 1). Mr. Zimmer held both North Western Pulp & Power Ltd. (N.W.P. & P.) and the Alberta Forest Service culpable for the alleged sad state of affairs on the FMA area.

As part of his expose N.W.P. & P.'s supposedly destructive practices, Mr. Zimmer prepared a tape-recorded report with accompanying slides. Here is part of the introduction to this presentation by Mr. Zimmer:

> *"Ladies and Gentlemen, the slides you are about to see have been photographed in the lease area of North Western Pulp and Power Company Limited, the pulp-mill operation at Hinton, Alberta. The slides and this tape recording are part of a brief submitted to the government by STOP - Save Tomorrow Oppose Pollution. This organization here wishes to express their concern and wishes to bring to the attention of the government concerns shared by many other Alberta citizens in respect to environmental damages which were found and exist in that pulp mill lease area. Examples of these damages will be seen on these slides and the nature of the damages found was described in the brief submitted to the government by STOP.*
>
> *"I have done much work on this research project for STOP. I guided the photographer into the Hinton pulp mill lease area and pointed out these scenes which to photograph. I subsequently prepared a report for STOP outlining my findings, the report was entitled Keep Alberta Green. A copy of this report was made part of the brief to the government. I also did much research for this brief to the government."*

This report and its highly touted accusations of environmental mismanagement became very popular with the media. Considerable attention was given to Mr. Zimmer, who quickly garnered a commanding position in challenging proven forest science and acceptable forest harvesting practices common throughout western North America.

3. FOREST SERVICE AND COMPANY RESPONSE

Mr. Zimmer's findings and the resulting adverse publicity in the media aroused consternation and dismay in the Alberta Forest Service, which viewed his findings as a direct criticism of its stewardship over Alberta's forest resources and the companies conducting operations therein. Meanwhile, Des Crossley, the Chief Forester of North Western Pulp & Power Ltd., and his Head of Silviculture, Steve Ferdinand (one of the authors of this report), viewed the STOP report with an attitude verging on apoplexy. Des Crossley — a distinguished silvicultural researcher of the

Canadian Forest Service – had been hired by the Company in 1955 to develop and implement a sustainable forestry program on the Hinton forestlands, and he was justifiably proud of his accomplishments since then. The innovative and co-operative approach that he and his staff developed in partnership with their Alberta Forest Service counterparts was already widely recognized and applauded throughout Canada and internationally. The STOP report was a harsh denunciation of everything he stood for.

Fred McDougall was the Director of Forestry for the Alberta Forest Service at the time and was alarmed and incensed at this condemnation of his Department's role as steward of the forests of Alberta. He dispatched his Head of Silviculture, Dr. Kare Hellum (who later became Professor of Silviculture at the University of Alberta), to identify all of Mr. Zimmer's cutblocks and photopoints and conduct a careful examination of the charges levelled in the STOP report.

Dr. Hellum located Mr. Zimmer's original photopoints and re-photographed them in 1972. He examined the status of regeneration in the cutovers both on the ground and as reported in the Company's own silvicultural records and found the STOP assertions to be entirely without foundation in respect to forest renewal. In September 1972, he prepared a response report that was used by the Company and the Forest Service to effectively refute the assertions contained in Mr. Zimmer's report. This review was the basis for this retrospective. However, it should be noted that Dr. Hellum's report was never published and its inclusion as Appendix II in this report is its first public unveiling.

Dr. Hellum's rebuttal of the Zimmer Report begins:

> *"The brief and slide presentation which Mr. A. Zimmer presented to the Minister of Lands and Forests on behalf of the S.T.O.P. organization of Edmonton in June of 1972, charged North Western Pulp and Power Ltd. with improper forest management and poor silvicultural practices and inferred inadequate governmental control over industry activities in these fields. This presentation is intended as a reply to Mr. Zimmer and to S.T.O.P. and it is based in its entirety on Mr. Zimmer's slides and verbal commentaries thereon.*
>
> *"It is widely recognized by foresters in Alberta that the S .T .0. P. brief is mainly based on aesthetic views and not on facts. The following presentation substantiates this view with field measurements and professional experience in the fields of silviculture and tree biology.*
>
> *"The approach used in this response to Mr. Zimmer and to S.T.O.P. was to relocate in the field the exact locations of as many of Mr. Zimmer's 64 photos as possible in order to evaluate his*

charges that logging and scarification remove all chance of reforestation by creating 'desert' environment for trees. By choosing Mr. Zimmer's field locations one could not be charged with bias of sample nor with evasion of issues. Sample plots were put in areas photographed by Zimmer and all conifers seedlings staked with 4' stakes and re-photographed. These plots were placed as near to the center of each location as physically possible and wherever possible made to span the full angle. Plots 100 feet wide were located in the field and 200 seedlings staked extending the plots into the picture as far as necessary to tally this number of seedlings.

"Mr. Zimmer also charged that scarification and logging cause erosion, that the North Western Pulp and Power Ltd. had logged to the edge of three permanent water courses (in violation of legal agreement not to log closer to permanent water course than 66 feet) in addition to the damages caused the environment for regeneration by scarification and clear-cutting large tracts of timber. Also these charges will be answered in some detail by referral to field observation, to cut records, and to published information on matters of erosion and water flow.

"A total of thirty-five black and white photographs were taken by Mr. Zimmer to depict how current forestry practices by North Western Pulp and Power Ltd. (henceforth referred to as N.W.P.&P.) of Hinton damage the forest environment and prevent the establishment of new forests. These photographs were taken in only nine areas and of these two locations depict what Mr. Zimmer calls 'preferable' stocking."

The two areas Mr. Zimmer considered satisfactorily regenerated are located in the Gregg River Burn south of Hinton, which was grossly overstocked to lodgepole pine following a large forest fire in 1956.

4. METHODOLOGY – THE 35 YEAR REVIEW

The STOP report, informally known at the time as the Zimmer Report, had value to the extent that it helped to arouse public interest in forest management and forestry practices. Additionally, the two sets of photographs taken by Mr. Zimmer and the Forest Service presented a unique opportunity for "time-lapse" photography. This was done in June 1997 by Steve Ferdinand and Bob Stevenson (25 to 26 years after the Zimmer photos were taken), under the sponsorship of Weldwood of Canada Ltd. (now, West Fraser Mills Ltd.). Most areas were photographed again from as close to the original photopoints as could be identified, but were taken from a helicopter

hovering at low altitude, since the forest regrowth blocked the view for ground-based photography with the same viewscape as the original photos. Today, the areas cited by Mr. Zimmer as suffering from serious soil erosion caused by log skidding, road building and site preparation operations appear well vegetated and are fully compliant with reforestation regulations.

In 2000, silviculturist Lynn Bergeron of Weldwood (now West Fraser), conducted an ecological assessment of most of the Zimmer blocks in Dr. Hellum's review, examining the soil types, vegetation identification and composition, forest cover type, silvicultural history respecting date of harvest, site treatments and planting (if any) to bring the logged area to a "satisfactorily restocked condition."

The Zimmer blocks were visited again by Bob Udell in the summer of 2006, during a West Fraser repeat photography project. Fresh images were recorded on the ground, including geographically referenced (latitude/ longitude) photopoints, along with new aerial images from the vantage point of a helicopter, most taken with the assistance of photographer Brian Carnell. A few of the blocks so visited were also included in his project report, available through the Foothills Model Forest Website as Report #7 in the Adaptive Forest Management/History Program.

This 2007 report uses four sets of pictures: the Zimmer photos taken in 1971, those taken by the Alberta Forest Service in 1972, the 1997 helicopter photography project and the 2006 ground/ helicopter image set. The comments for each of Zimmer's photographs are quotations from his original presentation. Comments for the Forest Service photographs are excerpts from Dr. Hellum's response to Mr. Zimmer's statements. The full text of each of these is found in the appendixes but would be too cumbersome to include in this summary review. The most recent photographs generally speak for themselves. However, current observations were compiled by Robert Stevenson, Steve Ferdinand and Robert Udell.

Mr. Zimmer's photo essay covered two separate areas within North Western Pulp and Power's Forest Management Agreement area (now, West Fraser Mills' Forest Management Agreement area). The first is in the McLeod Working Circle, presently part of West Fraser's "Crossley Forest" and the second in the Berland Working Circle, part of the "Loomis Forest." All locations are within easy reach of existing and former logging roads and trails and some are adjacent to primary and secondary highways. Most of the initial photographs were taken from roadside stations while photography for the 1997 and 2006 projects used helicopters to get above the five to 10 metre high regeneration to get a proper view of the formerly clear-cut areas. The 2006 project added ground photopoints for future reference.

In conducting and reporting on his survey, Mr. Zimmer tended to move from place to place with no apparent logical sequence. In this review, the authors have taken the earlier work and organized it in a more logical sequence by Working Circles and Operating Compartments. The Hinton Forest is divided into five landscape divisions known as Working Circles (Athabasca, Marlboro, McLeod, Embarras and Berland) and each Working Circle is further subdivided into numbered Operating Compartments. Harvest areas within Operating Compartments (e.g. McLeod 6) are further designed into blocks. These subdivisions are the basis for the STOP report and this retrospective.

5. SUMMARY OF FINDINGS – 1997 AND 2006 REVIEW OF ZIMMER REPORT BLOCKS

Without exception, the blocks so roundly condemned by Mr. Zimmer in his 1972 report are fully and satisfactorily regenerated as required under Alberta forest regulations (Appendix III), except for one or two cases where highway right-of-ways and gravel excavations have destroyed and prevented regeneration. All of the logged areas presently support thriving young forests growing at rates that exceed those of the fire origin forests that they replaced. The findings of this 35-year review are consistent with the observations of Dr. Hellum 35 years ago and are in stark contrast to the assertions and dire forecasts of the Zimmer Report. Indeed, an examination of these areas today highlights the resiliency and remarkable productivity of these areas, contrary to the 1971 images, most of which were either taken immediately after harvest or in areas not representative of the corresponding cutblock as a whole, and the attendant commentary by Mr. Zimmer respecting the harvested sites.

The ensuing pages of this report examine, block by block, the areas contained in the 1972 Zimmer Report including Mr. Zimmer's 1971 images, Dr. Hellum's 1972 images, and the 1997 and 2006 images. Mr. Zimmer's observations along with those of Dr. Hellum and the more recent visits by the authors of this report are presented, along with information on ecological classifications and maps of the areas. Quality of the Zimmer (1971) and Hellum (1972) photographs is often poor, as they are copied from old slides and faded original photographs. Nonetheless, they are clear enough – some remarkably so – to reflect the text outlined in the respective discussions. Recent photographs highlight the excellent forest regeneration and the resiliency of these productive, sustainable stands. For the record, every block that Mr. Zimmer and Dr. Hellum visited has been treated for reforestation (scarified and/or planted), was subsequently surveyed to ascertain the status of the reforestation and is classified as sufficiently regenerated under Alberta reforestation

regulations. Some blocks were so well stocked that they were subsequently thinned to reduce overcrowding and facilitate better growth on the trees remaining.

Readers of this report are encouraged to visit the Zimmer blocks and use this information to see first hand the living proof of good forest management and the genuine efforts of a dedicated staff to ensure sustainable growth and life in a viable, enduring ecosystem for years to come.

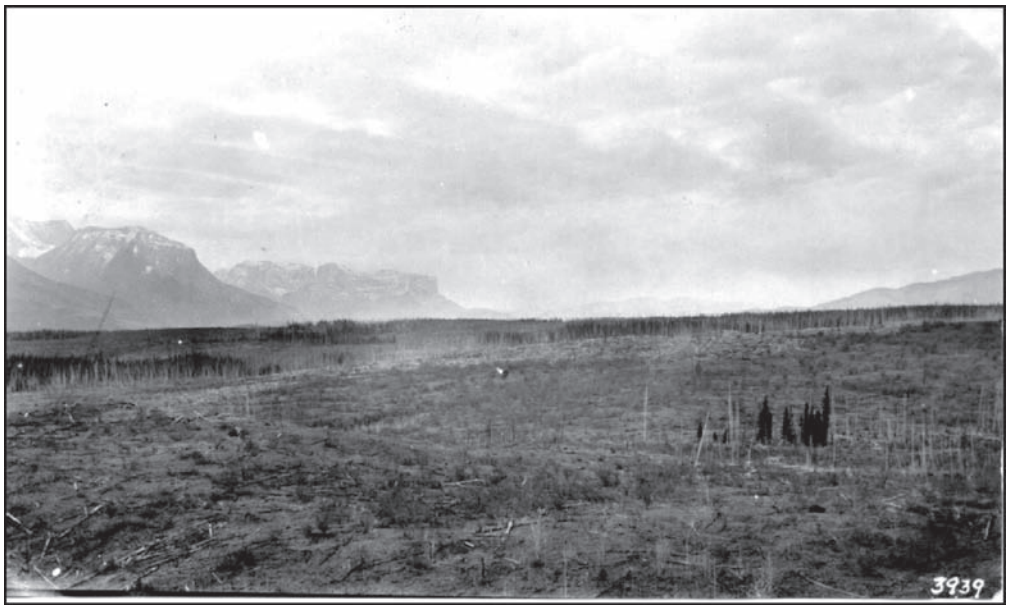
6. HISTORICAL PERSPECTIVE

In light of the controversy created by the Zimmer initiative over logging activities of the 1960s, it is worth reflecting on the landscape from which these forests evolved. Some images taken in the Hinton area by Dominion Forestry Branch foresters in 1912 highlight the widespread impact of uncontrolled wildfires and the results of relentless demands for timber by local coal mines and expanding railroads. At this time, the Dominion Forestry Branch began to take control of these lands. Forest reserves and districts were established with a staff of foresters and rangers in place to protect against fire and to regulate logging. Inventories of the timber and surveys of lands within the various districts also provided a basis to manage and assess these areas for water and non-timber values.

Much of the timber harvested on West Fraser's Forest Management Agreement area since 1955 originated from natural regeneration induced by forest fires prior to and at the turn of the last century. The 2006 image that follows the second 1912 image below shows a similar perspective of a landscape of mixed fire-origin and regenerated forests under a regime of active forest management and fire protection.

Alberta Forest Protection Historical Photo Collection

Dominion Forestry Branch 1912 photo of the north slope of the Athabasca Valley Twp. 52 Rge. 25 W 5th. Commentary on back of photo reads, “badly burned countryside, only scattered conifers left.”



Alberta Forest Protection Historical Photo Collection

This Dominion Forestry Branch (DFB) 1912 photo shows a burned over landscape looking west between the Athabasca River and Prairie Creek Twp. 50 Rge. 25 W 5th.

Udell/Carnell 2006

The same perspective in 2006: a mixture of fire-origin and regenerated forests under an active management regime.

7. THE ZIMMER BLOCKS

A. McLEOD WORKING CIRCLE: COMPARTMENT 2, BLOCK 509 (ZIMMER PHOTO 26)

Zimmer 26 (1971)

Hellum (1972)

Stevenson & Ferdinand (1997)

Zimmer:

"This one has been taken on the highway from Hinton to Luscar, a new highway; as a matter of fact this very same washout which again is not caused by the road but is caused by the clear-cut on the left side".

Hellum:

The erosion in photo 24 and 26 are again the result of the new Luscar road having changed the angle of flow in a small stream. This erosion is probably again accentuated by the logging (1969-70) but should not be blamed entirely on this operation.

2006 Review:

Over the 30 year period since Zimmer's comments, the roadsides and adjacent borrow pits have re-vegetated to a mix of aspen and poplars with subordinate shrubs and grasses. There is no evidence of erosion scars. The adjacent cutblock was scarified in 1969 and planted in 1974 and 1978 and was 86% stocked in 1982. The low-level aerial photograph of the Gregg River Valley immediately west of the Gregg Cabin shows the tree, shrub and grass communities characteristic of this area. Since Zimmer's visit in 1970, the area has sustained major flood damage at various times which resulted in bridge and road washouts. Despite these natural events the area's vegetation and landscape is vibrant and stable. Also, since Mr. Zimmer's photograph, Alberta Transportation has continued to maintain the wide right of way of Highway 40 in grass and herbaceous vegetation.

In the 2006 re-photography project, air and ground images were taken encompassing the areas castigated in the Zimmer report. These are shown on the next page.

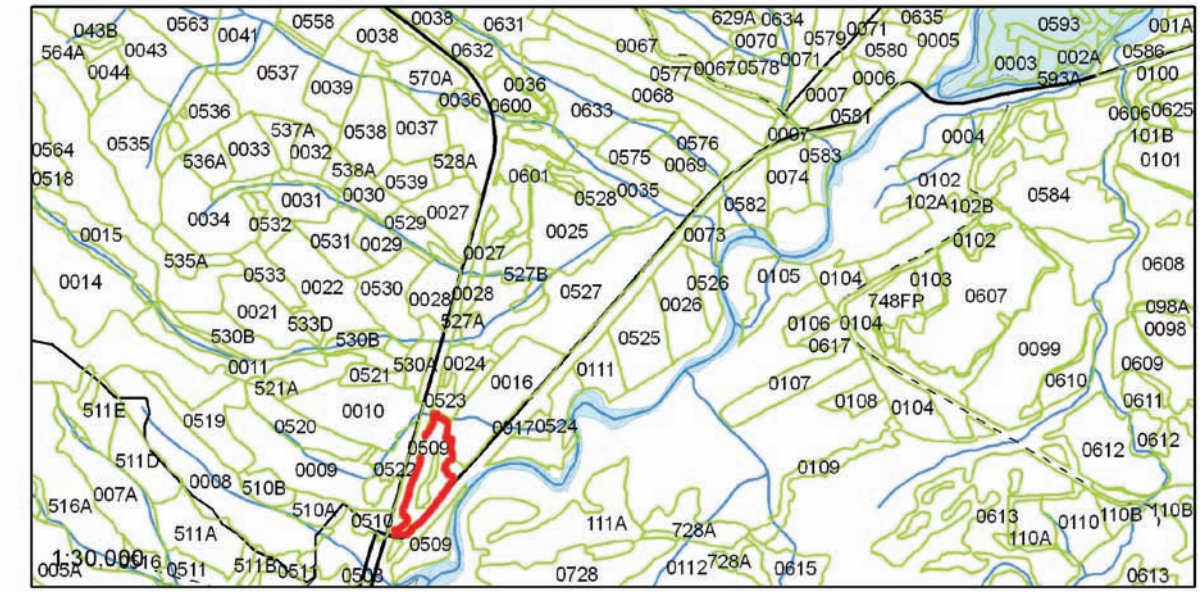
Udell/Carnell (2006)

The above photo shows the area contained in the Zimmer/ Hellum images, looking south along the Highway 40 right of way adjacent to the Gregg River. It shows a healthy young forest in those parts of Block 509 that have not been otherwise impacted by highway construction. The ground image below is at the approximate photopoint of the Zimmer/ Hellum images.

Close-up of roadside grasses and herbs along Highway 40.

Photopoint:
N 53 12.643
W 117 29.764

Udell (2006)



McLeod 2, Block 509

B. McLEOD WORKING CIRCLE: COMPARTMENT 2, GREGG BURN (ZIMMER PHOTO 60)

Zimmer 60 (1971)

Hellum (1972)

Stevenson & Ferdinand (1997)

Zimmer:

On slide 59 we see just how dense mother nature seeds trees in order to prevent environmental destruction following fire." "And thus natural selection will only let the strongest and healthiest trees survive this close competition, what remains then is a healthy forest.

"On slide number 60 we are looking at the pine regeneration following fire along the Gregg River road. I estimate that the pine in this particular area regenerate at a density of at least one tree every two square feet.

"I can not agree with some foresters' opinions who claim that such dense re-generation will result in stagnation of the entire re-growth" (slide 61)."

Hellum:

"The photograph shows where N.W.P. & P. accidentally thinned the pine in photo 60 in between the time that Mr. Zimmer took his photo in July of 1971 and August of 1972 when the colour photos were taken.

"The background of photos 60 and 61 contain about 53,600 lodgepole pine seedlings per acre judging by two sample plots 10 x 10 feet in an area located within the camera angle of photo 60. The thinned part contains over 1,670 seedlings per acre and this is still far too dense for good tree growth."

2006 Review:

Since the 1956 fire in this area, lodgepole pine regeneration has been extremely dense and well beyond limits desirable for sustainable forest management. For example, upwards of 100,000 stems per acre (250,000/hectare) are common with some densities much higher. At these densities, extensive areas in the 8,000 hectare burn are not as productive as they could be. Mr. Zimmer's view that this is the proper way to prevent environmental destruction is erroneous and inconsistent with scientific opinion in 1971 as well as now.

Recognizing the density problem in the Gregg Burn, which is similar to many others sites along Alberta's eastern slopes, research agencies as well as Company foresters have tried a number of different experimental approaches to reduce stocking levels including mechanical and hand thinning along with small, closely monitored trials with specific registered herbicides (tree killers). The stand at the junction of the Gregg River Road and the well-site road, visible on the 1997 photograph, was thinned by a group of so-called "young offenders" early in 1972 in an exercise conducted with the permission of the Company.

The view of these stands, some of which are deemed to be stagnated, is shown in Zimmer photo 60. Efforts continue to enhance development of economical methods to thin these stands and bring them into the productive cycle of managed forests.

Udell/Carnell (2006)

The 2006 photo above shows the area contained in Mr. Zimmer's photos, to the left of the road junction. The view is to the southeast into the Gregg Burn of 1956 and it highlights current forest conditions. There is evidence along the upper horizon of damage from a recent fire in December 1997. The photo below shows interior stand conditions in 2006 in the area thinned by the "young offenders" in 1972.

Udell (2006)

C. McLEOD WORKING CIRCLE: COMPARTMENT 6, BLOCK 139 (ZIMMER PHOTO 8)

Zimmer 8 (1971)

Hellum (1972)

Stevenson & Ferdinand (1997)

Zimmer:

'We are back in the Yellowhead tower area and again we can see how sparse coniferous tree life is in this area, which I described earlier as being bald from horizon to horizon. I can only notice one or two trees with large magnification, or one or two young trees that is with large magnification on this entire landscape. The grass here is very sparse in the foreground; at the very left we see some siltation apparently from the clear-cut that has washed down over the hillside (photo 8)."

Hellum 1972:

"Photos 6, 8, 11, 12, 14, 15, 43, 44, and 57 were all taken in Section 31, of Township 49, Range 22, W5 along the new road branching off the Robb road three miles west of the Yellowhead Tower Lookout. A total of three field plots were located in this area thus covering all photos criticizing N.W.P. & P. for insufficient regeneration.

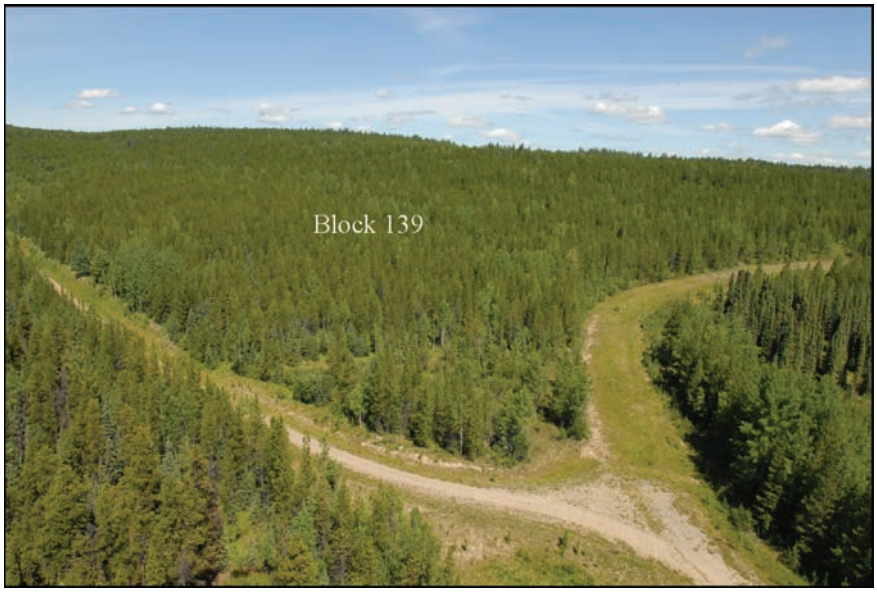
"Two colour prints were taken of the exact same area in late August of 1972 by the Silviculture Section. The white stakes in the second colour picture each represent one coniferous seedling three or more years old. According to our survey, the foreground contains the average 815 lodgepole pine seedlings per acre. This constitutes overstocking by our standards in that any area with more than 600 seedlings per acre three years or older will encounter crowding problems before the trees reach maturity.

"This particular area was cut in 1961-62 and scarified in 1962 according to N.W.P. & P. cut records. A regeneration survey done by the company in 1967 showed 67% stocking in the area. Average seedling height was about 10". The staked seedling constitutes only a small sample of pine regeneration on this hill which was quite uniformly stocked to lodgepole pine all over.

"It therefore would appear that Mr. Zimmer's charge of paucity of regeneration in this area is in grave error. Photos 6, 11, and 57 are covered by photo 8."

2006 Review:

The aerial oblique photograph of 1997 shows fully satisfactory lodgepole pine regeneration, refuting Mr. Zimmer's forecasts. It should be noted that the legislation requirements in 1972 specified that all logged areas be sufficiently regenerated with acceptable species, established and evenly distributed in the cutover by 10 years after logging. The regeneration survey method employed at the time, using one mil-acre (1/1000 acre) sample plots, set 40% as the minimum stocking to designate a logged area satisfactory regenerated (SR). This would require a minimum 400 trees per acre. Thus, to convert the stocking percentages often quoted by Dr. Hellum to trees per acre, multiply the stated percent value by 10. The situation Mr. Zimmer refers to in the lower left of this photograph was not caused by logging and in fact was a minor and localized soil accumulation from the main logging road surface. In 1967, the area was rated satisfactorily restocked at 90% (900 trees per acre).



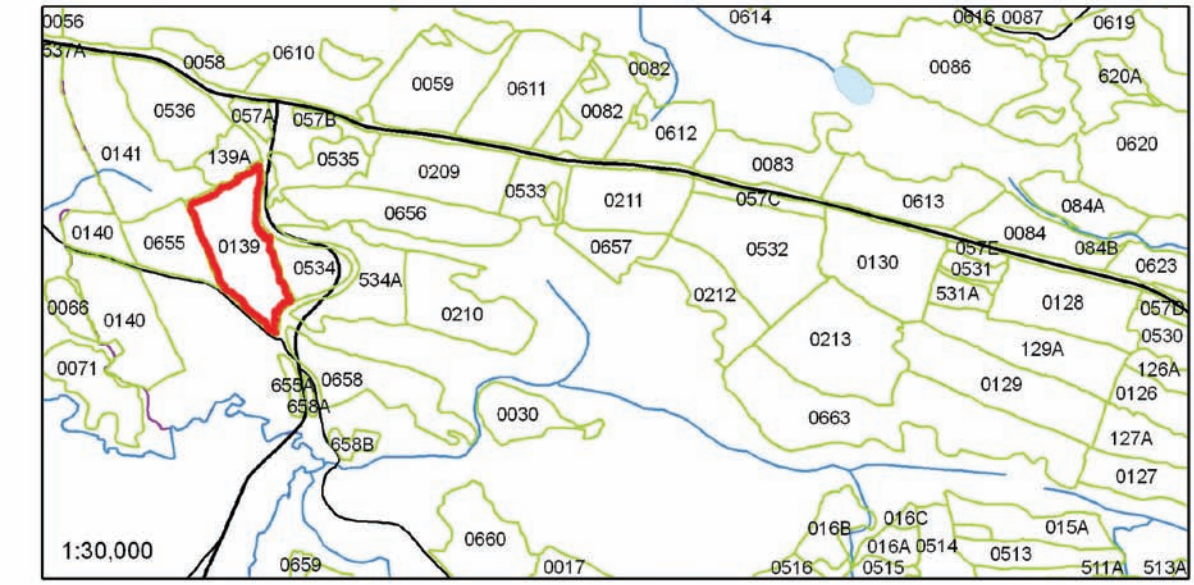
Udell/Carnell (2006)

The aerial photo at left shows the bend in the road in Mr. Zimmer's 1971 photo. Note the rich and abundant tree growth in the image.

Image from a ground photopoint near the bend in road in the aerial photo above:

Photopoint:
N 53 16.435
W 117 12.271

Udell (2006)



McLeod 6, Block 139

D. McLEOD WORKING CIRCLE: COMPARTMENT 6, BLOCK 183 (ZIMMER PHOTOS 36 TOP & 37 BELOW)

Zimmer 36 & 37 (1971) Hellum (1972) Stevenson & Ferdinand (1997)

Zimmer:

"On slide number 36 we have another viewing of the same area and here we can see the logging access road running through this area former cut line, I suppose, which had been utilized for logging and we also see that the area is washing out all over the place despite the fact this is apparently flat on the surface. Tremendous damage has been done on this particular area (Photo 36).

"The stumps have been either covered with silt or have been torn out by the scarification machinery, which one I cannot tell. However, the situation is very excessive. It appears to me it has been caused by over-use of earth disturbing machinery (Photo 37)."

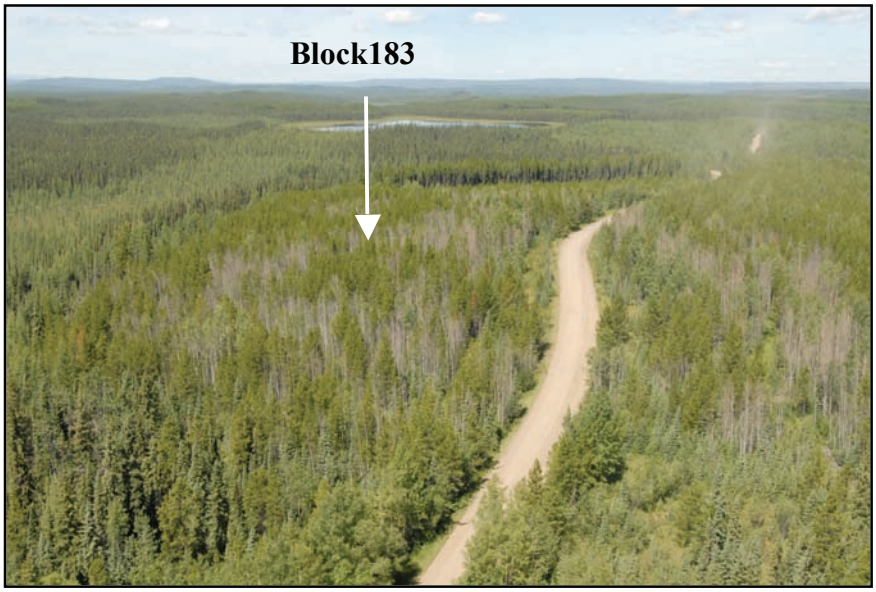
Hellum:

"Photos 35, 36, and 37 taken along the same Loffland Rig Road as mentioned under 'logging to waters edge,' bear signs of seismic activity damage subsequent to logging and not before logging as Mr. Zimmer states. This area was cut in 1963/64 and disturbed by oil explorations reportedly as late as in 1970. This area was regeneration surveyed in 1969, after scarification in 1964 to give an average stocking of 72%, according to N.W.P. & P. records."

2006 Review:

From the low level aerial oblique picture taken in 1997, the immediate area that caught Mr. Zimmer's attention has regenerated with a mixture of pine and aspen. Much of the recent growth is upwards of 25 feet (8 metres) high and reasonably spaced to ensure adequate stocking. With the aspen and shrub mix, suitable habitat is provided for a number of wildlife species. Some hand release work in recent years is reducing the aspen component of the stand to promote the growth of pine and spruce.

The seismic cut line remains evident and probably will be a fixture on the land for many years. The line is well-grassed and stable from erosion. A good mix of tree species provides for an interesting mosaic ideal for forestry and wildlife with good potential for maintaining watershed values.



Udell/Carnell (2006)

The above 2006 aerial photo looks northwest across Block 183. The picture below highlights conifer regeneration along the former open seismic line. Also, note the mat of grass vegetation on the line right-of-way.

Udell (2006)

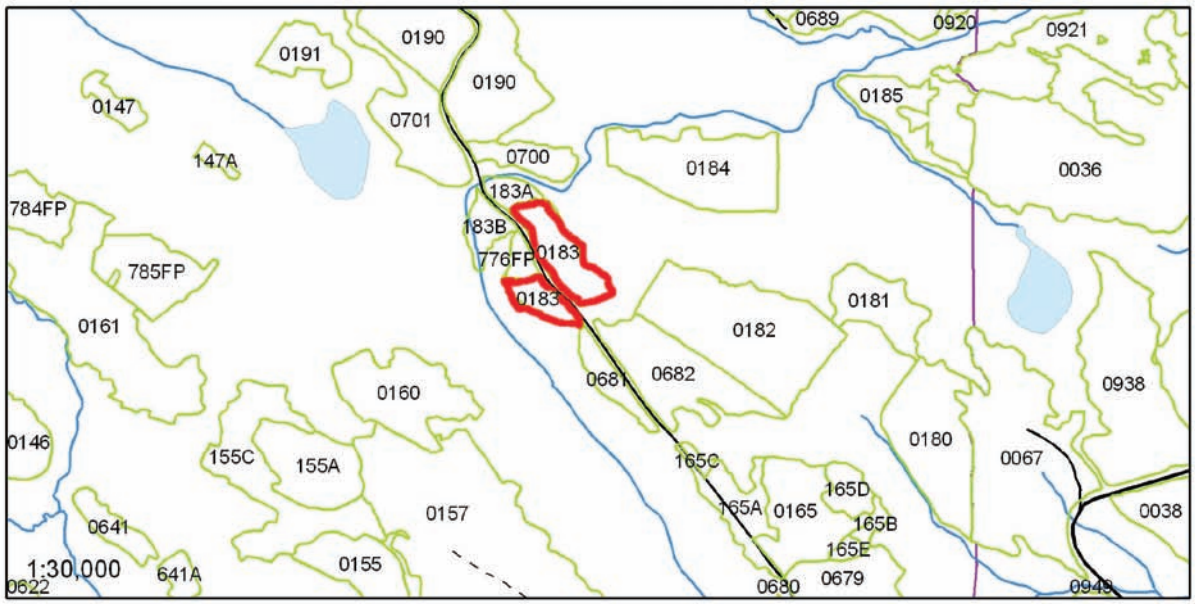
Udell /Carnell (2006)

This companion aerial photo shows the block looking southwest across the access road. Note the dead aspen regeneration resulting from a recent conifer release program.

This 2006 photopoint image was taken along the seismic line above, shooting back towards the access road. Note the young aspen tree on the right side with a black line indicating where the workers have manually girdled it to release the conifer trees growing in the block.

Photopoint:
N 53 17.457
W 117 04.562

Udell (2006)



Udell /Carnell (2006)

E. McLEOD WORKING CIRCLE: COMPARTMENT 6, BLOCK 534 (ZIMMER PHOTO 15)

Zimmer 15 (1971)

Hellum (1972)

Stevenson & Ferdinand (1997)

Zimmer:

"The grass growth here is very dense; again, it would make beautiful environment for pheasants, I would believe, if there would have been enough water there, but it sure makes a poor environment for a forest (photo 15)."

Hellum:

"The snag seen in photo 15 is the same as the snag next to the pine tree in photo 8. Photos 14 and 15 were taken with a telephoto lens thus distorting foreground to the point where it became impossible to relocate the exact photo position. This being the case, the snag and background were aligned and an approximate location chosen.

"The stocking to pine in this area was 382 seedlings per acre or 38.2% stocking judging by the plot in the second colour photo.

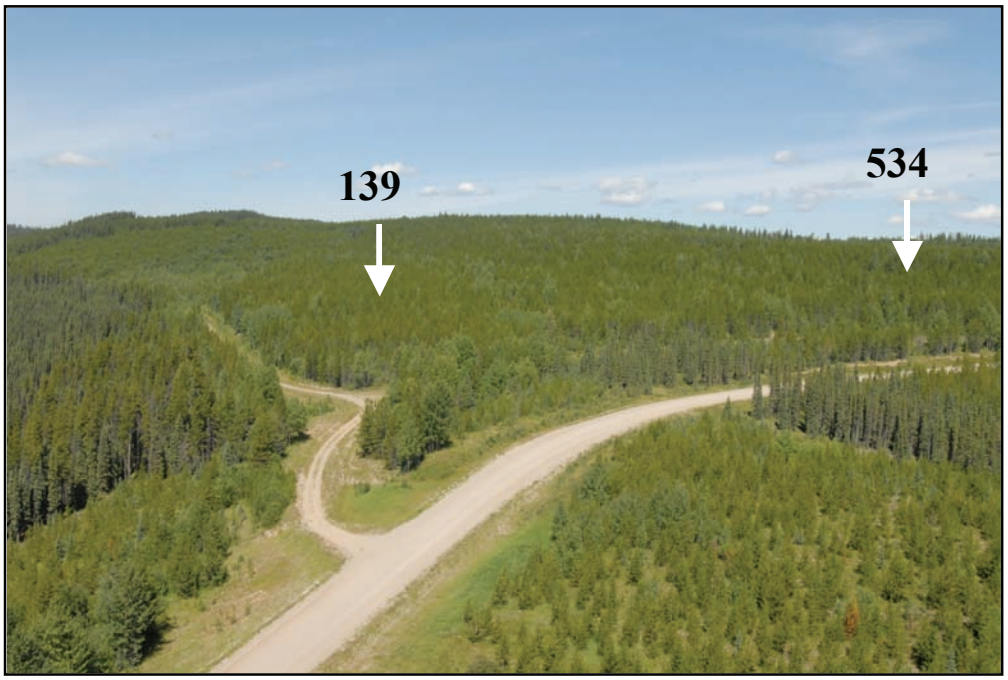
"This is insufficient stocking to meet the 40% standard, but this area was only logged in 1969 and scarified in the spring of 1970. Seeds are still being released from the pine cones, and a considerable number of additional pine seedlings may be expected from this additional seed. It is therefore too early to retreat this area on the basis of insufficient stocking to coniferous regeneration.

"The average height of tree seedlings in this area was 4" and the main proportion of the seedlings were three years old and they should have been visible to Mr. Zimmer in 1971 when he made his survey. It is therefore concluded that this statement of poor climate for regeneration is inaccurate and misleading."

2006 Review:

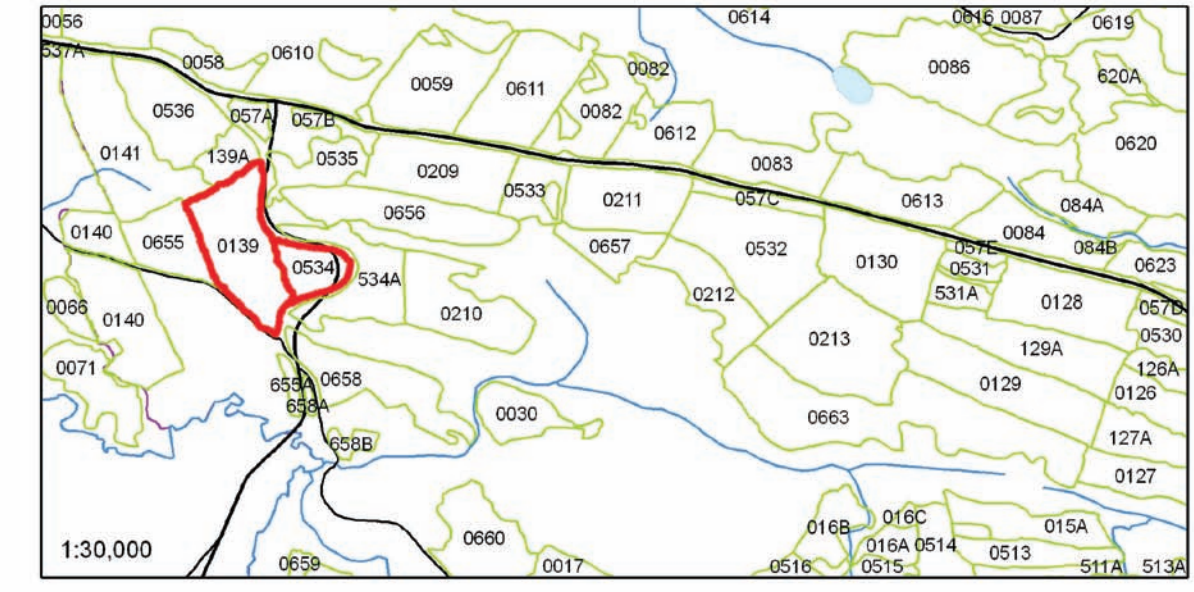
The 1997 oblique aerial photograph shows fully satisfactory regeneration, validating Dr. Hellum's observations and refuting Mr. Zimmer. This photo location is in the same cut block as Zimmer's photo 8, but looking to the southwest. To a passer-by on the access road, no environmental disaster originating from the logging operations would be noticeable because there was none. This area already passed the stage of providing "beautiful environment for pheasants," at least from the perspective of cover.

The ecological assessment of this area in 2000 revealed the young trees to be growing very well, with a site index rating of 19. This means that the large diameter dominant trees are forecasted to be 19 metres (62 feet) tall when the "breast height" age (measured at 1.3 metres, or 4.5 feet above ground) is 50 years. Fire origin stands at this age – such as the original stand on this site – would normally have a site index rating of 12 or 13 due to overcrowding of the trees and competition for light and nutrients in their early years.



Udell /Carnell (2006)

The 2006 above image shows Block 534 in relation to Block 139 described earlier. This picture taken in 2006 suggests that earlier comments of the area being a “wasteland” were premature and in error.



McLeod 6, Blocks 139 and 534.

Zimmer 10 (1971)

Hellum (1972)

Stevenson & Ferdinand (1997)

Zimmer:

"We still can not detect anything of significance as far as regeneration is concerned."

Hellum:

"This area is located in Section 32, Township 49, Range 22, West of the 5th, looking south across the Robb road close to the previous sets of photos.

"The photograph shows this area to have considerable stocking to coniferous seedlings. The lath stake markers show that there are approximately 335 spruce and pine seedlings per acre here 5 or more inches tall. This area was logged in 1966-67 and scarified in 1967. It is likely that this area may need 'fill-in planting' next year.

"The foreground in these photos was disturbed by the road right-of-way. The staked seedlings are again indicative of the general stocking on the whole hillside, excusive of the roadside in the foreground and the old logging road leading off to the right from photo centre."

2006 Review:

The 1997 photograph for this area showed regeneration where hardwoods, trembling aspen and balsam poplar appeared predominant, replacing what was originally a pine stand on a rich site. Such hardwood incursion is common on rich sites following harvest and reforestation, where the more open spacing of the coniferous seedlings (compared to stocking following fire) encourages other species to also take hold. However, in the ensuing nine years to 2006 pine and spruce appear to have gained predominance over the hardwood, with the end result of a coniferous-dominated mixedwood stand.

Udell/Carnell (2006)

Above is the regenerated stand in 2006 looking south across the Robb Road with the ground photo point (below) just off the Robb Road along the old access road leading away from the camera's perspective. Note the mixture of pine, spruce and hardwoods on the site.

Ground photopoint just off Robb Road along access trail shown above.

Photopoint:
N 53 16.787
W 117 11.093

Udell (2006)

G. McLEOD WORKING CIRCLE: COMPARTMENT 6, BLOCK 211 (ZIMMER PHOTO 41)

Zimmer 41 (1971)

Hellum (1972)

Stevenson & Ferdinand (1997)

Zimmer:

"What we see here is that slash covers the area to an average depth of one foot in solid wood... walking in this area would of course be very difficult and therefore the slash would require treating before any planting could be undertaken."

Hellum:

"Again this area was cut in 1966–67 and scarified in 1967. The photo...contains about 350 coniferous seedlings per acre and therefore suggests the need for supplemental planting in 1973. The photo plot is representative of the whole area. Photos 10 and 41 overlap on the ground and therefore lend strength to the understanding that the whole cut block will need some supplemental planting.

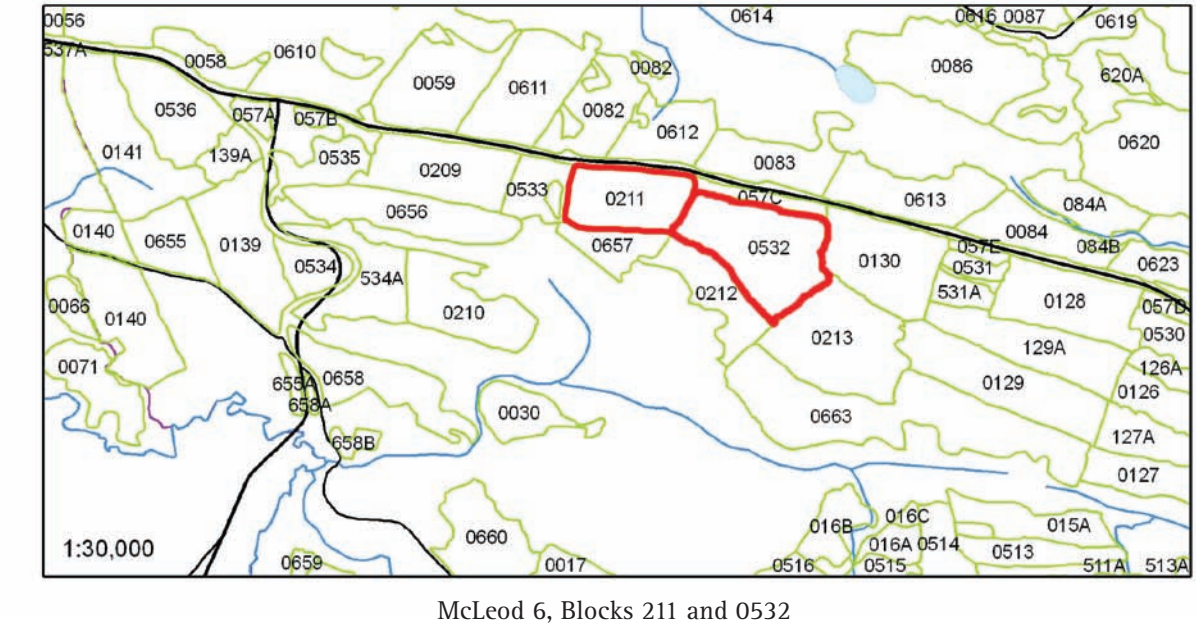
"If all the visible slash were spread evenly all over the ground in photos 10 and 41, the ground would not be covered anywhere near 12" in solid wood. While Mr. Zimmer may be correct in diagnosing this area to be in need of supplemental planting, access or slash treatment is not a problem."

2006 Review:

Despite earlier statements suggesting problems at this site, the 1997 photos, taken 28 years after logging, reveal the area to be well forested. Some roadside construction and mechanical disturbance in the immediate areas altered the establishment of trees but seems to have been modified over time with conifers, hardwoods, brush and grass stabilizing the ditch areas. Generally, the site shows a lot of resiliency and is adequately stocked with a productive mixedwood stand. The hardwood component at this cutover and the photo 10 location was greater than normally expected during the average regeneration process for lodgepole pine in the 1997 examination. However, by 2006, conifers had taken predominance in the species mix of the block.

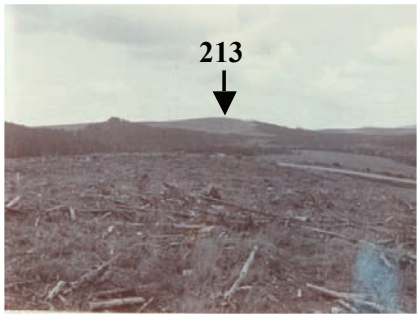
Udell/Carnell (2006)

This 2006 photo shows the regenerated cutblock on the south side of the Robb Road and the map below shows the block in relation to block 532, another block in the McLeod 6 series.

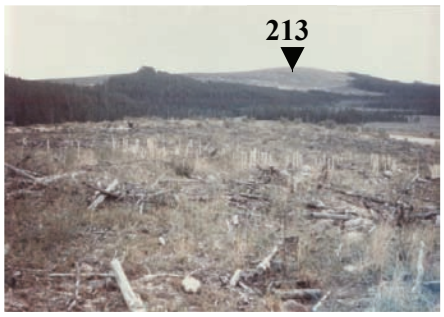


McLeod 6, Blocks 211 and 0532

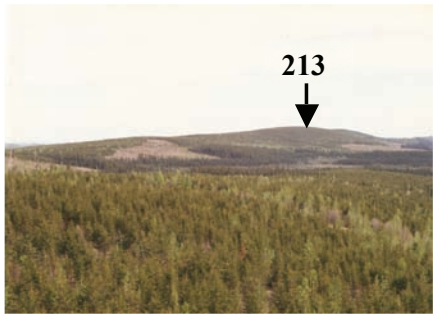
H. McLEOD WORKING CIRCLE: COMPARTMENT 6, BLOCK 213 (ZIMMER PHOTO 12)



Zimmer 12 (1971)



Hellum (1972)



Stevenson & Ferdinand (1997)

Zimmer:

"In the far distance we see a denuded hill and the area in the foreground of course doesn't look any better. Scarification most likely had been done in the foreground area, even though it still looks rough with debris, we couldn't detect any stumps in the area, a sure sign that scarification most likely had taken place. We didn't detect any regenerated trees either (photo 12)."

Hellum:

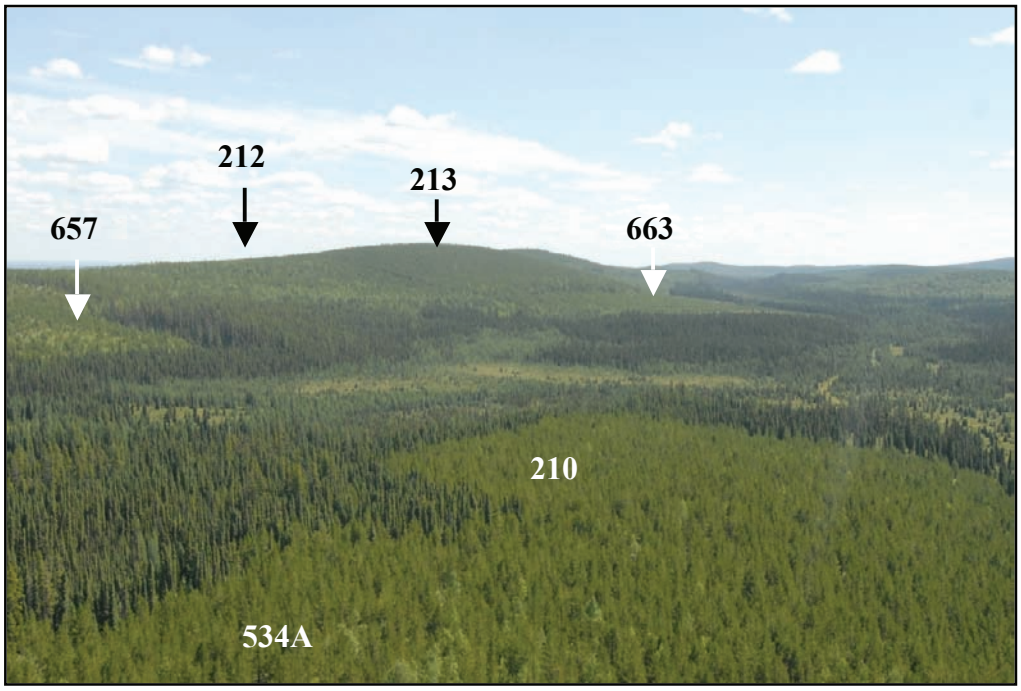
"This photo shows that the foreground in this area has considerable pine stocking. In fact the stakes indicate 64.6% stocking or 646 seedlings per acre three years and older. The average seedling height was about 4". This stocking density was typical of the whole area.

"This area was logged in 1969 and scarified in the spring of 1970, as in photo 15, and there is probably still pine seed retained in the cones which will be shed over the next one or two years. Again, one must conclude that Mr. Zimmer did not see the abundant pine regeneration and his statement of 'no regenerated trees' is erroneous.

"(Photographs 43 and 44 were taken in exactly the opposite direction to photo 12, standing virtually in the same spot. Because photos 12, 43, and 44 are of the same area of land only one field sample was taken especially because of the proximity to photo 15.)"

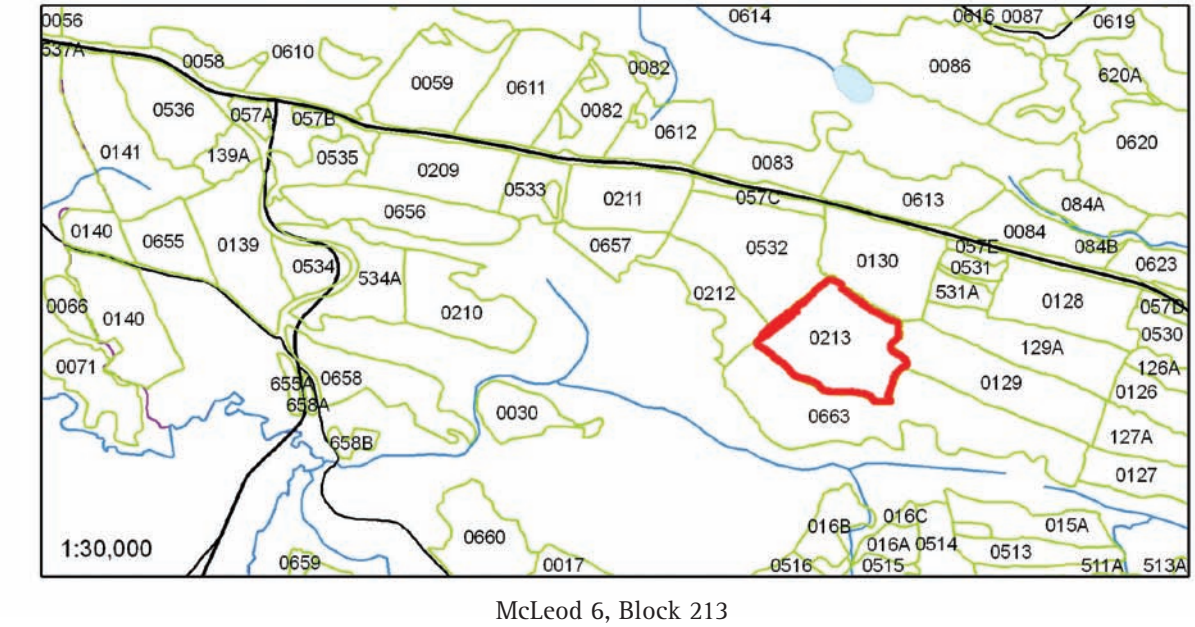
2006 Review:

The immediate foreground of these images is Block 534A; just beyond it is Block 210 and on the horizon Block 213 (see map). Harvesting in Block 534A was completed in 1969–70 and reforestation followed right after. Mr. Zimmer was standing in block 534 looking east across these blocks to block 213 on the hill top – quite a distance to see seedlings! Excellent regeneration is evident in the foreground in Block 534A as well as on the far hill in Block 213 in the 1997 picture as well as that of 2006. It illustrates the error of being too quick to judge forestry practices before the healthy reforestation that results from them has had time to become obvious. However, a careful ground examination even at that time would have shown the beginnings of this new crop, as Dr. Hellum invariably pointed out in his review.



Udell/Carnell (2006)

The 2006 photo above is taken from above Block 534 looking east across 534A and 210 with Block 213 and some more recent cuts on the horizon – the same perspective as the earlier photos. In 2006, all these blocks, including the "denuded hill" (Zimmer 1971) show excellent reproduction and the continuance of a sustainably managed forest. Note how reforestation and rapid early growth has "greened up" the areas that appear to have been newly harvested in the 1997 photo (Blocks 657, 663).



McLeod 6, Block 213

I. McLEOD WORKING CIRCLE: COMPARTMENT 6, BLOCK 213 (ZIMMER PHOTO 13)

Zimmer 13 (1971)

Hellum (1972)

Stevenson & Ferdinand (1997)

Zimmer:

"...but there is quite some erosion going on, on the top of that hill, just about at the very top centre of the hill a little to the right...it goes all the way along the top of the hill and seems to come down the hill towards the right."

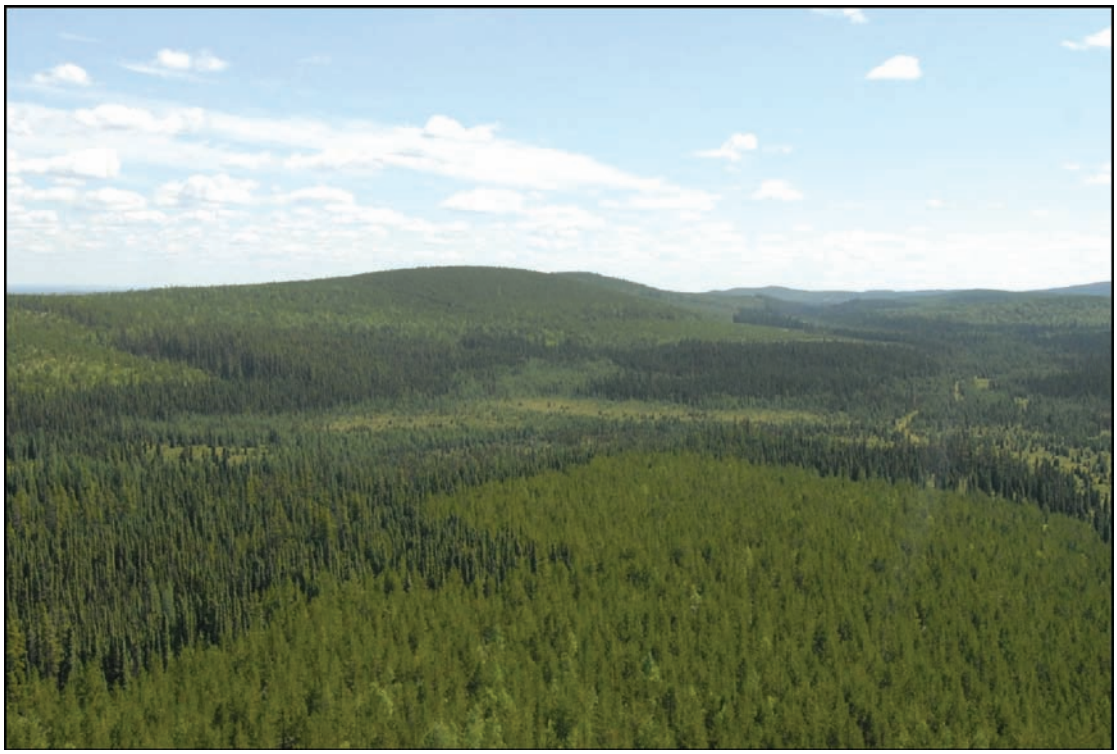
Hellum:

"This area was logged in the spring of 1971 only a few months before Mr. Zimmer visited the area. The fresh slash and recent scarification might appear as erosion from the distance of two miles or more, but one can hardly make careful assessment from such a distance.

"This photo 13 is in the same area as that of photo 12 where there were 646 seedlings per acre. It is too soon to tell whether or not the far hill will regenerate properly, but the charge of 'quite some erosion' is unlikely in view of what has been found to be the case everywhere else where Mr. Zimmer photographed scarification and regeneration."

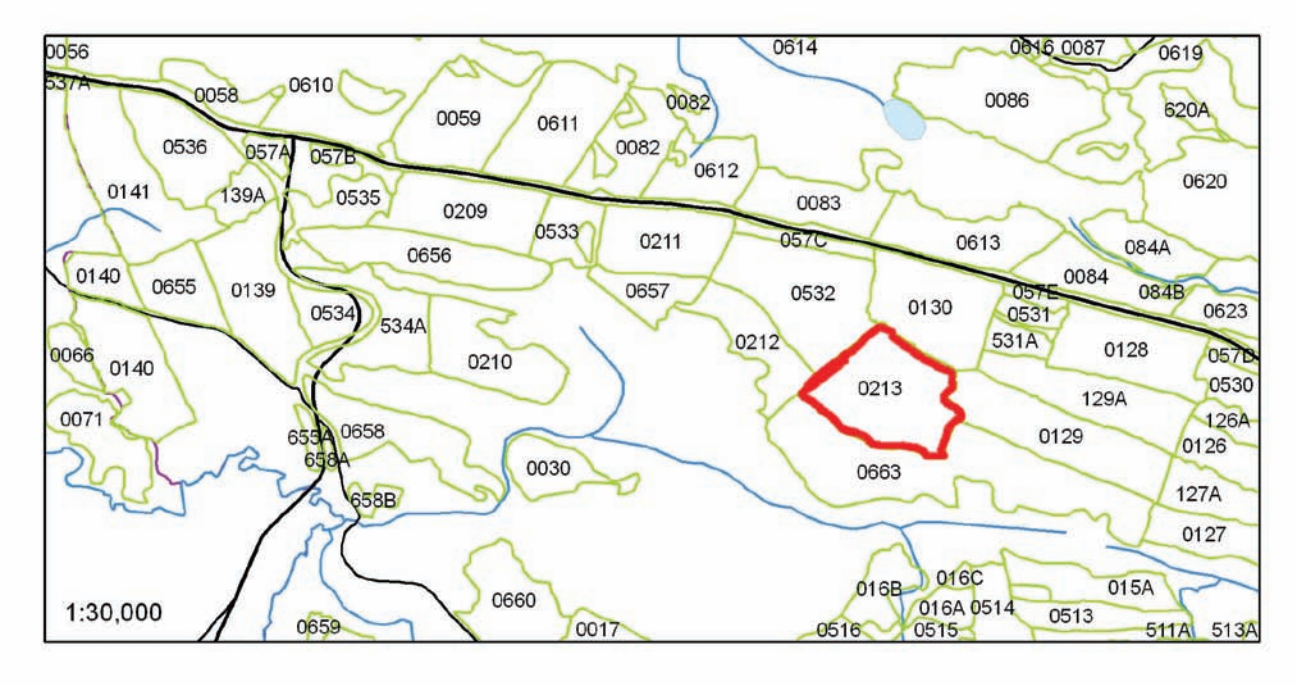
2006 Review:

The 1997 and 2006 photos highlight excellent regeneration and stocking. The hilltop (Block 213) is adequately restocked and well along as a productive forest. Portions of the residual stands have now been clearcut and are in the beginning stages of forest recovery, as can be clearly seen in the 2006 aerial images.



Udell/Carnell (2006)

This 2006 photo is another view of Block 213 shooting eastwards across Block 210. Excellent regeneration can be seen throughout the area.



McLeod 6, Block 213

J. McLEOD WORKING CIRCLE: COMPARTMENT 6, BLOCK 532 (ZIMMER PHOTO 64)

Zimmer 64 (1971)

Hellum (1972)

Stevenson & Ferdinand (1997)

Zimmer:

"This picture has been purposely chosen as the last picture since it very well represents the forest of the future in Alberta if we continue with present regulations under which the "pulp mill" is allowed to operate. What we are looking at is an area bald from horizon to horizon, there is not very much forest environment left..."

Hellum:

"This area was cut in 1969 (and not in 1963 as stated by Mr. Zimmer) and scarified in the spring of 1970. According to Photo Complex 6, the photo plot contains 543 coniferous seedlings per acre and both the pine and the spruce are about 6" tall. The plot is again representative for stocking over the whole area. The immediate foreground is the Robb road right-of-way.

"This was Mr. Zimmer's closing picture to depict how desolate the landscape is because of clearcutting and scarification practices by N.W.P. & P. It is indeed regrettable that such charges be based on such inadequate knowledge of fact."

(Note: Mr. Hellum's staked seedlings can be seen in upper half of photo)

2006 Review:

Mr. Zimmer chose this image as the last in his examination of the reforestation and environmental status of McLeod 6. His prophecy – "it very well represents the forest of the future in Alberta" – foretold a far more positive outcome than he envisaged. A sharp contrast is evident from the 1971 photo taken soon after scarification treatment of the clearcut area and the productive well-stocked coniferous forest of 2006. The aerial view highlights both the logged area and adjacent roadside vegetation patterns, which cover ditches and "borrow" pits over a reasonable period of time. There is no baldness in this area. Indeed, the picture shows an attractive well-stocked forest that meets the criteria for sustainable forest management in this area and elsewhere in Alberta.

Udell/Carnell (2006)

This 2006 photo looking south across the Robb Road shows a number of blocks logged at different times that have, over the passage of time, regenerated successfully and grown together to the point that the boundaries between them are indistinguishable on the ground.

A view to the south into Block 532 from the Robb Road.

Photopoint:
N 53 16.718
W 117 10.120

Udell (2006)

K. BERLAND WORKING CIRCLE: COMPARTMENT 3, BLOCKS C-14 & C-20 (ZIMMER PHOTOS 5 & 16)

Zimmer 5 & 16 (1971) Hellum (1972) Stevenson & Ferdinand (1997)

Zimmer:

"...again we see this drifted, freshly drifted soil and alongside the road in the ditch. And we see also some pine advance growth on the right hand side. Advance growth as far as I know which has not been restocked by the company but which seems to have stocked itself from mature trees prior to harvesting (photo 5 – upper series)."

"Slide number 16 gives us a beautiful shot again of the light structured soil as it is eroding from a clear-cut area along an old logging access road running off the old Grande Cache highway...Silt or sandy silt seems to make up most of this particular area and it is quite susceptible to erosion by wind and water (photo 16 – lower series)."

Hellum:

"Zimmer photos 3, 4, and 5 as well as 16 were all taken in the area immediately adjacent to the junction of the old and the new Grande Cache Highway in Section 5 or 6, Township 55, Range 2, W6th. A regeneration plot was located on the hill in background. While the foreground was again scarified in July 1971 and supported recent regeneration, as one might expect, the hill in the background contained 1,110 lodgepole pine seedlings per acre judging by the plot at photo centre which was again typical of stocking on the whole hillside. The seedlings were about 10 inches tall and most vigorous. This area was logged before 1966 and then scarified by N.W.P. & P. in 1966. It will be in need of thinning in 10 or more years.

"It is not possible to predict what stocking one might expect on the recently scarified area, but there is no immediate reason to expect less stocking here than on the far hill for the timber was the same in both areas, mainly mature lodgepole pine.

"(Zimmer's) photo 16 shows a 1971 cat track onto the area scarified in July of 1971. Photo Complex 10 (Hellum's) shows that this cat track, which was made only days before Mr. Zimmer visited the area, had grassed in well by late August of 1972. "

2006 Review:

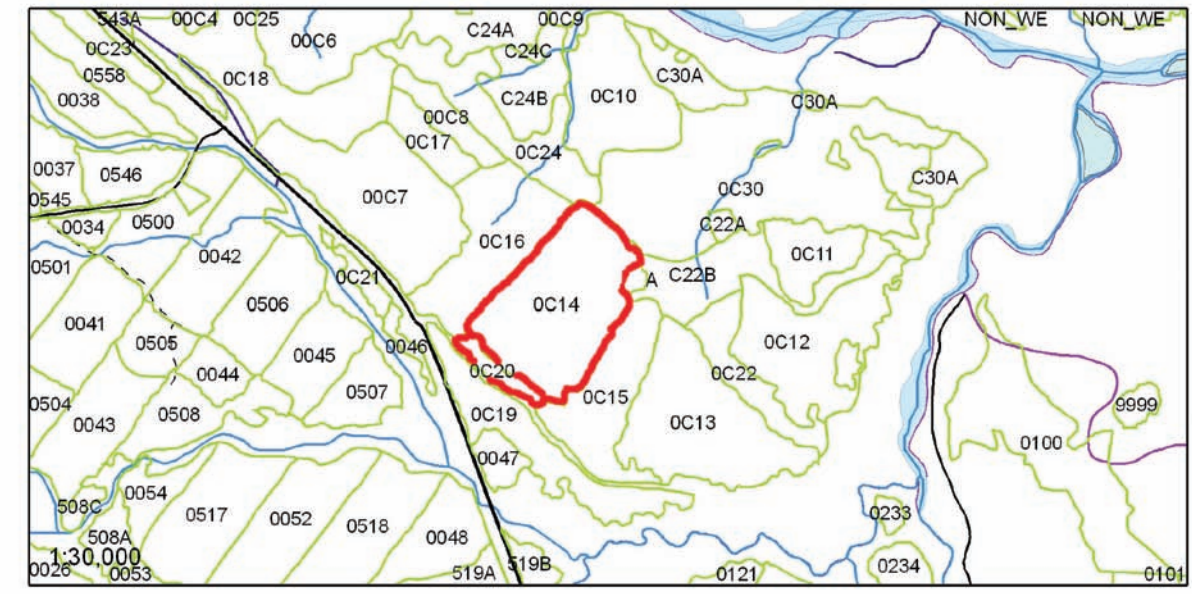
The whole hillside comprising these blocks and others cut at various times is well covered with healthy, vigorous lodgepole pine and some black spruce. The evaluation by Kare Hellum in 1972 determining regeneration to be adequate has been confirmed by the good growth and general condition of the young stands shown here. Hellum's comment about the "foreground" pertains to Block C20 adjacent to the road while the "hill in the background" is Block C14.

Udell/Carnell (2006)

This 2006 image along the east side of Highway 40 shows good production from harvest and reforestation. Exact locations between blocks cannot be located due to the passage of time and the rapid growth of the regeneration in adjoining blocks, but approximate locations are shown. Few drivers passing by these stands have any idea that they are travelling through a landscape of regenerated forests arising from the handiwork of the early Company foresters.

Udell (2006)

View of Block C-20 from the old road. The siltation that was such a concern to Mr. Zimmer in 1971 is no longer evident. Photopoint: N 53 43.348, W 118 16.126



Berland 3, Blocks C-14 & C-20

L. BERLAND WORKING CIRCLE: COMPARTMENT 4, BLOCK K-10 (ZIMMER PHOTO 30)

Zimmer 30 (1971)

Hellum (1972)

Stevenson & Ferdinand (1997)

Zimmer:

"In this area again we can see some erosion on the right hand side.... The erosion is in the right foreground. I can not tell whether you can get this area clear enough, but it seems to have been completely stripped in that area of all plant life..."

Hellum:

"Mr. Zimmer is here referring to the borrow pit in the foreground. The area in the back, judging by the plot location contains 1,360 lodgepole pine seedlings per acre. This plot is again entirely typical of the stocking on the hill in general.

"The new Grande Cache Highway was completed in 1969 and the borrow pit in the foreground should not be blamed on the forestry operations. Logging in this area was completed in 1963–64 and the land was scarified in 1966. This is the old E7 – L3 timber licence issued before the time of N.W.P. & P. logging in the area.

"The seedlings in this area were about 18 inches tall and most vigorous. This area will need to be thinned in another 10 years or less if good growth is to be maintained for the remaining trees..."

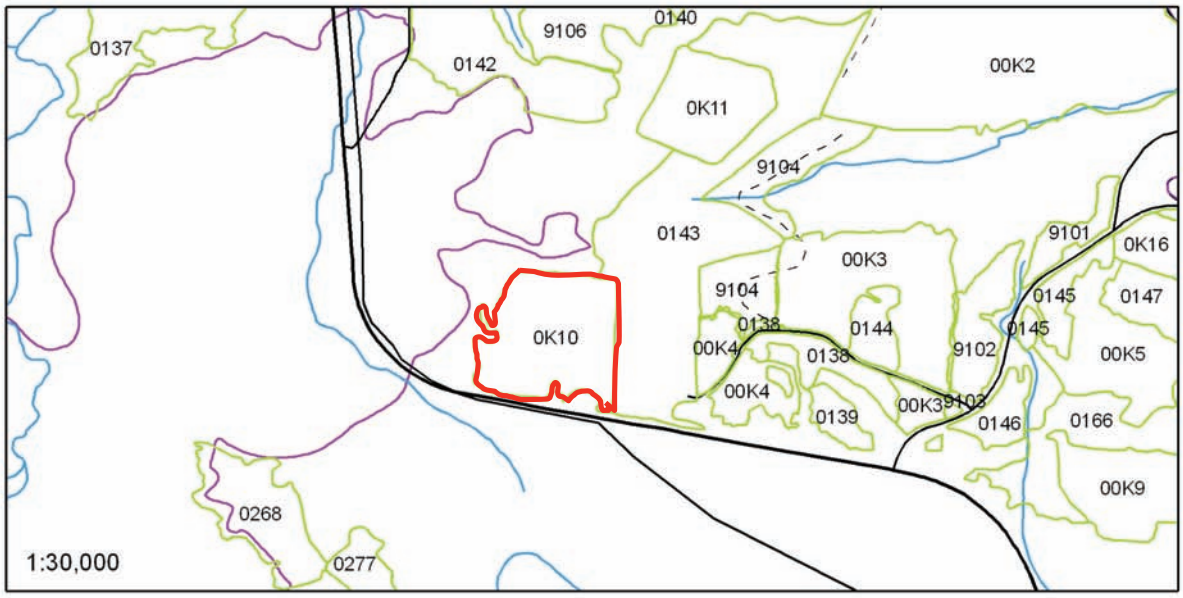
2006 Review:

The hillside stand of regenerated conifers is a good example of adequate regeneration and a productive healthy forest resulting from sustainable forest management practices. Additional planting in 1976 and 1985 to fill-in small openings, that is, "borrow" pits resulting from unreclaimed excavation for highway construction, are now fully stocked with acceptable trees.

Udell/Carnell (2006)

As the above photo shows, the area is “not stripped of all plant life.” Good growth and yield in a sustainable forest is evident along east side of Highway 40 (looking northwest), both from the air and along the road. The ground level view below shows the reclaimed and reforested “borrow pit.” Photopoint: N 53 39.438, W 118 13.377.

Udell (2006)



Berland 4, Block K-10

Zimmer 49 (1971)

Hellum (1972)

Stevenson & Ferdinand (1997)

Zimmer:

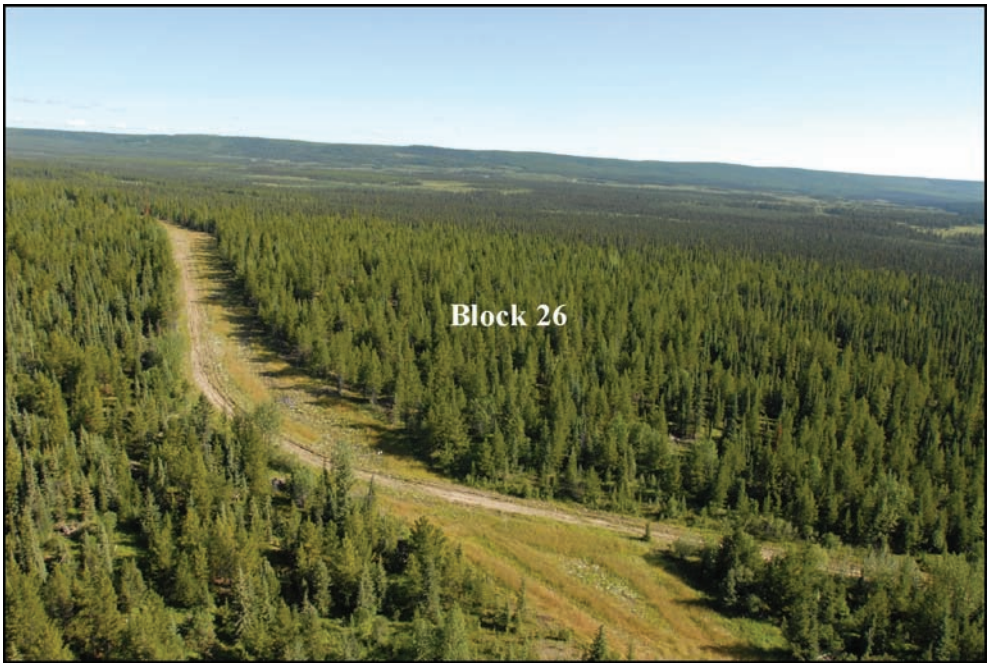
"What you are looking at here [are] some remains of earlier methods of scarification used in the area. If I may ask you to put the picture on the sharp focus you will probably agree with me that there is hardly a blade of grass which grows between those wind rows..."

Hellum:

"This is not intended as scarification. This area was cut in 1956–57 and, according to N.W.P. & P. records, this is an extraction road. The mineral soil is indeed scraped off and the most exposed parts of these roads are poorly regenerated. However, this method of extraction was not used after about 1957, and is certainly not used today. The photo shows again that the general area within the photo angle has ample regeneration. There are in fact 856 seedlings per acre in this general area judging by this photo location which is typical of much of the general area. The predominant regeneration is to lodgepole pine and white spruce with some balsam fir and black spruce also present. Seedlings in this area are on the average 12 inches tall."

2006 Review:

Good regeneration has developed into a vigorous mixed coniferous stand along the slope in the picture and throughout the area. Few open areas remain with subordinate brush and grass in the understory. Erosion is negligible and not a concern.



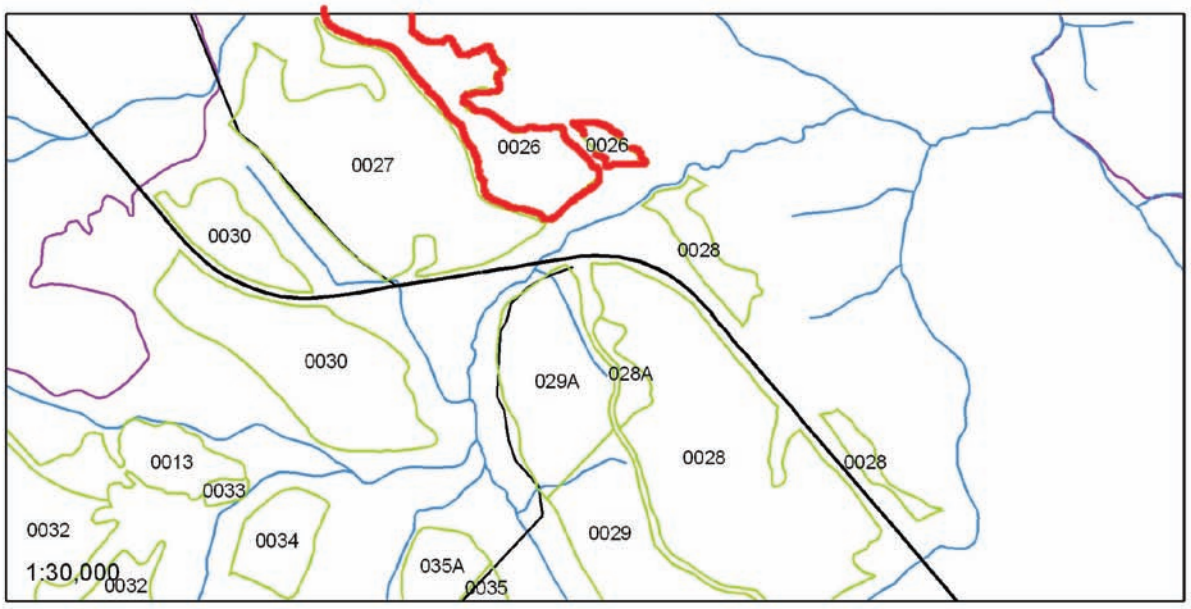
Udell/ Carnell (2006)

Block 26, above, supports a thriving mid-rotation stand of lodgepole pine in 2006. In the photo below, taken near the road/pipeline junction above, Bob Udell stands on an old logging trail in the block which, with the passage of time, is also re-vegetated and supporting a healthy crop of trees.

Block 26

Photopoint:
N 53 36.436
W 118 05.009

Udell (2006)



Berland 8, Block 26

N. BERLAND WORKING CIRCLE: COMPARTMENT 8, BLOCK 28 (ZIMMER PHOTO 2)

Zimmer 2 (1971)

Hellum (1972)

Stevenson & Ferdinand (1997)

Zimmer:

"What we see here is a complete denuded area almost bald from horizon to horizon. A little immature timber is left in the foreground. The area here shows very little reforestation evident..."

Hellum:

"This area was horse logged in 1959 and a company regeneration survey of 1969 classified this area as adequately stocked by our standards (40% plus). Photo Complex 9 may not show the two hundred 4' tall stakes placed by seedlings in the very center of the picture just up hill from the road, but our survey showed that at least this part of the photo had an average 968 seedlings per acre and less than 10% of these were advanced growth.

"The average seedling height was about 36 inches. There is abundant pine and spruce regeneration all over this hill, but it is not made visible by photography from over a mile away'

"The timber in the foreground is mature black spruce and lodgepole pine and not a 'little immature timber.' "

2006 Review:

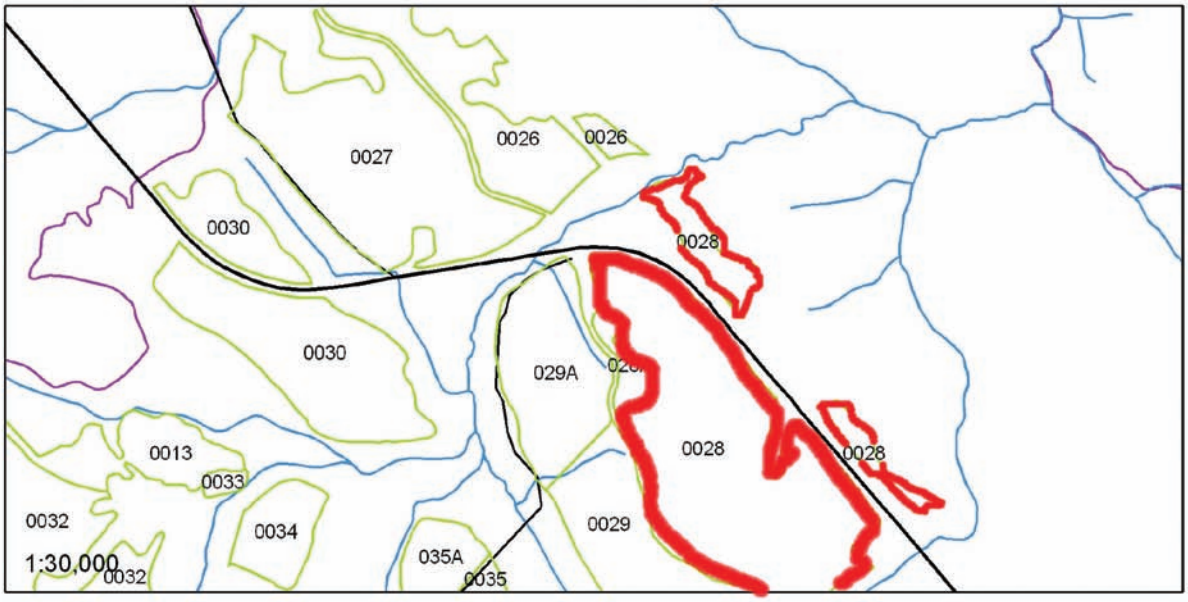
The entire hillside is well-covered by productive mixed conifers. This area certainly did not remain "denuded from horizon to horizon."

Udell/Carnell (2006)

Udell (2006)

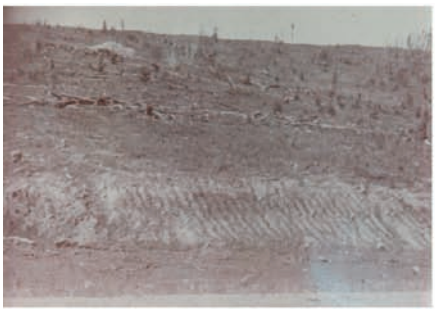
The 2006 photo above highlights a much larger area than the smaller three images and confirms Hellum's comment "that his plot information (1970) of good regeneration is typical of the entire area."

A healthy mixed pine/white spruce/ balsam fir stand. Photopoint: N 53 35.842, W 118 03.743.



Berland 8, Block 28

O. BERLAND WORKING CIRCLE: COMPARTMENT 8, BLOCK 28 (ZIMMER PHOTO 52)



Zimmer 52 (1971)

Hellum (1972)

Stevenson & Ferdinand (1997)

Zimmer:

"On slide 52 we can see a mixture of regenerated fir and pine and what appears to be advance growth, that is trees, young trees, which were in this area before the harvesting operation was commenced. The trees in this particular area were found to be an average of ten by eighty feet apart..."

Hellum:

"This photo shows that there are abundant conifer seedlings in this area, in fact there were on the average 670 seedlings per acre of spruce and pine. Even if one only counted the advanced growth on the plots there would be a tree every 10 x 20 feet not 10 x 80 as claimed by Mr. Zimmer. The average spacing among all seedlings in the photo plot is 8.0 x 8.0 feet which is too dense if all seedling survive to maturity. The foreground is right-of-way for the new Grande Cache Highway. The plot is representative of the stocking of trees on the whole hillside except for the right-of-way.

"The regeneration is predominantly black and white spruce and lodgepole pine. There is less than 10% balsam fir in the sample plot. Seedlings are on average 36 inches tall here.

"(Photos 51 through 56 are in the immediate area of photo 52 and were thus not sampled.) This area was horse logged in 1959 and a N.W.P. & P. regeneration survey shows the whole cut block stocked to 40%+ in 1969."

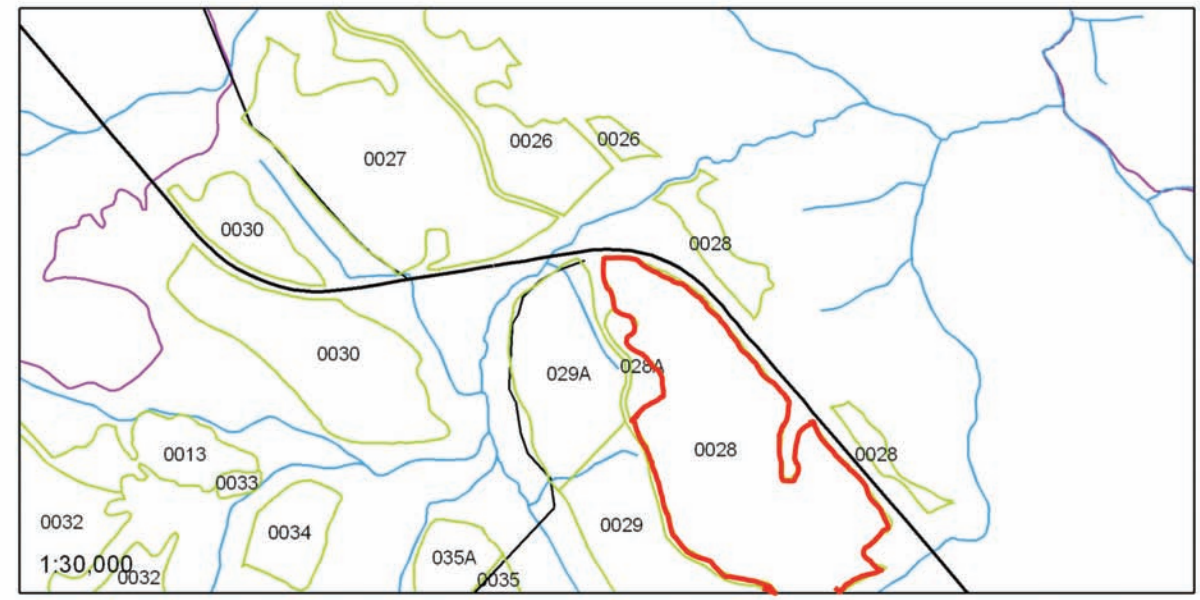
2006 Review:

The blocks were harvested in 1959–60 and scarified in 1960. The 1997 and 2006 photos of this area highlight a well-stocked coniferous stand "back dropped" with some older spruce and balsam fir. Minor roadside erosion is evident which is an aftermath of the extensive construction and upgrading of the Grande Cache Highway. Again, the logged site is regenerated while the roadside is still showing some minor erosion.

Udell/Carnell (2006)

This aerial view of Block 28, looking west across Highway 40, shows a semi-mature regenerated landscape that has responded to the post logging treatments to give good sustained yields and a general healthy stand environment. The stand is seen from Photopoint N 53 36.888, W 118 03.707, along the Grande Cache Highway.

Udell (2006)



Berland 8, Block 28

8. SUMMARY COMMENTS

One of North America's most eminent foresters, Aldo Leopold, set forward a land ethic that includes all the values of the land and the life it sustains, not just short-term economic values. The measure of success is the effect of the forester's husbandry on the forest itself. It is fair to say that change does not occur quietly or easily when you work with nature or even when forests regenerate naturally following catastrophic fires. In forestry, the results of today's efforts are passed down to the benefit of future generations.

Kare Hellum's review, as well as this 35-year retrospective, show that the 1972 campaign and rhetoric of the STOP group was wrong in trying to defame and cast shadows of doubt on the forestry profession, on the province's stewardship of the forest and on the forest husbandry of West Fraser's earlier predecessor, North Western Pulp and Power Ltd. (N.W.P. & P.).

Efforts by foresters at Hinton in sustainable management are producing meaningful results. Lessons have been learned and changes to maintain and increase wood production continue with research through programs of adaptive management. Our forests change over a period of time, much of it taking a long time. Over the years natural disturbances such as fire, insects and diseases have shaped our forest landscapes. Today, mankind protects the forest from fire for the benefit of the forest industry, as well as the communities and infrastructure that fire would place at risk. Instead, man harvests and regenerates the forest in a manner that replenishes the land and sustains the forests' ecological functions (services). Re-growth or regeneration is stimulated in ways that in the early stages may not look attractive at the beginning, even as the aftermath of catastrophic wildfire is not pretty and Mr. Zimmer's observations were consistent with the view of many then as now. Yet both approaches to regenerating the forest landscape yield positive results in a very short time, as a closer examination would have shown, even at the time of Mr. Zimmer's review.

The passage of time between Mr. Zimmer's visit to the forestlands around Hinton and today shows healthy, young forest stands growing across the landscape. Forest practices are continuing to evolve to ensure the sustainability of all the resources dependent on these healthy forests.

STOP's campaign received much attention from the media. Public consternation about clearcutting and purported environmental degradation focused on the forestry profession and N.W.P. & P. Concerted efforts by foresters to explain and emulate nature's processes with the help of manmade techniques allayed some fears. However, the 35-year photographic record and the systematic assessments of reforestation effectiveness show that the fear mongering and alarm contained in the 1972 STOP report and attendant campaign were unfounded. The logged areas in the 1960s and 1970s have been regenerated successfully and are an integral part of a thriving forest with rich biodiversity.

S U B M I S S I O N

F R O M

S. T. O. P. (S A V E T O M O R R O W - O P P O S E P O L L U T I O N)

F O R

C O N S I D E R A T I O N B Y T H E A L B E R T A G O V E R N M E N T

I N R E F E R E N C E T O M A T T E R S C O N C E R N I N G

T H E E N V I R O N M E N T A L E F F E C T S R E S U L T I N G F R O M

P U L P M I L L T I M B E R O P E R A T I O N S I N A L B E R T A

Dated, the 28th day of April,

in the City of Edmonton, Alberta.

SUBMISSION

FROM

S. T. O. P.

(SAVE TOMORROW - OPPOSE POLLUTION)

FOR

CONSIDERATION BY THE ALBERTA GOVERNMENT IN REFERENCE TO MATTERS CONCERNING THE ENVIRONMENTAL EFFECTS RESULTING FROM PULPMILL TIMBER OPERATIONS IN ALBERTA

STOP should have established its consultant's credentials in its Preface before submitting its report for serious consideration. His credibility is important to the concerned readers.

Dated the 28th day of April, 1972,

in the City of Edmonton, Alberta.

INDEX OF SUBMISSIONS

(FORMING PART OF BRIEF AND/OR EVIDENCE)

D. "Some Implications of Large-scale Clear-cutting in Alberta". (Forest Research Summary 120 pages, available free of charge from Canadian Forestry Service, Edmonton). (Complimentary copies submitted only to the Hon. Peter Lougheed, Premier of the Province of Alberta, Hon. Dr. A. A. Warrack, Minister of Lands and Forests, and Hon. Mr. W. Yurko, Minister of the Environment). (Forms part of brief).

$E._1$ Pictorial Documentary, "Hinton Pulpmill Clear-cut Effects", 65 pictures, assembled on 15 plates. (Submitted to Hon. Dr. A. A. Warrack, Minister of Lands and Forests only).

$E._2$ List of locations where pictures taken, code to locations. (Submitted to Hon. Dr. A. A. Warrack, Minister of Lands and Forests only).

F. 65 Photographic (projector) slides plus tape-recorded commentary and locations code. (Submitted to Hon. Dr. A. A. Warrack, Minister of Lands and Forests only).

PREFACE:

S.T.O.P. (Save Tomorrow - Oppose Pollution), being a volunteer organization dedicated to protect our environment against unnecessary destruction, respectfully submits this brief together with various exhibits of evidence in support of this brief to the Alberta Government, for their consideration.

This brief and the supporting exhibits are intended to express the concern of S.T.O.P. about environment damages found in harvested areas within the lease areas of Northwestern Pulp and Power Co. Ltd. (NWPP) of Hinton, Alberta.

This organization considers much of the damage found in the area to have resulted from questionable harvest and scarification techniques, which were permitted apparently by agreement and regulations established under former Alberta Governments.

In the opinion of this organization the techniques used, and permitted for use, especially the method of scarification that follows harvesting operations, are responsible for most of the environmental damages found. It appears, further, that in a great many locations the forest environment has been destroyed or damaged to such an extent that re-forestation of the areas has become difficult, and the renewability of the timber resources appears questionable.

In the same context it has become evident that the reforestation standards set by former Alberta Governments which require only 40% restocking in harvested areas, are completely inadequate for the conditions

under which the reforested trees must grow, namely the conditions of a hostile non-forest environment that has resulted from the forementioned method of scarification.

This brief and evidence are the result of an extensive field trip undertaken into the pulpmill lease area last summer (1971). The trip involved about 700 miles of travelling, and was conducted for S.T.O.P. by Mr. Arnim Zimmer of St. Albert, with the photographic assistance given by Mr. Barry Headrick of Edmonton. Approximately 120 photographs were taken in the area, as well as six movie films. Due to camera difficulties encountered in the field, the movie films did not turn out to be presentable and were therefore not made part of this submission, although they contained additional evidence of environmental damage. From the 120 photographs, 65 slides were developed, and approximately 65 pictures (not necessarily the same as those in the slides) were developed, and assembled on 15 pictorial documentary plates. The slides and pictures were submitted to the Minister of Lands and Forests, the Hon. Dr. Allan Warrack, simultaneously with the submission of this brief.

S.T.O.P. trusts that the Minister will make the pictures available to other concerned members of the Government for examination. It is hoped, that the Minister of Environment, the Hon. William Yurko, will have a chance to share equal time with the Hon. Dr. Allan Warrack, in assessing the various types of environmental damages shown as examples on these pictures.

Subsequently, to the field trip, Mr. Zimmer prepared a report for S.T.O.P. entitled "Keep Alberta Green", outlining his observations in the areas in respect to the NWPP timber operation. This report was first made public on February 6th, 1972. A copy of this report is attached and forms part of this brief. "Keep Alberta Green" was purposely written by Mr. Zimmer in a way which could be easily understood by the public, and most reference to technical detail was omitted.

Public comment in the form of constructive criticism was invited by S.T.O.P. during the initial release of about 50 copies of this report, criticism that could improve this final brief to the Government. Later S.T.O.P. printed another 5,000 copies of "Keep Alberta Green" for distribution to the public.

As part of the feed-back from the initial release of that report, Mr. Zimmer obtained numerous suggestions from concerned citizens from all over Alberta, as well as the valuable opinions of professional foresters, many of which are incorporated into this final brief.

There appear to be many professional foresters who share the opinion that the reforestation efforts to date in the NWPP pulpmill area are beset with many failures, and are generally inadequate, even if successful in limited areas. These concerned foresters suggested valuable alternatives to the presently used harvesting and reforestation methods and pointed out valuable forestry research work that could be used by S.T.O.P. as reference material for this brief. Such concerned foresters

include, besides others, foresters employed by NWPP as well as foresters in the Alberta Forest Service. Naturally their help was highly appreciated, and in no way will S.T.O.P. release particulars as the names of these concerned people, since reprisals from those who do not share their concern could result.

It was pointed out that related research work in book form is available free of charge from the Canadian Forestry Service in Edmonton. The book, is entitled "Some Implications of Large-scale Clear-cutting in Alberta", and contains about 120 pages, summarizing nearly 100 professional forestry research studies on effects of clear-cutting. Since much of that research is applicable as reference material for this brief, the entire book should be read in conjunction with this brief and should be considered part of this brief. Complimentary copies of this book for the Hon. Premier of the Province of Alberta, Mr. Peter Lougheed, the Hon. Dr. Allan Warrack, Minister of Lands and Forests and the Hon. William Yurko, Minister of the Environment were submitted simultaneously with this brief. Additional copies of this book are available from the Canadian Forestry Service, free of charge, for others who may take special interest in this matter.

Although all incidents of applicable research work from this book are not necessarily mentioned in this brief, to save unnecessary repetition of those findings, some detailed cross-reference will be made occasionaly to support specific points.

The intention of this brief is to make the Government aware of widespread public concern in respect to the present pulpmill operations, and to present to the Government proposals for alternate methods of harvesting and reforestation, which in the opinion of S.T.O.P. would go a long way towards permitting rational timber harvesting in perpetuity, while at the same time protecting the environment from further unnecessary damage.

This brief was prepared and researched for S.T.O.P. by Mr. Arnim Zimmer of St. Albert, Alberta.

Full credit is herewith given to the Canadian Forestry Service for their co-operation in making "Some Implications of Large-scale Clear-cutting in Alberta" available as reference material for this brief.

S U M M A R Y

O F P R O P O S E D L E G I S L A T I V E C H A N G E S

G O V E R N I N G P U L P M I L L O P E R A T I O N S I N A L B E R T A

A S P R O P O S E D B Y

S. T. O. P.

(S A V E T O M O R R O W - O P P O S E P O L L U T I O N)

S.T.O.P. (Save Tomorrow - Oppose Pollution) respectfully submits to the Alberta Government the following proposals for legislative and regulative changes in respect to large-scale timber operations in Alberta:

(A detailed explanation of these proposals is presented on pages following this summary.)

PROPOSAL # 1: Abandon scarification in its present form. Permit only "Spot Scarification".

how will these get hazard control ?

PROPOSAL # 2: Abandon large-scale clear-cutting in its present form. Permit (proper) ? strip-cutting, limiting strip-cut size, and limiting areas where used.

PROPOSAL # 3: Use "Selective Cutting", where strip-cutting proves, or could prove detrimental to the environment.

under what conditions could it prove to be detrimental ?

PROPOSAL # 4: Provide (watershed) ? protection with buffer zones along watersheds and bodies of water.

PROPOSAL # 5: Improve design of logging access roads, require that areas of roads no longer used be restored into forest environment.

PROPOSAL # 6: Immediately embark upon a program to reforest by manual replanting such areas in which rate of regrowth regenerated is slow or inadaquate. Replant with fast growing poplar or aspen if necessary.

PROPOSAL # 7: Require posting of harvested areas with well visible signs on all corners of harvested areas. Signs to identify plot as to date harvested, date of subsequent reforestation efforts, name of timber operator, size of area plus plot number to correspond to like number held in Government files.

PROPOSAL # 8: Change reforestation standard requirements from present 40% to minimum of 150% restocking of mature timber harvested.

PROPOSAL # 9: Require a bond from any timber operator prior to harvesting, that will guarantee subsequent reforestation to be sucessful and of sufficient density and growth rate within alloted time.

PROPOSAL #10: Before permitting establishment of, or Government advertising to receive proposals for construction of new pulpmills, or similar large timber operations, require public hearings and province-wide plebiscites to ascertain public opinion.

* * * * * * * * * *

S.T.O.P.'s PROPOSALS AND REASONS IN DETAIL

PROPOSAL # 1: ABANDON SCARIFICATION IN ITS PRESENT FORM, PERMIT "SPOT SCARIFICATION" ONLY.

This proposal recognizes that coniferous trees must be planted into stable, firm soil seedbeds, and that planting into loose layers of partially decayed plant fiber matter (duff) will be unsuccessful.

For this reason it may be necessary to remove this duff with hand tools in the immediate, approximately one-square-foot sized area into which each tree will be planted. THIS IS WHAT THIS BRIEF RECOGNIZES AS "SPOT SCARIFICATION".

Machine scarification which affects the entire soil-surface as presently used should be abandoned, since this method destroys all plant-life, destroys the insulating duff layer over the whole surface area, and tears out the tree roots near the surface which are necessary to reinforce the soil and hold it in place against erosion.

Oh!

The purpose of the present scarification method is twofold. It breaks up and partially buries excessive amounts of slash remaining from clear-cutting, and it exposes mineral soil. The latter is the main purpose of scarification, according to statements made by Mr. D. I. Crossley, Chief Forester of NWPP, during the Alberta Fish and Game Association 1972 Convention. Mr. Crossley stated at that time also that the purpose of exposing the mineral soil is to absorb and reflect sufficient heat to cause serotinous (pitch-sealed) pine cones to open to shed their seeds. When questioned, Mr. Crossley added that a temperature

to he didn't!

of +125° F. minimum is necessary to accomplish melting of the pitch that seals the cones. THE VERY SAME HEAT BUILT UP IS SUFFICIENT TO KILL CONIFEROUS SEEDLINGS UP TO FOUR YEARS OF AGE, ACCORDING TO VALID FORESTRY RESEARCH.

No. It takes more atmospheric heat to raise the temp of living, moisture containing seedlings to lethal temperatures than it does mature cones.

This forestry research in "Some Implications of Large-scale Clear-cutting in Alberta", as stated on pages 28 to 29, defines the temperatures sufficient to kill such coniferous seedlings (up to four years of age), as ranging from 120° F. to 130° F. (the exact temperature within that range being dependant upon duration of exposure and also being dependant on the available moisture within the soil).

Enderw. 2

S.T.O.P. wishes to stress that the mineral soil exposed by scarification will stay exposed for up to ten years following the scarification, according to their field observations. It appears evident that such heat will continue to be generated for a long time following scarification, thus possibly affecting the mortality of regenerated new growth for that period.

The destruction of the insulating loose plant fiber layer also subjects seedlings to extreme low soil temperatures during winter, which may affect successful survival of regenerated or planted small trees.

The destruction by machine scarification of all small plant-life, and the destruction, or plowing-under of water-absorbent loose plant-fiber matter that results when mineral soil is plowed to the surface during the process, causes rain water and water from melting snow, to

flow unobstructed across the soil surface. Moss, and other small plant life is no longer able to slow down such water flow so that it can be in part or fully absorbed into the soil. Also, the sponge effect of semi-decayed or loose plant fiber matter is no longer able to absorb such water. As a consequence much water from precipitation flows across the surface of the soil, that would otherwise be slowed down and/or would be absorbed into the soil. This surface flow, if excessive during major rainfalls, for instance, causes erosion and siltation of nearby watersheds. During major rainfalls or fast melting of snow, the unabsorbed water accumulates at fast rates in the watersheds causing or contributing to flooding in downstream watersheds. (Viz. Macleod River Flood 1969, clear-cutting and scarification along tributaries to Macleod River).

Secondary effects of additional water running over the surface of the exposed mineral soil instead of being absorbed into the soil are, that the ground moisture reserves are affected adversely. Soon after rains the exposed mineral soil forms crusts in many places, which bake to brick-like surface consistencies in hot weather, thus further obstructing water absorbtion into the ground during subsequent rains. Underlying layers of soil suffer from lack of ground-moisture and consequently become barren dry, soon after dry weather sets in. This affects the regularity of constant water supply to creeks and streams in the area. The upper reaches of Apetown Creek, for example, dried up during the relatively wet summer of 1971, most likely due to clear-cutting and scarification in the area.

Examples of erosion caused by water flowing over the surface of the soil in scarified areas, can be found in almost all of such areas, providing of course, that the land is sufficiently sloped to cause water to flow. Besides water caused erosion, some extremely light-weight soil areas seem to be affected as well by wind erosion and soil drifting.

where?

There are several types of erosion, which are caused by excessive surface water flows in scarified areas, namely sheet erosion, rill erosion and gully erosion. While the occurrence of a still more severe type of erosion, namely mudslides, was not found during S.T.O.P.'s investigations, the probability of it occurring in steeper terrain should not be ruled out.

Sheet erosion is not as obvious to cursory observers as gully or rill erosion. However it is prevalent in many moderately sloped clear-cuts. Sheet erosion consists of a gradual transfer of the surface layers of the soil, in sloped areas having light soil structures. It can be verified to exist by close examination of the soil surface below suspected areas of eroded sloped terrain. It is recognized by apparently freshly deposited layers of smooth surfaced light weight soils, with a float-finished appearance.

The most readily noticed types of erosion are rill and gully erosion. These can occur in all types of sloped terrain, but are found as a rule in terrain sloped more than 8% only. Often this type of erosion is found on the sides of road embankments and on former logging access roads. However gully erosion can also be found where there are no roads, in the middle of clear-cut areas.

Tsk, tsk!

Apparently author is unfamiliar with the mechanics of rill & gully erosion.

Contrary to supposed former findings, which claimed that most gully and rill erosion is caused by roads and road-side ditches, Mr. Zimmer during his field trip into the area, found that even if the erosion can be found on roads, it is not necessarily the roads which CAUSE the erosion. It was observed by Mr. Zimmer, that rill and gully erosion in a direction towards and at right angles to a lower lying road, always started at the very top of such road cuts, farthest away from the road and at the edge of the clear-cut area that extented for considerable distance uphill from the road. The fact that this erosion starts at the very top of these road cuts points out that sufficient amount and flow of water must be present there, to start the damage. This water is of course the water that cannot be absorbed into the denuded crusted soil of scarified areas, and instead flows for great distances over the surface of the soil towards the road. By the time it has reached the road this water has built up sufficient head and velocity to start the damage right at the very top of the road cut, which is as a rule somewhat steeper sloped than the clear-cut beyond and therefore is more susceptible to erosion.

(To follow these statements of erosion along roads more easily see slide #29).

"Some Implications of Large-scale Clear-cutting in Alberta", on pages 45 to 68 points out with professional research, that CLEAR-CUTTING ALONE ALREADY causes dangers of increased flooding, as well as siltation in watersheds. (The research findings in "Some Implications of Large-scale Clear-cutting in Alberta" form part of this brief and should be read in conjunction with the brief). Most of this research refers to areas where scarification as done in Alberta was not used following

clear-cutting, and the only soil disturbance in the areas referred to by this research consisted of log skidding and the construction of access roads. SOIL DISTURBANCE AS SUCH is however pointed out AS BEING THE MAJOR CAUSE OF EROSION AND SILTATION. S.T.O.P. therefore wishes to stress that the effects of clear-cutting in relation to erosion and siltation, as pointed out with that research, SHOULD BE MULTIPLIED BY AN APPROPRIATE FACTOR TO TAKE INTO ACCOUNT THE ADDITIONAL EFFECTS OF SOIL DISTURBANCE BY MECHANICAL SCARIFICATION OF THE ENTIRE CLEAR-CUT AREAS, as practised in Alberta.

Whilst the effects of CLEAR-CUTTING ALONE are gradually lost starting within the first 5 years following the cutting in accordance with that research, it appears obvious that the damage caused by mechanical scarification as practised in Alberta will last much longer.

* * * * * * * * * *

PROPOSAL # 2: ABANDON LARGE-SCALE CLEAR-CUTTING IN ITS PRESENT FORM. PERMIT PROPER STRIP-CUTTING, LIMITING STRIP-CUT WIDTHS, AND LIMITING AREAS WHERE USED.

Under this proposal it is recommended by S.T.O.P., that strip-cuts be limited in size to a maximum width of 3 chains (200 feet), and to a maximum length of 6 chains (400 feet). It is further recommended that strip-cuts be laid out in a careful manner, contoured around hill terrain, with the narrower dimension parallel to the direction of the prevailing winds, and laid out in a checker-board fashion. Strip-cut margins should occur where full wind-force cannot easily develop, such as in locations where timber height is lowest.

The limited width of the strip-cuts reduces areas between margins of remaining stands, thus providing better environment for natural seeding of fir and spruce. It also provides the required conditions for growth of these seedlings namely shade, wind shelter and appropriate soil moisture. The environmental conditions for growth of sub-climax and climax species such as fir and spruce are greatly improved within the proximity of the margins of remaining timber. Climatic conditions are less severe in areas closer to margins.

This is backed up with forestry research, in "Some Implications of Large-scale Clear-cutting in Alberta", pages 19, 20 and 26 in particular, as well as on pages between these numbers in general (the information in that book should be read as part of this brief).

The limited size of strip-cuts are of course, also intented to prevent development of full wind-forces against the side of trees, since this could cause wind damage to remaining stands.

The limited size of strip-cuts would further facilitate hand piling of most slash into shaded areas, where the necessary environment for decomposition, such as shade and humidity exists, thus speeding natural slash decomposition. Humidity present in these shaded areas further would reduce the danger of slash fires, which is described as extreme in clear-cut areas in "Some Implications of Large-scale Clear-cutting in Alberta".

There should be little difficulty in convincing responsible timber operators that reforestation efforts will have much greater success in narrow strip-cut areas, as proposed above. Mechanical harvesting equipment can still be used in this strip-cut method. Scarification by the present method should not be done in these strip-cut areas, and could be replaced by spot scarification where necessary (see Proposal # 1).

Reforestation problems, watershed damage and water conservation problems could be greatly reduced by limiting the size of strip-cuts.

* * * * * * * * * *

PROPOSAL # 3: USE "SELECTIVE CUTTING", WHERE STRIP-CUTTING PROVES, OR COULD PROVE, DETRIMENTAL TO THE ENVIRONMENT.

but how then to do with fire ague?

Undoubtedly there will be certain locations within mature timber areas in which all timber is of fire origin and even-aged, and in which strip-cutting may be inadvisable, due to variables of wind direction which could threaten the remaining margins of timber with wind damage.

For such locations, as well as for locations which require special environmental considerations, such as: steeply sloped terrain (slopes over 10%), high altitude areas with fragile top-soil layers, areas with relatively high underground water tables and similar special problem areas, it is recommended that an appropriate selective cutting method be chosen from methods proposed below.

No roads?

The advantages of proper selective cutting are numerous. The forest environment is never damaged beyond recovery. Water management problems and watershed siltation problems do not even arise. Natural regrowth especially of sub-climax and climax species of coniferous trees takes place under much improved environmental conditions, at much faster rates.

why faster?

All types of selective cutting chosen must of course be in concept with GOOD forestry management practise. This dictates that in every type of selective cutting sufficient numbers of the healthiest and best trees must be left standing as a seed source, especially when they are to be relied upon to do natural reseeding. This applies also to selective cutting in even-aged stands of timber.

This is of course contrary to the type of selective cutting that was and maybe still is practised in many places in North America today, which left only worm infested or diseased trees and "old runts", after selective cutting in even-aged stands.

The entire success of selective cutting therefore seems to depend on who is doing the cutting and under which motives.

Certainly those interested in maximum short-term profit would only leave old runts and diseased trees, but THEY should not consider that protecting the renewability of the timber resources in Alberta.

Even if some of the profit may become lost on immediate short-term basis, it is never completely lost. An operator will have fewer problems of establishing regrowth, and can furthermore go back as soon as regrowth has established, to harvest the balance of the mature healthy timber, probably in about five to ten years following the initial harvest.

Successful selective cutting can be done in almost all types of timber. In even-aged stands it should be done by thinning the mature trees evenly, and in such a way that:

a) Stands are not thinned to an extent, which would permit wind to come down below tree top height, where it could cause wind damage by developing its full force against the side of trees.

b) Spruce, fir or mixed stands should be thinned sufficiently to provide the proper space and environmental conditions necessary

for regrowth by natural reseeding and/or artificial regeneration by planting (where inadequate natural reforestation occurs it should by supplemented with planting).

c) In mono-culture pine stands the trees should be thinned sufficiently to provide adequate space and environmental conditions for regrowth of planted spruce, fir, poplar, aspen or even planted pine.

d) In all cases the balance of mature timber, which remains after initial selective cutting, should be harvested as soon as new trees have reached an age of five to ten years. At this age the young trees are still flexible enough to withstand a certain amount of abuse that may result from falling the remaining timber. Where necessary, the final harvest should be followed up with additional reforestation.

The main advantage of selective cutting in even-aged stands, is of course, that the forest environment necessary for optimum rates of regrowth regeneration, and for watershed protection, is maintained at all times during the timber operations.

The main disadvantage of the selective cutting method is that it provides for little use of ingeneous timber harvesting machinery. However this could be offset by economics in more successful regeneration. Regeneration of spruce especially, is extremely difficult in clear-cuts other than along margins of remaining timber.

From a provincial resource inventory point-of-view, spruce is much more valuable as a pulp species than pine, and is in many respects more valuable as a construction material as well. It is also reasonable to assume that it yields more fiber and usable wood per acre than pine.

It is therefore suggested that harvested spruce stands, which because of poor environmental conditions created by large scale clear-cutting must be regenerated with pine, result in a long range loss of resource values for the province.

It is therefore recommended that, wherever possible, pioneer species stands of pine which are selectively cut, should be replanted with spruce. This would constitute long range gain in resource value for the province.

The pine species being a pioneer species, will easily establish under almost any conditions, and there should be no concern about possible loss of same, for as long as there are forest fires there will be natural pine regeneration areas.

From a provincial economics point-of-view, it should also be taken into account that the environmental damage resulting from clear-cutting or strip-cutting in areas with fragile soil structures, or steep terrain, etc., could adversely affect future economics of environment protective measures that may have to be taken as a consequence. Selective cutting will prevent almost all types of watershed damage that is usually associated with clear-cutting and even possibly with strip-cutting.

This does affect the provincial economics. The Macleod River flood of 1969 would probably have been less serious, would it not have been for clear-cutting in head-water collecting areas of tributaries to that river.

Professional forestry research studies point out the danger of flooding caused by clear-cutting. It is pointed out that snow accumulation in clear-cut areas is approximately 50% greater than in adjoining stands of timber, resulting in discharge of 50% more water during melting. The moisture is also released at a much faster rate than from within remaining timber stands during melting. In Alberta, it is claimed by this research work, "the increased and faster run-off from melting snow occurs at a time when north and east flowing rivers are still covered with ice, which could cause severe flooding implications" (see pages 48, 52, 53, 66, 67, 68 in particular, and other pages between these generally in "Some Implications of Large-scale Clear-cutting in Alberta").

The same pages of that research book state, that the siltation created by clear-cut areas leads to a rise in average water levels, increasing the flood hazard at lesser flood flows.

The question arises whether the provincial treasury and thus the taxpayer should be burdened with additional future costs for damage to environment and especially to watersheds, which could occur possibly far downstream from, but as a result of clear-cutting? There could be astronomical costs involved in assessing damages that may require compensation for flooded farm lands, for reconstruction of roads, bridges, railroads, etc., to retain, and again regulate our watersheds.

These are economic factors which could in the future be felt by many Albertans, but which may not be recognized by those merely concerned with the economics of harvesting timber.

It certainly seems warranted that a complete review of the economics of clear-cutting, versus those of selective cutting, be undertaken on such an overall basis by the Government.

There are almost 200 square miles which were denuded by clear-cutting in the Hinton area over the last 16 years, and the water retention qualities of these areas seem to have improved little since start of cutting. Professional research in "Some Implications of Large-scale Clear-cutting in Alberta", page 68, states that "effects of clear-cutting in respect to watersheds will last for more than 30 years", and "cutting should be planned now for the year 2000, since the proportions of the timber leases effecting run-off will be large by then".

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PROPOSAL # 4: PROVIDE WATERSHED PROTECTION WITH BUFFER ZONES ALONG WATERSHEDS AND BODIES OF WATER.

Under this proposal it is recommended that no timber harvesting be permitted by the clear-cut or strip-cut methods within a buffer zone along shores of lakes, rivers, streams and creeks, to protect both the recreational aesthetics and the quality of the watershed from damage that may result from such methods of timber harvesting.

The buffer zones should have "ABSOLUTE MINIMUM WIDTHS", and should furthermore conform to REQUIRED MINIMUM WIDTHS as follows:

1) The ABSOLUTE MINIMUM WIDTHS for INTERMITTENT CREEKS AND STREAMS, should be 200 feet on each shore side, measured from the creek bed towards the timber harvest margins, at 90 degrees to the shoreline.

Why?

2) The "ABSOLUTE MINIMUM WIDTHS" FOR ALL OTHER BODIES OF WATER, lakes, rivers, streams and creeks, measured from the HIGHWATER MARK towards the margin of the timber harvesting operation, at 90 degrees to the line forming the high water mark, should be whichever is THE GREATER WIDTH:

How were these figures selected?

either a) a width of 500 feet,

or b) a width, equal in distance to 30 times the distance between the high water marks on opposite shores of that body of water (at point of buffer zone measurement), except that the minimum absolute width need not be more than 2,000 feet.

3) The REQUIRED MINIMUM WIDTH of any buffer zone along each shore should be the "absolute minimum width" as defined by 1) or 2) above, PLUS any additional width necessary to locate the line of timber harvest margin in accordance with good forestry practise into such a location that the margin of the stand remaining after harvesting is not subject to predictable wind damage.

The reasons for the above proposals are most evident from the damage that has resulted to watersheds by indiscriminate harvesting up to the shore lines. Where ?

All types of watershed damage could be greatly reduced with such regulations if properly enforced, and if offenders are made punishable by losing their cutting rights, for at least a year upon first offence.

The timber could still be harvested within the buffer zones by selective cutting which should be restricted to leave a minimum of 60% of existing timber to remain unharvested in these zones. What about wind damage, skid-road erosion, etc ?

Although there seem to be regulations at present which require buffer zones of 66 feet for small (?) creeks and waterways and 330 feet for larger (?) rivers, and bodies of water (the existence of such present regulations could not be verified at time of this writing). Such regulations would be inadequate if they exist, and are not enforced at present. Oh!

S.T.O.P. has pictures of pulpmill operations cutting right across small creeks and cutting right into rivers. These pictures are submitted simultaneously with this brief to the Minister of Lands and Forests. Also according to a letter received and subsequently verified by other verbal reports, the clear-cutting operations at Kinky Lake and Wildhorse Lake were carried right up to the shore lines of these lakes (copy of letter forms part of the brief).

b) That timber operators be required to restore to forest environment all such access roads, skid roads and places of log loading which they do not intend to maintain or no longer require after harvesting, immediately after harvesting and prior to reforestation efforts in that harvesting area.

How do you get access to reforestation areas?

c) That restoration proposed under a) and b) preceeding, consist of the following:

Filling of road-cuts, washouts, etc., to be flush with surrounding terrain, with suitable soil material to facilitate regeneration of forest growth. Securing fill in areas subject to further possible erosion by suitable means, such as driving of stakes, etc. Replanting and reseeding of these areas to the same Government Standards, as applicable to the surrounding, harvested area.

d) That timber operators be required to place any future access roads, skid roads and places of log loading in such a manner and into such locations, which will cause the least possible erosion, and the least possible damage to the environment, subject to approval of the Department of Lands and Forests.

The reason for the forementioned proposals is that, in the past, no effort seems to have been made by the timber operators in their lease area, to either maintain, or restore to forest environment, their access and skid roads and places of log loading within the already completely harvested areas. These roads and places of loading are obviously of no more use in most cases for such a time until successful regeneration has taken place and the regenerated trees have again grown to maturity.

In many cases these no longer needed facilities have deteriorated to the point that road beds at lower elevations than surrounding terrain have washed out to 3 feet in depth. S.T.O.P. has found in their investigations, that almost every plot harvested to date (since 1956) has one of these severely eroded access or skid roads, with erosion scars in many cases so deep that they can be noticed from a mile away. Plenty of evidence of such eroded roads can be seen on the photographs and slides submitted simultaneously with this brief to the Minister of Lands and Forests.

In almost all cases the access and skid roads subject to such severe erosion had been built in, and along, the lowest portion of surrounding clear-cut terrain. They thus became ready-made places where the run-off water from clear-cut hillsides would collect, only to charge along the road-cuts towards still lower terrain, washing out the roads in the process. In many cases the washed out soil is ultimately deposited in the form of silt in watersheds of the area.

No attempt seems to have been made by the timber operators responsible for the construction of these roads to locate them into places where environment damage would be kept to a minimum. On the contrary, it appears that rather the opposite is the case. S.T.O.P. also found that access roads were never cross-ditched, as is now the requirement for seismic trails (cut-lines) constructed on sloped terrain by oil and gas exploration companies.

It is the opinion of S.T.O.P. that regulations pertaining to construction of access roads by timber operators are long overdue.

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PROPOSAL # 6: IMMEDIATELY EMBARK UPON A PROGRAM TO REFOREST BY MANUAL REPLANTING, SUCH AREAS IN WHICH RATE, OR DENSITIES OF REGENERATION ARE SLOW OR INADEQUATE. REPLANT WITH FAST GROWING POPLAR OR ASPEN IF NECESSARY.

Under this proposal it is recommended that harvested areas which were reforested under the former Government Standards and which show obvious failure, such as inadequate densities or inadequate rates of regrowth of new trees, be replanted by specially hired groups of workers. For this purpose it could be considered by the Government that the necessary manpower be hired under the proposed Provincial and Federal Government summer employment programs, and that experienced silviculturists be put in charge of the operation.

Why would planted stock grow away faster than natural regeneration

It is further recommended that where coniferous trees are chosen for such replanting they should consist of minimum 3 year old trees, and that in areas where several previous failures with coniferous tree replanting were experienced, poplar or aspen be used for replanting. The poplar and aspen trees are deciduous pioneer species which grow under some of the most adverse conditions, at rates much faster than coniferous species. The poplar or aspen could be planted as a temporary cover crop, which could provide the proper environmental and climatic conditions for later successful planting or seeding of spruce, under the canopy of these rapid growing deciduous trees.

There are no such areas.

The reason for the forementioned proposals is that the regeneration in areas harvested by NWPP, in general appears to be too slow in growth, and of insufficient density over much of the nearly 200 square miles

thus far harvested. The purposes of the proposed immediate replanting measures would be to prevent further environment damages which could arise due to failure to immediately restore the forest environment.

hey this change of heart!

This brief recognizes the fact that there are several areas of excellent densities and rates of regrowth amongst areas reforested by NWPP. But, these small areas of approximately 80 to 100 acres each are so limited in number, that they seem to bear absolutely no relationship to the approximately 200 square miles harvested to date. Such lots of apparent good standing were noticed with great satisfaction during the field investigations carried out by S.T.O.P. One of these small plots is situated in the midst of an area bald almost from horizon to horizon, along the Forestry Trunk Road about 7 miles east of the Macleod River Campsite. It is marked with a conspicous (public relations?) plaque by the company with the wording, "NWPP Reforestation Project, Alpine Fir, 1958". This lot demonstrates that the company CAN grow trees AT THE RATE OF ONE FOOT PER YEAR, within that bald area. Much of that surrounding bald area had been cut before 1963, and regeneration seemed to be inadequate or too slow in growth. Complaints about apparent lack of regrowth in that area had been answered by the Department of Lands and Forests with statements that people must crawl around on their hands and knees in order to find the trees (these areas had been observed to suffer from lack of regrowth for almost ten years). It was further stated, that it may take from 15 to 20 years for these small trees to grow above the grass (the grass in most of that area is sparse and less than 6 inches high).

Oh! oh!

Nonsense.

who paid for?

This brief questions the validity of these statements by Lands and Forests Department Timber Management Officials, and similar statements made by pulp-mill officials. If it is supposed to take 15 to 20 years in most of the areas for a tree to grow 6 inches tall, then why is the company able to grow FOURTEEN FOOT TALL trees in the lot advertised with a plaque, IN JUST FOURTEEN YEARS? It must be stressed that this lot is in the middle of an area that is supposedly an area where, in accordance with those statements, IT TAKES FIFTEEN TO TWENTY YEARS FOR A TREE TO GROW SIX INCHES TALL.

If what statements?

This brief also questions the validity of these statements, with respect to the 80 year cycle in which the company is committed to regrow the timber resources harvested by them. This forms the basis of the amount of area of timber harvested each year by NWPP, and the basis of their "Forest Management", as repeatedly stated by Mr. Crossley, chief forester of NWPP.

This brief furthermore questions the supposed slow rate of growth in areas harvested by NWPP, compared to fast regrowth following forest fires in the same general area, such as the Antler Creek to Mercoal forest fire in 1956. In this area of forest fire, trees are now well over ten feet in height.

They are even greater than those areas cut seven the same years.

S.T.O.P. is of the opinion that forests should be managed in such a way that regrowth of sufficient density takes place in the shortest possible time following harvesting, in order that environment damage is kept to a minimum.

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PROPOSAL # 7: REQUIRE POSTING OF ALL HARVESTED AREAS WITH WELL VISIBLE SIGNS ON ALL CORNERS OF HARVESTED AREA. SIGNS TO IDENTIFY PLOTS AS TO DATE HARVESTED, DATE OF SUBSEQUENT REFORESTATION EFFORTS, NAME OF TIMBER OPERATOR, SIZE OF AREA, PLUS PLOT NUMBER TO CORRESPOND TO LIKE NUMBER TO BE HELD IN GOVERNMENT FILES.

This proposal is recommended for the reason that it would greatly ease enforcement of Government requirements. Each lot could be easily identified in the field without the help of a surveyor, even by members of the public. Each operation that is not conforming to Government requirements could be easily spotted by Government personal charged with such enforcement, and by concerned members of the public.

The posting may also help for orientation in the field, particularly along new roads. In this respect it would, no doubt, be found useful by members of the public, employees of the timber operator and Government personal. This could be of special benefit during emergencies, such as accidents, injury of persons and forest fires. The signs could take similar orientation significance as the signs erected by oil and gas companies to identify their wells.

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PROPOSAL # 8: CHANGE REFORESTATION STANDARD RESTOCKING REQUIREMENTS FROM THE PRESENT 40%, TO A MINIMUM OF 150%, RESTOCKING OF MATURE TREES CUT DURING CLEAR-CUT OPERATIONS.

This proposal recommends an increase be made in the required amount of trees to be re-established within a given area, after clear-cut or strip-cut harvesting.

(Under the present reforestation standards set by former Alberta Governments, it is required that in any contiguous 10,000 mil acre area, at least 4,000 mil acres must each have one established coniferous seedling that has grown for three years in that location, except that 2 two year old seedlings which have grown on such a mil acre will be recognized in lieu of one established three year old seedling).

The reasons for this proposal for increase in restocking are as follows:

The present requirements, if exactly adhered to by a timber operator in the field, could mean:

a) That only 40% of any ten acre area requires such an established seedling for each mil acre, with the remaining 60% of that clear-cut area requiring no seedling whatsoever under those standards.

With that in mind, an operator could purposely make his clear-cuts 60% wider than good forestry practise would allow him for margin seeding, and/or successful regeneration under the favourable margin climatic influence permits. Each margin could be relied upon, more

lack of understanding of primary method

or less by the operator, to successfully influence the regeneration of a strip along the margin equal to 20% of the total clear-cut width, at the the required density of one seedling for each mil acre.

THE REMAINING 60% OF THE CLEAR-CUT WIDTH, WHICH IS THE MOST DIFFICULT TO REFOREST BECAUSE IT IS FARTHEST FROM THE MARGINS, NEEDS ON THIS BASIS NOT TO BE REGENERATED AT ALL, UNDER PRESENT REQUIREMENTS.

The same present requirements, if exactly adhered to in the field, could also mean:

b) That an even distribution of 400 trees per acre, at exact equal spacings is sufficient reforestation. At such theoretical equal spacings, planted trees or seedlings would have to be at spacings of 10.8 feet centers.

Again, a basic misunderstanding

400 stocked mil. acres does mean that there are only 400 seedlings per acre.

This spacing was arrived at by taking the square-foot area of an acre, namely 43,560 square feet, and dividing it by 400, the amount of trees per acre necessary. Thus it is found that there is one tree required for each 108.9 square feet, and the square root of that figure, namely 10.8 feet, would be the center to center spacing the trees have to be apart, in even equal spaced distribution.

This means that if one tree should die before it grows to be mature, four trees would be 21 feet apart. Of course, there will be more than one tree that will fail to grow the full 80 years to prime maturity.

S.T.O.P. has taken photographs of an average dense stand found with new tree growth well above the grass. The trees in that area appeared to be possibly intermixed with some advance growth, and their average age was estimated to be between six and eight years. The trees in that area appeared to be from ten to eighty feet on centers, as can be clearly seen on the pictures and slides submitted with this brief. This could mean that there is a density of one tree for each 10 feet x 80 feet area, that is one tree for each 800 square feet of area. If so, it would also mean that if the trees were originally planted and checked when they were three years old to conform to theoretical minimum spacing of one tree for each 100 square feet, THEN SEVEN OUT OF EIGHT TREES MUST HAVE DIED WITHIN THE SHORT TIME OF THREE TO FIVE YEARS.

As pointed out in "Keep Alberta Green" (copy attached as part of this brief), there are many reasons why small trees fail to grow. There are natural hazards, disease, pests, fungi, browsing animals, etc., all effecting the successful survival of a tree until mature. In scarified areas, in particular, these hazards seem to be increased due to adverse climatic influences, as pointed out elsewhere in this submission.

It is suggested therefore, that the density of trees to be established following clear-cutting and scarification should be adequate to allow for conditions under which the new trees will have to grow.

No allowance seems to have been made for natural die-off of trees, during their growth to maturity, under present Government Standards. Existing older spruce stands within the Hinton pulpmill lease area were observed to have trees at approximate spacings of six to eight feet on

center, average. This approximately, or nearly, is equal to a density of one tree for each mil acre. Only 40% of that is required to be re-established by the present Government Standards.

NWPP representatives have made statements that their reforestation, as checked seven years after harvesting, is 90% successful. This reduces the 40% required restocking density to 36% of actually re-established density, and amounts therefore to only 360 trees per acre. If only half of these trees die during their subsequent 80 year growth to maturity, there would be 180 trees left per acre at maturity. This amounts to only about 18% of the density that can be found presently in existing older stands within Alberta. In Sweden, it was recently stated in an informative newscast, two trees are planted for every tree cut off in harvesting, this constitutes 200% restocking, and allows 100% mortality during the 80 year growth to maturity, resulting again in 100% of mature timber available for harvesting.

Nonsense!

Don't play around with the word "stocking".

In Germany, three year old, or older, trees are planted in rows approximately 6.6 feet apart, and approximately 3.3 feet from each other in the rows, which amounts to an equivalent of 2 trees per mil acre.

Nobody does they plant so thickly.

These European Countries have 300 years experience in regenerating their forest growth, and in Germany almost all timber to-day was established by artificial planting. Certainly with so much experience someone would have noticed if these reforestation densities would have been excessive in Europe.

Some one has, & this includes the foresters.

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PROPOSAL # 9: REQUIRE A BOND FROM TIMBER OPERATORS PRIOR TO HARVESTING THAT WILL GUARANTEE SUBSEQUENT REFORESTATION TO BE SUCCESSFUL AND OF SUFFICIENT DENSITY AND GROWTH RATE WITHIN TIME ALLOTED FOR REGENERATION.

This recommended proposal would require a bond to be posted by timber operators prior to issue of a permit for harvesting. The bond should be made out in favour of the Government, and should be for a sum of money that is adequate to cover any costs that the Government might occur for reforestation, if such an operator fails to regenerate new forest growth in accordance with Government Requirements.

The funds derived by the Government in case of such a bond having to be forfeited upon default by the operator could be used to contract the regeneration of that particular area in which the operator did not establish adequate reforestation, to companies specializing in forest regeneration.

The present agreement between NWPP and the Alberta Government dated August 30, 1968, does not require a bond pertaining to reforestation. It does, however, provide a general bond in the amount of $25,000 which can ONLY BE DECLARED FORFEITED by the Government if the company gets in default AFTER CONSTRUCTION OF MILL-EXPANDING FACILITIES (see agreement, clause 44.(1)). This present agreement (clauses 1.(1)g and 6.(3)a) even provides that the company be reimbursed for regenerating forest growth in areas harvested by them (upon withdrawal of lease area lands by the minister).

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PROPOSAL #10: BEFORE PERMITTING ESTABLISHMENT OF, OR GOVERNMENT ADVERTISING TO RECEIVE PROPOSALS FOR ESTABLISHMENT OF ANY NEW PULPMILLS IN ALBERTA, OR SIMILAR LARGE TIMBER-USE OPERATIONS, REQUIRE PROVINCE WIDE PUBLIC HEARINGS, AND/OR PLEBISCITES TO ASCERTAIN PUBLIC OPINION.

This recommended proposal would assure that concerned citizens can express their views in relation to possible wide-spread ecological effects, such as increasing incidence of watershed damage, and in respect to the ecological importance of adequate forest reserves in Alberta.

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CONCLUSION

S.T.O.P. wishes to stress that the aforementioned proposals constitute a sincere effort on their behalf to submit not only complaints about environmental damages found, but submit as well constructive criticism of how the damage could be repaired, and how such damage could be avoided in the future.

The ideas expressed in this brief are the result of much volunteer work, and include valuable information suggested for inclusion by concerned professional foresters to Mr. A. Zimmer. These include foresters from the Alberta Forest Service, and even forestry personal working for the NWPP Company, besides others.

One of the A.F.S. foresters who contacted Mr. Zimmer, was so concerned about inadequate regeneration in the NWPP area that he used some non-repeatable expressions to describe what he thought of it. He was further of the opinion that the Silvicultural Section in the Department of Lands and Forests was powerless to do anything about the matter. He blamed the circumstances on the fact that the timber use section overruled most silviculturist opinions expressed in the department. This forester expressed his desire and indicated that other Alberta silviculturists may share his feelings, that the Silviculture Section should be taken out of the Lands and Forests altogether, and be included under the Department of Environment. We pass this on as information only, for what it may be worth. What is it worth!!

During the final stages of this writing it has become evident that other organizations are also concerned about inadequate rates of regrowth in the NWPP lease area. What other organizations?

Again for information only, we advise that the Canadian Union of Public Employees in Alberta, with a membership said to be 15,000 strong, ? have passed a resolution asking for more strict enforcement pertaining to re-seeding of timber areas harvested by pulpmill operators. And further, that the Alberta Fish and Game Association has set aside $2,000 ? $2000.00 to investigate the damages claimed to exist in the pulpmill area in resolutions passed by their Zone 4/5.

Obviously many citizens of Alberta are extremely concerned.

It is hoped that this brief and the photographic evidence submitted with it, will cause sufficient concern among members of the new Provincial Government, to personally inspect more of the types of damage which exist in the NWPP lease area, examples of which are shown on the photographic evidence.

Mr. Zimmer has agreed to go back into the area where the pictures were taken and guide concerned members of the Government into areas found damaged.

Valuable evidence about European Standards of reforestation, which have proven to be successful for centuries, could possibly be obtained in writing, by contacting Forestry Departments of European countries mentioned in this brief, or alternately by on-the-spot investigation.

These are already known.

We sincerely trust that the Government will take all necessary action to prevent further damage to our forest environment and to have existing damage repaired as soon as possible. We hope that the foregoing proposals merit consideration by the present Government for implementation, to "KEEP ALBERTA GREEN".

Respectfully submitted by:

S.T.O.P.

(Save Tomorrow - Oppose Pollution)

Edmonton, Alberta

(Date) June 7, 1972

(Signatures)

" KEEP ALBERTA GREEN "

An Investigation of Reforestation Practises in Alberta
Prepared for S.T.O.P. by Mr. Arnim Zimmer

"one tree has the cooling effect of five air conditioners."

"Noise levels are reduced by six to eight decibels by green belts one hundred feet wide."

"One acre of growing trees will scrub clean the air polluted by eight automobiles operated for twelve hours."

"The same acre will absorb the carbon dioxide produced by fifty automobles driven twelve hours."

"A green belt less than three hundred feet wide will produce the same effect on the atmosphere as a one mile increase in altitude."

State Forester A. R. Bond
Quoted by the Ottawa Journal

Additional copies may be obtained from:

S.T.O.P. (Save Tomorrow-Oppose Pollution)
Room 230, Student's Union Building,
University of Alberta,
Edmonton, Alberta,
phone 432-5165.

Alberta's greatest gift from nature is its natural forest environment.

The natural forest environment consists not only of a conglomeration of big and little trees more or less valuable as timber resource, but consists of a multitude of smaller plants, which together with the trees form an interdependant environment. It includes various shrubs, berry-bushes, grasses, wild flowers, mushrooms, moss, lichens and so on. Most of these plants can only grow successfully within the protection of this environment.

This interdependant relationship becomes clearer, if it is understood that the taller trees provide necessary shade for the smaller plants, while the small seedlings of big trees are dependant, during pro-longed dry weather, upon ground-moisture retained by the smaller plants, such as moss, etc.

The natural forest environment plays an important role in our total ecology.

The many different kinds of plants found in our natural forest provide the habitat necessary for the successful survival of hundreds of different species of animals. These include all our wood-land game, most of our fur-bearing animals, a whole range of other small mammals, all sorts of birds, plus many kinds of insects, some of which, like the wild bees, butterflies, are in turn necessary for survival of certain plant-life by carrying on pollination.

Natural forests regulate our supply of water, and provide our streams and rivers with a constant supply of naturally pure, mineral-enriched water. Rain water and water from melting snow is temporarily stored by having to drip through a mass of branches into grass and moss, where it must trickle through a thick spongy maze of minute plant-fibres. The thick plant-growth prevents the water from gushing over the ground, and the water is slowed down or stopped to seep into the ground. Seepage through the maze of plant fibres, and through the ground, filters impurities from the water, while the water is at the same time enriched with trace-minerals from the ground. Many of these minerals are beneficial, if not necessary, for health of plant and animal life alike.

When the water finally emerges from its travel below ground at a low point in the terrain, it provides the source for our CONSTANT supply of fresh water in our creeks, streams and rivers. It emerges constantly because water entering the soil near the well will emerge sooner than water entering the ground at more distant points from the well. Without the protection of the forest environment, little water enters the ground, and most water will simply wash over the surface causing erosion, siltation, and flash-floods followed by drying-up of wells and small creeks soon after dry weather sets in.

Our forest environment also cleans and "scrubs" our air of pollutants. Carbon dioxide exhaled by man and animals, and produced by all types of combustion, is re-converted by our forests into pure oxygen while the carbon is absorbed by the plants. Other forms of pollutants are literally "scrubbed" from the air. Forest growth also slows down the air-currants and allows heavier-than-air pollutants to slowly settle to the ground. When the forest is moist due to precipitation this scrubbing action becomes even more effective, as air-borne particles are being caught by branches and growth, much in the same way as in a moist air-filter. These particles are then washed into the ground during subsequent rains, and filtered from the water as described.

Other plants which take their nourishment directly from the air, such as lichens, can absorb even such pollutants as radio-active fall-out directly from the air. The invigorating air we breathe in a forest is therefore not imagination, it is a natural fact.

The combination of fresh air, shade, humidity and the scent of trees, shrubs and flowers, plus the serene quietness which is only interrupted by the occasional chatter of a squirrel or the sudden rise and stop of a bird song, provides us with one more benefit from natural forest environment, namely a place to re-create our human awareness and spirit, and a place to go for cleansing of our minds and souls, away from the noise and stench that has fallen over our cities.

Alberta's forests provide us with lots of good harvestable timber. By harvesting in a careful manner, and with proper reforestation, we can harvest raw timber in perpetuity and protect our environment as well.

If we harvest irrationally without care we will destroy not only the forest environment, but the renewability of the timber resource as well.

The harvesting method most damaging to the environment is the practice of clear-cutting of large areas, often more than a square mile in size. This method becomes especially destructive, if it is followed up by slash removal methods which destroy remaining plant-life and disturb the soil-reinforcing root-work underground which took centuries to grow, and which is necessary to hold the soil in place against erosion.

The clear-cutting methods are presently being used by timber operators, mainly for economic reasons. Some of the new tree-harvesting machines can de-branch, fell, and store a tree in a log-pile faster than some woodsmen could start a chain-saw. But the machines require "elbow room" to operate, and are costly to move from place to place. They therefore cut everything that is either usable timber or gets into the way, and any balance of smaller trees and bush is soon run over by the machinery or buried under piles of slash. Slash consists of branches, short and broken ends of timber, crooked logs, and of course the large amount of small trees, which are not usable timber and are merely cut down because they get into the way.

Immediately after clear-cutting, the area looks as if it was hit by an atomic blast or some sort of terrible natural disaster. Twisted slash covers the entire area to an average of one foot thickness of solid wood.

Timber operators, harvesting in our forests, are required to replace removed timber through reforestation programs. For operators which use clear-cutting methods this is an impossible task as long as the slash remains on the ground, since even walking over it is extremely difficult.

The slash would be no considerable problem, if it would rot as fast as it does in a natural forest environment. However, with this environment gone, fungi and bacteria necessary for decomposition of slash, no longer have the required shade and humidity necessary for their successful survival. As a consequence the slash starts to dry out, and becomes a fire-hazard, and would probably lie around for centuries, or at least until sufficient natural growth has re-grown to provide the required environment for decomposition. This could either take too long, or may not happen at all.

The slash must therefore be at least partially removed by man, before any attempt at reforestation can be made. So to overcome one machinery caused problem, other machinery is brought in. Two methods for slash removal have thus far been used in Alberta clear-cut areas.

The first method consisted of bringing in bulldozers to pile up the slash in hugh windrows for burning. This was a very effective slash removal method but unfortunatley, it virtually destroyed the possibility of successful reforestation. Not only was the slash bulldozed together, but in the process all vegetation was completely stripped away, the soil-reinforcing rootwork was torn from the ground and often the topsoil was stripped from the area. After the windrows had dried for several years they were set on fire, and the remains and ashes were re-distributed over the area.

During the century that it may take for a forest to grow and mature, up to 90% of the plant nourishment originally in the soil is absorbed and stored in the trees. When the trees are removed by harvesting most of this percentage of fertilizer matter becomes lost to the area. The burning process then destroyed the balance of this percentage of natural fertilizer matter contained in the slash, rootwork and other vegetation. Although the remaining ashes are re-distributed, very little is left from a former forest to help future growth. The freshly spread ashes and the remaining topsoil (which is no longer reinforced with a network of roots) are easily washed down-hill during major rainfalls. This has resulted in wash-outs, erosion and siltation of nearby water sheds.

Fortunately this method of slash removal is not used often any more, and may even have been completely abandoned. A newer method called "scarification" is extensively used at present.

Scarification tries to overcome some of the problems caused by the just described method.

Scarification equipment consists of bulldozers equipped with heave triangular steel wedges, three per machine. Each wedge measures about 2'-6" at all its triangular sides. The wedges are pushed into the slash in an effort to break up the slash and bury it at the same time. Dragged behind the machines is a heavy chain harrow about 15' x 15' in size. The harrow consists of a net of arm-thick chain links equipped with arm thick steel spikes each about a foot in length. The harrow is followed by a heavy 4" square steel drag-bar about 15' in width.

The equipment is partially successful, burying about 50% of the slash, and the fertilizer matter in the slash no longer gets lost by burning.

However, this method also completes the destruction of what initially was an ecologically balanced and intricate forest system. Not only does the equipment bury or tear from the ground every last bit of grass, bush, moss and mushroom, and leaves the area looking like a desert, it also loosens the topsoil and tears out the reinforcing rootwork. The method is particularly dangerous for use on terrain with more than 8% slope, where erosion of topsoil becomes a much greater problem. The bald earth is unable to stop rain water from gushing over the surface which causes washouts, erosion and siltation of watersheds, and leads to the damages of downstream flooding in waterways. In hot weather the soil in scarified, clear-cut areas becomes parched with arid dryness soon after the rains, and as a consequence, small creeks are known to have dried up completely in their upper reaches during 1971, a relatively wet year. The forest environment is being destroyed to an extent that it becomes difficult to re-grow new trees by reforestation.

Reforestation standards set up the former Social Credit Government call for establishment of 400 trees per acre. This works out to about one tree for one hundred square feet, and would therefore require trees at about 10' x 10' spacings. In other words, trees should be about ten feet apart. The trees are required to have grown for three years in the area, when they are checked for complying with the density standards. This occurs seven years after the initial harvesting operation. The pulp companies are supposed to do their own policing for complying with the standards. In addition up to 1/3 of their policed areas are double checked by government inspectors.

While this spacing of trees at 10' on center would be a tolerable spacing, if all trees were to grow to an age of 30 years, it should not be assumed, that all 3 year old trees found in the area after planting will necessarily become thirty years old. It is by no means as good a spacing as occurs in not yet harvested stands in the area, where fully mature trees vary from 6 to 8 feet on center spacing in average.

We know how difficult it is to grow a little spruce or fir tree in our front lawn. The reason of course is, that a lawn is not a forest environment. But we try to make up for it. We provide a rich fertilized soil, we add peatmoss, we water the tree daily during hot weather, we spray it against insects and fence it againstmisuse by animals. In spite of all this care the little tree sometimes will not make it.

A small tree that is planted during reforestation in a clear-cut area gets none of this protection and care, and is exposed to a hostile environment. The question is not whether or not all trees will become 30 years old or older, the question is how many will make it?

S.T.O.P.'s inspection of reforested areas showed replanted trees approximately 6 years old and older occuring at spacings from 10 to 80 feet apart. That could mean an average of 1 tree per 800 square feet, establishe and growing. If so, it also means that, if the area was originally reforested at the correct spacing of one 3 year old tree per 100 square feet, then SEVEN OUT OF EIGHT TREES DIED WITHIN ABOUT THREE YEARS after government or pulpmill reforestation inspection.

Such a death-ratio should not be assumed as unreasonable under the conditions under which these trees must grow. Their greatest problem undoubtedly is lack of shade and lack of ground moisture. In addition the small treelings are subject to browsing by animals. A single deer or moose could in theory effectively clean out a whole acre of trees in one week, by biting the tops off, or tearing the plant out whole. Deer especially love to feed on the light green new branches forming each spring, and it is common practice in Europe to paint these tips with coal-tar in young stands to prevent this damage.

But the trees will also be subject to damage by other animals, rabbits, squirrels and insects etc., as well as subject to disease, erosion and other natural hazards.

Long range worse damage still could occur later, if the tree density were reduced by the fore-going damages to less than 1 tree per 400 square feet, because they would then be easily blown down during heavy winds, before they become 30 years old, and the whole timber stand could become lost.

It becomes evident that we must reforest at density rates more closely related to the conditions under which trees must grow.

At the same time the forest environment should be protected during harvesting from unneccessary destruction, and all accidental destruction that is neccessitated by temporary access roads, etc., should be fully repaired after harvesting is complete.

Selective cutting might be the answer for full protection of the forest environment, but since invention of machinery replacing workers, there appear to be suddenly all sorts of reasons why it cannot be done. However, even in fully mature stands it is possible to cut only every second tree and cut the remaining trees some ten years later. After trees that have naturally reseeded or were planted by reforestation are well established.

Soil disturbing machinery and the practise of destroying all plant-life and tearing out of soil-reinforcing rootwork should be stopped immediately and should never have been considered for terrain sloping more than 8%.

Water courses should be protected from clear-cut harvesting operations along their shores, for a distance from shore equal to 30 times the width between the high water marks of the water courses.

Clear-cutting operations, if at all used should be reduced to strip cuts not wider than 200 feet, and not longer than 300 feet, with the 200 foot dimension parallel to the direction of the prevailing wind. In this way the opening in the forest could be small enough to prevent development of the full wind force against the side of the fashion, and planned to prevent possible development of wind-damage. The method is extensively used in Europe, and any precautionary advise is likely available from most European forestry textbooks. Strip-cutting should be at least tried an alternate to present clear-cutting, since it would still permit moderate use of economic techniques by operators, and is less destructive to environment than the present methods.

With strip-cutting, slash should be hand-piled into shaded areas along the edge of remaining stands to accelerate natural decomposition. The soil should not be disturbed. The remaining stands would help to restore forest growth by protecting the ground moisture, by providing shade and wind shelter and by reseeding. Natural reseeding should be checked, and any areas which fail to recover naturally should be replanted without any major soil disturbance prior to replanting.

Slash may still be a problem in the strip-cutting areas, especially in high altitude or dry areas. But it appears that slash left by present operations includes about 10% to 20% usable pulp wood, which should be picked out by the operators. In all likelihood then, the slash could be reduced by that amount. Slash piles in dry areas which fail, or are expected to fail, to succumb to rapid natural decomposition could possibly be shredded into mulch. Machinery for such shredding is available on the market, and in extreme problem areas could possibly provide an alternative solution for disposal.

If strip-cutting methods should prove to cause unforeseen problems the only alternative left is a return to selective cutting, which has proven itself for centuries as not harming the forest environment. In mature pine areas where natural reseeding will not take place, fir could be planted between pine thinned by selective cutting.

There appears to be much room for improvement in existing harvesting regulations, and enough reasons to abandon the present clear-cut harvesting technic. At the same time, the public should be able to more easily assess any environmental damage caused by harvesting methods, and failure or success of subsequent reforestation. Each plot cut by an operator should immediately be posted well visible at all corners with a sign showing when it was cut, by whom, add the time of any subsequent reforestation effort, and identify the plot by a number corresponding to a number held in government files. Any operation not conforming to standards could then by easily spotted by the public and brought to the attention of the government.

It is in the interests of all Albertans to "Keep Alberta Green".

S.T.O.P. is preparing a brief that will be presented to the provincial government calling for a full investigation into reforestation practises and provincial reforestation standards.

The pictorial survey as well as this critique of present reforestation methods were prepared for S.T.O.P. by Mr. Arnim Zimmer of St. Albert, with the photographic assistance of Mr. Barry Hendrick.

Extensive forest environment damage and inadequate regrowth in reforested areas has been documented by "Save Tomorrow - Oppose Pollution" (S.T.O.P.) to exist in the pulpmill lease area leased by Northwestern Pulp & Power Company of Hinton. Documentation consist of 65 photographs assembled into pictorial displays, plus 65 slides, taken in the lease area during the summer 1971. The pictures show examples of the various types of damage caused by the clear-cut harvesting and scarifying methods used by the company, and show the inadequate regrowth in reforestation areas that have resulted by a combination of inadequate reforestation requirements set by the former provincial government in conjunction with the harvesting and scarifying technics. The damages and inadequate regrowth threaten the re-newability of the timber resources. The company lease area contains approximately 6,700 square miles of Alberta forest land. About 200 square miles of timber has been harvested by the company to date, by the clear-cut methods.

Game group to probe paper mill operation

The Alberta Fish and Game Association will conduct a $2,600 investigation of possible ecological damage in areas near the North Western Pulp and Paper mill at Hinton.

The investigation, to be carried out this spring, will examine the company's replanting procedures to see if they conform to provincial regulations and to determine if enough regrowth is taking place.

Also to be studied is the run-off of dirt from logging roads into rivers and streams. Excessive run-off can kill aquatic life says association President Tom O'Keefe.

The study will be carried out by checking sample areas of land logged by the company. The company owns roughly 3,300 square miles of land in the Hinton region. 200 square miles of which have been harvested.

Results of the investigation will be presented to the provincial lands and forests department, Mr. O'Keefe says.

A similar study was carried out by the ecology group STOP last year. Its findings included evidence of erosion, siltation and inadequate reforestation.

Protect resources, CUPE meet urges

JOURNAL MAR-20/72

Calls for protection of the environment and Alberta's natural resources dominated resolutions passed by the CUPE convention which would up here Saturday.

More than 175 delegates representing 15,000 Alberta members of the Canadian Union of Public Employees called on the province to increase oil royalties from the present approximate 47 cents per barrel to $1 per barrel.

They also urged the province to more strictly enforce re-seeding of timberland by pulpmill operators; to prohibit strip mining on high mountain meadows and in mountainous areas in national and provincial parks.

The delegates representing municipal, hospital, school board, hydro and library employees from throughout the province debated 75 resolutions during the three-day convention at the Macdonald Hotel.

They went on record as opposed to extending the length of the work day to shorten the work week.

The province was also called on to change the juvenile age so that it will be uniform for males and females; to incorporate kindergartens into the educational system; and to revise electoral boundaries to give equal weight to the urban and rural vote.

Delegates also declared that many provincial regulations — and acts — such as the Workmen's Compensation Act and the Local Authorities Pension Act — discriminate between the sexes. The convention urged the provincial government to strengthen and enforce anti-discrimination regulations so that both sexes would enjoy

Forestburg, Alta
Feb. 9, 1972

Armin Zimmer
8 Seymore Cresent
St Albert, Alberta

Dear Sir:

Last summer on our holidays we went to Wild Horse Lake & Turkey Lake. There were a few trees left around those lakes but other than that we saw a devastated area. The trees of any use or beauty were not there. The surface of the ground was rough and ridgey - ~~It was~~ We drove north of those lakes and for a large area there was nothing to be seen but destruction.

We then came & went South & East of Hinton to Quigley Creek or something like that. On the left hand side of the road (going out) we saw a sign announcing a Reforestration area of Lodgepole of 1960 acres. There the trees appeared small to me for their age and certainly far apart.

We have a power plant dam across the Battle River here and a strip mine. How can we give a Wild Life (Fish & Game) group

Yours truly.

C. C. Lafleur

Forest

The Journal's report on Armin Zimmer's ecology study (story, Feb. 7, Forest becomes 'disaster': STOP), and North Western Pulp and Power's rebuttal (story, Feb. 7, Report wrong, says company) were most interesting.

Hear! hear! Mr. Zimmer, I'm with you!

I lived in this area before North Western Pulp and Power, and the clear-cut method. Formerly, sawmill operators were required to use the select-cut method, thereby harvesting only saw-log timber. Our forest remained a thing of beauty. But comes the big operation, and economy for the company comes before conservation of our resources.

However, Mr. Zimmer, we really shouldn't worry about the scarring of our land. Mr. Crossley has told us that under the 80-year rotation plan, North Western Pulp and Power can do it all again to our great-grandchildren's land (maybe).

Notice in their rebuttal to you, Messrs. Crossley and Clark neglected your reference to natural reforestation over a burned area. In 1956 I lived in Mercoal (adjacent to North Western Pulp and Power leases). During that summer a forest fire ripped through the timber from the headwaters of Antler Creek to within 1½ miles of Mercoal. A train waited to evacuate the population. About the same time, North Western Pulp and Power began clear-cut forest operations of timber around Hinton.

As one drives to Jasper today, the bald strips appear to show little reforestation in the Hinton clear-cut area. On the burned-over area, trees are extremely dense, and average well over 10 feet in height.

Our Alberta is (was) a land of beauty. Clear-cut swathes are not very esthetic even if they are economical for North Western Pulp and Power.

Procter and Gamble are developing a pulp mill in Grande Prairie. Let's hope, Mr. Zimmer, that your study will prevent the same ecological disaster as you found in the North Western Pulp and Power operations. Let's hope, too, that it starts a select-cut operation for North Western Pulp and Power.

I hope you are eavesdropping, Mr. Yurko. Let's keep Alberta ecologically sound.

Mrs. A. Mihaljevich,
Edson.

Summer of Spring 1971

Pulp firms draw fire in Edson

EDSON (CP) — Two pulp and paper companies operating in west-central Alberta should not be granted further extensions of forestry leases if their options are not exercised by July 1, officials of the Edson Chamber of Commerce said Tuesday.

Northwestern Pulp and Power Ltd. of Hinton, and MacMillan-Bloedel Ltd. of Vancouver, have until that date to decide if they will go ahead with mill expansion and construction projects. MacMillan-Bloedel is considering a $50 million mill near Whitecourt and Northwestern is studying a $70 million expansion plan for its Hinton Mill.

Chamber officials said Northwestern has tied up forestry leases in the Edson area for 15 years and some of the lands should be opened up to native lumber cutters. The company was "turning the area into desolate sand hills with no concerted effort at reforestration."

The chamber intends to turn its views over to the Alberta Chamber of Commerce for study and possible presentation to the provincial government.

Forest

Regarding the article Forest becomes "disaster": STOP (The Journal, Feb. 7) my hearty congratulations to Mr. Zimmer and STOP!

At last someone has taken to task the sacred cow of Alberta industry, the North Western Pulp and Power Co. of Hinton. The laissez faire attitude of the former government toward the mill made many fearful that further protest against the company would be hopeless. But

Reforestation

In regard to The Journal's article April 10, Long-term project in re-forestation, we should all be able to appreciate such a rationally-sound reforestation policy in Alberta, even though, as was stated, our generation won't live long enough to see the proven results.

It will, then, be even more appreciated by our children, who, for once, will be able to see how much man really can improve on nature. He has lost the battle in many other parts of the world but will win here. Where, in some cases, it has taken nature 100-300 years to produce a high-quality tree in terms of pulp value, it can now be done in 80 years.

Although nature has never encouraged a monocultural system, we can now replace an entire natural forest with a "man-made" forest of purportedly equal economic value within a specified length of time. It seems somehow contradictory that nature has never been restricted by economic considerations, either.

I think nature would be most impressed if she could read a recently-released publication by the Northern Forest Research Centre, Some Implications of Large-Scale Clearcutting in Alberta, A Literature Review.

Anne Bronson,
Entrance

lic awareness, the new government will demand responsible use of its woodlands!

Those who know the country here have little difficulty showing you where water has cut gullies down logging-access roads or where the mill has cut timber across the headwater of a stream or have cleared trees along a watershed. There are also the problems of the foul stench which pours from the company's stacks or the brown, foamy liquid which the mill discharges into the beautiful Athabasca River.

The final irony lies not in the fact that people have lost and are losing the recreational and aesthetic use of the land, but in that misuse of the land is undermining the very economic assets which the mill claims to promote. If, as Mr. McDougall says, North Western Pulp has one of the best records in Canada, (Report wrong, says company, The Journal, Feb. 7) then all Canadians have great cause for despair!

R. Bruce Morrison,

Alberta Forest Service

Reforestation Stocking Standards

Any person required to reforest public lands pursuant to any disposition of timber under The Forests Act 1971 or the regulations shall be required to meet the Reforestation Stocking Standards following.

Reforestation Stocking Standards shall be:

(a) For any given area to be classified as stocked:

4,000 of any contiguous 10,000 mil-acres within the area must contain an established tree seedling with at least 3,000 of the 4,000 stocked mil-acres containing an established spruce or pine or Douglas fir seedling; the other 1,000 may contain an established balsam fir or deciduous (poplar or birch) seedling.

(b) For any tree seedling to be counted as established, it must be alive and have grown for three years on the site, except that

(i) Two live tree seedlings which have grown on one mil-acre for two years are acceptable as one established seedling.

(ii) Any coniferous tree which existed on the site prior to logging and which remains live and undamaged after logging and which is young enough to remain live and merchantable by the time the rest of the established tree seedlings are logged may be counted as an established tree seedling.

S. Ferdinand.

A RESPONSE

to the Brief presented by the S.T.O.P. Organization of Edmonton to the Minister of Lands & Forests, 1972

ALBERTA DEPT. of LANDS & FORESTS
September, 1972

A RESPONSE

TO THE BRIEF PRESENTED BY THE S.T.O.P. ORGANIZATION OF EDMONTON TO THE MINISTER OF LANDS AND FORESTS REGARDING CLEAR-CUT OPERATIONS BY NORTH WESTERN PULP & POWER LTD.

prepared by:

SILVICULTURE SECTION, TIMBER MANAGEMENT BRANCH

ALBERTA DEPT. OF LANDS & FORESTS

September, 1972.

INTRODUCTION

The brief and slide presentation which Mr. A. Zimmer presented to the Minister of Lands and Forests on behalf of the S.T.O.P. organization of Edmonton in June of 1972, charged North Western Pulp and Power Ltd. with improper forest management and poor silvicultural practices and inferred inadequate governmental control over industry activities in these fields. This presentation is intended as a reply to Mr. Zimmer and to S.T.O.P. and it is based in its entirety on Mr. Zimmer's slides and verbal commentaries thereon.

It is widely recognized by foresters in Alberta that the S.T.O.P. brief is mainly based on aesthetic views and not on facts. The following presentation substantiates this view with field measurements and professional experience in the fields of silviculture and tree biology.

The approach used in this response to Mr. Zimmer and to S.T.O.P. was to relocate in the field the exact locations of as many of Mr. Zimmer's 64 photos as possible in order to evaluate his charges that logging and scarification remove all chance of reforestation by creating "desert"

environments for trees. By choosing Mr. Zimmer's field locations one could not be charged with bias of sample nor with evasion of issues. Sample plots were put in the areas photographed by Mr. Zimmer and all coniferous seedlings staked with 4' stakes and rephotographed. These plots were placed as near to the centre of each location as physically possible and wherever possible made to span the full picture angle. Plots 100 feet wide were located in the field and 200 seedlings staked extending the plot into the picture as far as necessary to tally this number of seedlings.

Mr. Zimmer also charged that scarification and logging cause erosion, that the North Western Pulp and Power Ltd. had logged to the edge of three permanent water courses (in violation of legal agreement not to log closer to permanent water courses than 66 feet) in addition to the damages caused the environment for regeneration by scarification and clearcutting large tracts of timber. Also these charges will be answered in some detail by referral to field observations, to cut records, and to published information on matters of erosion and water flow.

REGENERATION AFTER LOGGING (as per Mr. Zimmer's photographs) ON THE NORTH WESTERN PULP & POWER LTD. LEASE AREA NEAR THE YELLOWHEAD TOWER LOOKOUT AND BETWEEN THE BERLAND RIVERS AND FRED CREEK ON THE GRANDE CACHE HIGHWAY

A total of 35 black and white photographs were taken by Mr. Zimmer to depict how current forestry practices by North Western Pulp and Power Ltd. (henceforth referred to as N.W.P.&P.) of Hinton damage the forest environment and prevent the establishment of new forests. These photographs were taken in only nine areas and of these two locations depict what Mr. Zimmer calls "preferable" stocking. The photo numbers referred to in the following are those used in the slide presentation by Mr. Zimmer (see attached, Appendix I).

> Photo #8. "...We are back in the Yellowhead tower area and again we can see how sparce coniferous tree life is within this area which I described earlier as being bald from horizon to horizon. I can only notice one or two trees with large magnification, or one or two young trees that is with large magnification on this entire landscape"...(this and subsequent quotations are all from Mr. Zimmer's slide presentation, see Appendix D).
>
> Zimmer.

Photos 6, 8, 11, 12, 14, 15, 43, 44, and 57 were all taken in Section 31, of Township 49, Range 22, W5 along the new road branching off the Robb road and going three miles west of the Yellowhead Tower Lookout. A total of three field plots were located in this area thus covering all photos critisizing N.W.P.&P. for insufficient regeneration.

Photo complex 1 shows Mr. Zimmer's black and white photograph #8 and two colour prints taken of the exact same area in late August of 1972 by the Silviculture Section. The white stakes in the second colour picture each represent one coniferous seedling three or more years old. According to our survey, the foreground contains on the average 815 lodgepole pine seedlings per acre. This constitutes overstocking by our standards in that any area with more than 600 seedlings per acre three years or older will encounter crowding problems before the trees reach maturity. Also, mortality among coniferous seedlings after the third year is minimal.

This particular area was cut in 1961-1962 and scarified in 1962 according to N.W.P.&P. cut records. A regeneration survey done by the company in 1967 showed 67% stocking in the area. Average seedling height was about 10". The staked seedlings constitute only a small

Zimmer #8

Hellum

Hellum

PHOTO COMPLEX I

sample of pine regeneration on this hill which was quite uniformly stocked to lodgepole pine all over. As in all later colour photos with staked seedlings, the plots show ample stocking at photo centres and these samples were indicative of general stocking levels over all reforested land in each photo.

It therefore would appear that Mr. Zimmer's charge of paucity of regeneration in this area is in grave error. Photos 6, 11, and 57 are covered by photo 8.

Photo #15. "...The grass growth here is very dense; again it would make beautiful environment for pheasants, I would believe, if there would have been enough water there but it sure makes a poor environment for a forest"...
Zimmer.

The tree in the far right of photo 8, seen against the horizon, is the same tree as seen in the foreground of photo 15, and the snag seen in photo 15 is the same as the snag next to the same pine tree in photo 8. Both photos 14 and 15 were taken with a telephoto lense thus distorting foreground to the point where it became impossible to relocate the exact photo position. This being the case, the snag and background were aligned and an approximate location chosen. Photo Complex 2 shows the details of the regeneration plot-survey established in August of 1972.

The stocking to pine in this area was 382 seedlings per acre or 38.2% stocking judging by the plot in the second colour photo. Again, the stakes are only a sample indication of the general stocking in the whole photo area. However, this is insufficient stocking to meet the 40% standard, but this area was only logged in 1969 and scarified in the spring of 1970. Seeds are still being released from the pine cones, and a considerable number of additional pine seedlings may be expected from this additional seed. It is therefore too early to retreat this area on the basis on insufficient stocking to coniferous regeneration. The 1961-62 cut, which lies just behind the snag, had considerably more regeneration than the foreground, as indicated by Photo Complex I.

Zimmer #15

Hellum

Hellum PHOTO COMPLEX 2

The average height of tree seedlings in this area was 4" and the main proportion of the seedlings were three years old and they should have been visible to Mr. Zimmer 1971 when he made his survey. It is therefore concluded that his statement of poor climate for regeneration is inaccurate and misleading.

Photo #12. "...We didn't detect any regenerated trees either".

Zimmer.

Photo complex 3 shows that the foreground in this area has considerable pine stocking. In fact the stakes indicate 64.6% stocking or 646 seedlings per acre three years and older. The average seedling height was about 4". This stocking density was typical of the whole area.

This area was logged in 1969 and scarified in the spring of 1970, as in photo 15, and there is probably still pine seed retained in the cones which will be shed over the next one or two years. Again, one must conclude that Mr. Zimmer did not see the abundant pine regeneration and that his statement of no "regenerated trees" is erroneous.

Photographs 43 and 44 were taken in exactly the opposite direction to photo 12, standing virtually in the same spot. Because photos 12, 43, and 44 are of the same area of land only one field sample was taken especially because of the proximity to photo 15. (See Appendix II).

Zimmer #12

Hellum

PHOTO COMPLEX 3

Photo #10. "...We still can not detect anything of significance as far as regeneration is concerned".

Zimmer.

Three regeneration plots were located in the general area of photos 1, 9, 10, 41, 42, and 64. They were located in the areas pictured on photos 10, 41, and 64. This area is located in Section 32, Township 49, Range 22, W5, along the Robb road close to the previous sets of photos.

Photo Complex 4 (bottom photo) shows this area to have some considerable stocking to coniferous seedling. Colour photo number two shows that there are approximately 335 spruce and pine seedlings per acre here 5 or more inches tall. This area was logged in 1966-67 and scarified in 1967. It is likely that this area will only need fill-in planting next year.

The foreground in these photos was disturbed by the road right-of way. The staked seedlings in the bottom colour photo are again indicative of the general stocking on the whole hillside, exclusive of the road side in the foreground and the old logging road leading off to the right from photo centre.

Zimmer #10
(BLK 211?)

Hellum

Hellum

PHOTO COMPLEX 4

> Photo #41. "...What we see here is that slash covers the area to an average depth of about one foot in solid wood. The walking in this area would of course be very difficult and therefore the slash would require treating before any planting could be undertaken".
>
> Zimmer.

Again this area was cut in 1966-67 and scarified in 1967. The photo centre (bottom photo) contains about 350 coniferous seedlings per acre (See Photo Complex 5), and therefore suggests the need for supplemental planting in 1973. The photo plot is representative of the whole area. Photos 10 and 41 overlap on the ground and therefore lend strength to the understanding that the whole cut block will need some supplemental planting.

If all the visible slash were spread evenly all over the ground in photos 10 and 41, the ground would not be covered anywhere near 12" in solid wood. While Mr. Zimmer may be correct in diagnosing this area to be in need of supplemental planting, access or slash treatment is not a problem.

Zimmer #41

Hellum

Hellum

PHOTO COMPLEX 5

> Photo #64. "...This picture has been purposely chosen as the last picture since it very well represents the forest of the future in Alberta if we continue with present regulations under which the pulp mill is allowed to operate. What we are looking at is an area bald from horizon to horizon, there is not very much forest environment left,"...
>
> Zimmer.

This area was cut in 1969 (and not in 1963 as stated by Mr. Zimmer) and scarified in the spring of 1970. According to Photo Complex 6, the photo plot contains 543 coniferous seedlings per acre and both the pine and the spruce are about 6" tall. The plot is again representative for stocking over the whole area. The immediate foreground is the Robb road right-of-way.

This was Mr. Zimmer's closing picture to depict how desolate the landscape is because of clearcutting and scarification practices by N.W.P.&P. It is indeed regrettable that such charges be based on such inadequate knowledge of fact.

Zimmer #64

Hellum

Hellum

PHOTO COMPLEX 6

Photo #52. "...On slide 52 we can see a mixture of regenerated fir and pine and what appears to be advance growth, that is trees, young trees, which were in this area before the harvesting operation was commenced. The trees in this particular area were found to be an average of ten by eighty feet apart".

Zimmer.

Photo Complex 7 shows that there are abundant conifer seedlings in this area, in fact there were on the average 670 seedlings per acre of spruce and pine. Even if one should only count the advanced growth on the plot there would be a tree every 10 x 20 feet not 10 x 80 as claimed by Mr. Zimmer. The average spacing among all seedlings in the photo plot is 8.0 x 8.0 feet which is too dense if all seedlings survive to maturity. The foreground is right-of-way for the new Grande Cache Highway. The plot is representative of the stocking of trees on the whole hillside except for the right-of-way.

The regeneration is predominantly black and white spruce and lodgepole pine. There is less than 10% balsam fir in the sample plot. Seedlings are on the average 36 inches tall here.

Photos 51 through 56 are in the immediate area of photo 52 (See Appendix II) and were thus not sampled. This area was horse logged in 1959 and a N.W.P.&P. regeneration survey shows the whole cut block stocked to 40%+ in 1969.

Zimmer
#52

Hellum

Hellum

PHOTO COMPLEX 7

The erosion visible on photo 54 is likely caused in part by improper treatment of an old logging road and certainly also caused by change of grade brought about by location of new Grande Cache Highway the ditch for which runs in the foreground.

Photo #49. "...What you are looking at here is some remains of earlier methods of scarification used in the area". "If I may ask you to put the picture on the sharp focus you will probably agree with me that there is hardly a blade of grass which grows between those windrows".

Zimmer.

This is not intended as scarification. The area was cut in 1956-57 and, according to N.W.P.&P. records, this is an extraction road. The mineral soil is indeed scraped off and the most exposed parts of these roads are poorly regenerated. However, this method of extraction was not used after about 1957, and is certainly not used today. Photo Complex 8 shows again that the general area within the photo angle has ample regeneration. There are in fact 856 seedlings per acre in this general area judging by this photo location which is typical of much of the general area. The predominant regeneration is to lodgepole pine and white spruce with some balsam fir and black spruce also present. Seedlings in this area are on the average 12 inches tall.

Photo #50 is immediately adjacent to photo #49, and was therefore not sampled.

Zimmer #49

Hellum

Hellum

PHOTO COMPLEX 8

Photo #2. "...What we see here is a completely denuded area almost bald from horizon to horizon...A little immature timber is left in the foreground."

Zimmer.

This area was horse logged in 1959 and a company regeneration survey of 1969 classified this area as adequately stocked by our standards (40%+). Photo Complex 9 may not show the two hundred 4' tall stakes placed by seedlings in the very centre of the picture just up hill from the road, but our survey showed that at least this part of the photo had an average of 968 seedlings per acre and less than 10% of these were advanced growth. The average seedling height was about 36 inches. There is abundant pine and spruce regeneration all over this hill, but it is not made visible by photography from over a mile away.

The timber in the foreground is mature black spruce and lodgepole pine and not a "little immature timber". The staked plot is representative of the whole hillside.

Zimmer
#2

Hellum

Hellum

PHOTO COMPLEX 9

Photo #30. "...I can not tell whether you can get this area clear enough, but it seems to have been completely stripped in that area of all plant life".

Zimmer.

Mr. Zimmer is here referring to the borrow pit in the foreground. The area in the back, judging by the plot location depicted in Photo Complex 10, contains 1,360 lodgepole pine seedlings per acre. This plot is again entirely typical of the stocking on the hill in general.

The new Grande Cache Highway was completed in 1969 and the borrow pit in the foreground should not be blamed on forestry operations. Logging in this area was completed in 1963-64 and the land was scarified in 1966. This is the old E7 - L3 timber licence issued before the time of N.W.P.&P. logging in the area.

The seedlings in this area were about 18 inches tall and most vigorous. This area will need to be thinned in another 10 years or less if good growth is to be maintained for the remaining trees.

Zimmer #30

Hellum

PHOTO COMPLEX 10

> Photo #5. "...And we also see some pine advance growth on the right hand side. Advance growth as far as I know which has not been restocked by the company but which seems to have stocked itself from mature trees prior to harvesting".
>
> Zimmer.

Photos 3, 4, and 5 as well as 16 were all taken in the area immediately adjacent to the junction of the old and the new Grande Cache Highway in Section 5 or 6, Township 55, Range 2, W6. The area to the left of the road in photo 4 was logged in 1970 and scarified in July of 1971. There is no apparent regeneration over most of this freshly scarified area. (Photo Complex 10).

A regeneration plot (centre photo 5) was located on the hill in the background. While the foreground was again scarified in July 1971 and supported no recent regeneration, as one might expect, the hill in the background contained 1,110 lodgepole pine seedlings per acre judging by the plot at photo centre which was again typical of stocking on the whole hillside. The seedlings were about 10 inches tall and most vigorous. This area was logged before 1966 and then scarified by N.W.P.&P. in 1966. It will be in need of thinning in 10 or more years.

It is not possible to predict what stocking one might expect on the recently scarified area, but there is no immediate reason to expect less stocking here than on the far hill for the timber was the same in both areas, mainly mature lodgepole pine.

Zimmer #5

Hellum (2-5)

Hellum (2-16)

Zimmer #16

PHOTO COMPLEX 10

Photo 16 shows a 1971 cat track onto the area scarified in July of 1971. Photo Complex 10 shows that this cat track, which was made only days before Mr. Zimmer visited the area, had grassed in well by late August of 1972.

> Photo #59. "...On slide 59 we see just how dense mother nature seeds trees in order to prevent environment destruction following fire". "And thus natural selection will only let the strongest and healthiest trees survive this close competition, what remains then is a healthy forest".
>
> Zimmer.

There are over 10,000 stems per acre in the foreground on photo 59 and over 3,700 stems per acre in the background. This is far too dense for good tree growth. Lodgepole pine does not thin itself well and Mr. Zimmer's statement that a healthy stand will result is not factual for this species (Photo Complex 11).

This area is in the Gregg burn of 1956 in Section 24, Township 49, Range 24, W5.

Zimmer #59

Hellum

PHOTO COMPLEX 11

Photo #60. "...I estimate that the pine in this particular area regenerate at a density of at least one tree every two square feet". and photo 61 "I can not agree with some foresters' opinions who claim that such dense regeneration will result in stagnation of the entire regrowth".

Zimmer.

Both Photos #61 and #60 were taken in Section 15 of Township 49, Range 24, W5, in the Gregg Burn of 1956.

Photo Complex 12 shows where N.W.P.&P. "accidentally" thinned the pine in photo 60 in between the time that Mr. Zimmer took his photo in July of 1971 and August of 1972 when the colour photos were taken. The background of photo 60 and 61 contain about 53,600 lodgepole pine seedlings per acre judging by two sample plots 10 x 10 feet in area located within the camera angle of photo 60. The thinned part contains over 1,670 seedlings per acre and this is still far too dense for good tree growth.

Zimmer #60

Hellum

PHOTO COMPLEX 12

> Photos 62 and 63. "...Now I have reasons to call this a method of selective cutting". "I understand that this operation was started by Muttart Lumber at one time and I also understand that at the present the thinning of the stand is being continued by inmates of a close-by limited security camp." "Once the new regeneration has successfully been established, and following another five years of that, the remaining mature timber can then be cut without too much damage to the still flexible young growth and the forest environment will never suffer."
>
> Zimmer.

This thinning was done only for aesthetic reasons (Photo Complex 13) and could scarsely be considered an economic operation. This work is carried on today by the Department of Lands & Forests with the aid of minimum security inmates. Removal of residual pine after initial thinning would raise havoc with existing regeneration unless current methods of logging be abandoned. Pine would certainly not be able to establish an understory stand and spruce invasion would be very slow. Seeding with spruce, or underplanting would not be wise in view of the need to scarify for seeding or planting. Spot scarification, as recommended by Mr. Zimmer, has proven only marginally successful in the past in Alberta, and in order to establish 400 seedlings per acre very much of the natural forest floor would have to be disturbed even with spot scarification.

Zimmer #62

Zimmer #63

Photo #31. "...Here we have what happens when the timber is cut right into a watershed, in this case you are looking at an Alberta river. This is water conservation, pulpmill style. This has been tolerated by the former government; I think the new government should put an end to this".

Zimmer.

LOGGING TO WATERS' EDGE

The three areas in which Mr. Zimmer charges that N.W.P.&P. has logged to waters' edge are along the Gregg River in Section 16, Township 49, Range 24, W5, along the "Loffland Rig Road" in Section 1, Township 50, Range 22, W5, and in Section 7, Township 55, Range 2, W6 along the Grande Cache Highway.

Photo Complex 14 contains four of Mr. Zimmer's photos (31, 32, 33, 34) showing what would appear to be logging to waters' edge. The water seen in the foreground is indeed a part of the Gregg River. When the Gregg River crossing upstream from this picture was put in before 1969, the road ditch on the upstream side was not protected from river water entering it because the ditch was several feet above normal water level. In 1969 the Gregg River flooded and the ditch was eroded and deepened so that part of the river now flows year-round in the ditch. This matter has been brought to the attention of N.W.P.&P. through their silviculturist.

What is important is that logging which was done in the winter of 1968/69 was done before the river changed this part of its course. The whole matter can be rectified by closing off the road ditch. The washout at this point in the Gregg River Road is regularly forded by all cars at present.

Zimmer #31

Zimmer #32

Zimmer #33

Zimmer #34

PHOTO COMPLEX 14

Hellum

Photo Complex 15. "...We are along the same road below the area where the timber has been cut right into a small creek, the head-waters of a small creek".

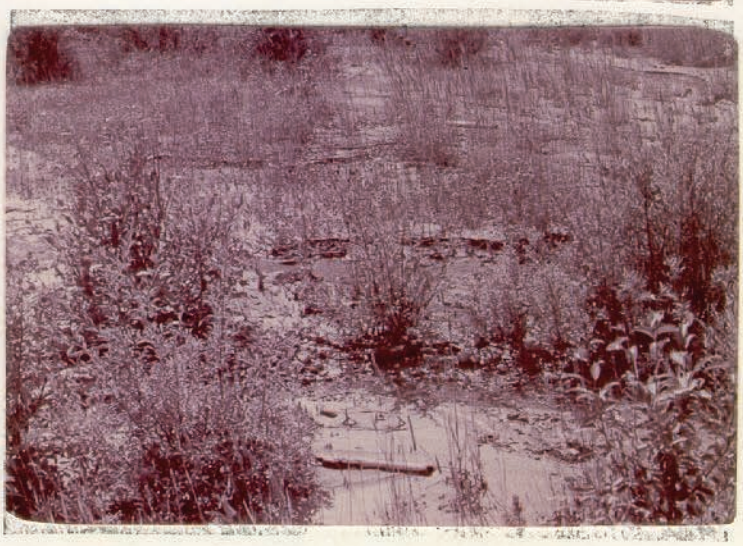
Zimmer.

This set of photos (38, 39, 40) indeed shows flowing water but what Mr. Zimmer neglected to say is that the creek crosses the road flowing out from behind the photographer (in the centre of the photo). The creek then turns sharply to the right and disappears into the timber to the right on photo 39 (see also bottom colour photo for general area orientation - Photo Complex 15). The colour photograph shows the general area from a different angle to show how logging does in fact not approach closer to the creek than 66 feet except in the right-of-way of the road itself where the timber has been removed.

The road ditch may at times carry water, but it is not even an intermittent creek.

Zimmer #38

Zimmer #39



Zimmer #40

PHOTO COMPLEX 15

Hellum

Hellum

Hellum

PHOTO COMPLEX 15

> Photo #7. "...However, just beyond the road in the foreground we can see, next to the road, willow flats covered with some grass extending up to a white line in the centre of the picture. This white line is actually the creek bank which we tried to photograph here...".
>
> Zimmer.

Photo Complex 16 shows, however, that the white line is not the creek. It is an old logging road which Mr. Zimmer would have seen had he gone there to look. The creek flows in the middle of the "willow flat" and is no where in this picture closer than 150 feet to the area logged.

Zimmer #7

Hellum

PHOTO COMPLEX 16

EROSION AND SCARIFICATION

By and large this section is composed of photographs of borrow pits and road construction by the Department of Highways, of seismic activity damages and logging slash, and of two sites where access roads put in by N.W.P.&P. have not been removed after logging thus causing local erosion problems.

Mr. Zimmer's understanding of water flow in forested and logged situations is wanting in accuracy to the degree that his whole argument against lack of erosion control in forest operations is lost. There is evidence for erosion caused by logging roads, but there is very scanty proof indeed anywhere for erosion caused by logging itself or scarification. The book entitled "Forests and Floods in the Eastern United States" by H.W. Lull and K.G. Reinhard (U.S.D.A. For. Serv. Res. Paper NE-226, 1972) is lucid background for a clearer understanding of the effects of logging on water flow than what Mr. Zimmer states as fact.

> Photo #23. "...It can be seen very clearly that this erosion is not caused by the road but is caused by water which could not be retained on that clearcut hillside and thus float towards the road causing excessive erosion"...
>
> Zimmer.

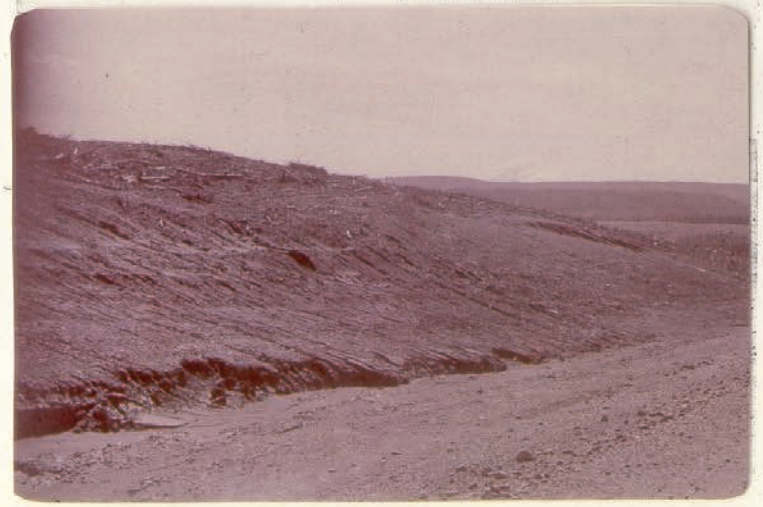
In photos 23, 27, 28, and 29 (Section 6, Township 55, Range 2, W6) the bare and sloping mineral soil surface is simply the cutback slope for the New Grande Cache Highway and not due to erosion as a result of scarification (Photo Complex 17).

Photo 23 shows an erosion gash which was formed as a result of the road bed lowering the flow-grade for an already intermittent creek, seen as a slight draw behind the scar. There is little or no surface flow as a result of scarification and the erosion seen in Photo 23 would probably have only been somewhat smaller had the trees not been removed and the area not scarified.

Zimmer #23

Zimmer #27

Zimmer #28



Zimmer #29 PHOTO COMPLEX 17

Hellum

Hellum

Hellum

Hellum

PHOTO COMPLEX 17

Photo #24. "...as a matter of fact this very same wash which again is not caused by the road but is caused by the clear-cut on the left side".

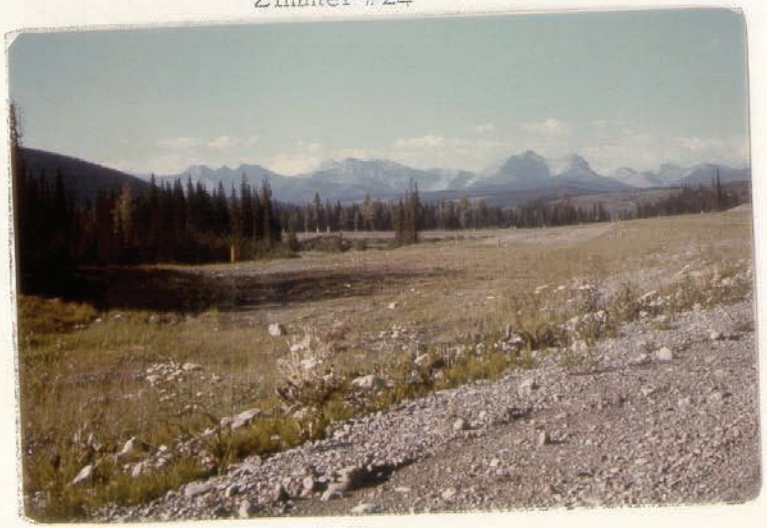
Photo #26. "...Here is another detail of this very same wash-out in the Berrys creek area as it rises in the culvert underneath the road".

Zimmer.

The erosion in photos 24 and 26 are again the result of the new Luscar road having changed the angle of flow in a small stream. This erosion is probably again accentuated by the logging but should not be blamed entirely on this operation. Photo 25 is a picture of a gravel pit created during road construction of the Luscar road in 1970 (Sec. 7, Twp. 49, Rge. 24, W5). There is no sign of logging in this picture. (see Photo Complex 18).

Zimmer #24

Hellum



Hellum

Zimmer #26

PHOTO COMPLEX 18

(Blk 509) V

> Photo #36. "...On slide number 36 we have another viewing of the same area and here we can see the logging access road running through this area, former cut line, I suppose, which had been utilized for logging"...
>
> Zimmer.

Photos 35, 36, and 37 taken along the same Loffland Rig Road as mentioned under "logging to waters' edge", bear signs of seismic activity damages subsequent to logging and not before logging as Mr. Zimmer states. This area was cut in 1963/64 and disturbed by oil explorations reportedly as late as in 1970. This area was regeneration surveyed in 1969, after scarification in 1964, to give an average stocking of 72%, according to N.W.P.&P. records (see Photo Complex 19).

Zimmer #36

Hellum 36

Hellum 37

Zimmer #37

PHOTO COMPLEX 19

Photo #13. "...but there is quite some erosion going on on the very top of that hill"...

Zimmer.

This area was logged in the spring of 1971 only a few months before Mr. Zimmer visited the area. The fresh slash and recent scarification might appear as erosion from the distance of two miles or more, but one can hardly make careful assessment from such a distance (Photo Complex 20)?

This photo 13 is in the same area as that of photo 12 where there were 646 seedlings per acre. It is too soon to tell whether or not the far hill will regenerate properly, but the charge of "quite some erosion" is unlikely in view of what has been found to be the case everywhere else where Mr. Zimmer photographed scarification and regeneration.

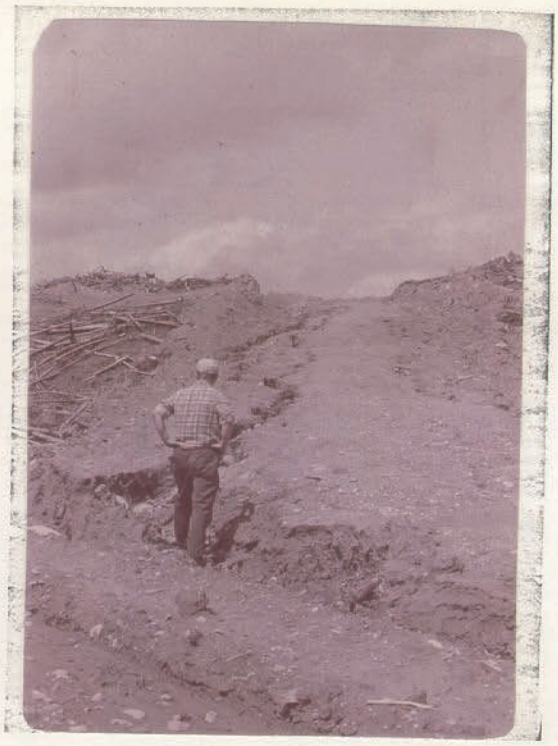
Zimmer #13

Heilum

Photo #19. "...Just one more proof that these kinds of conditions exist all over the area".

Zimmer.

This photo was taken along the same "Loffland Rig Road" as referred to for photos 38 and 39 (see page 39 of text). This road was put in for the 1970 logging of this area which was subsequently scarified in 1971, just before Mr. Zimmer visited the area. Access roads of this nature should be blamed on forestry operations and should have been removed after operations ceased in this area (Photo Complex 21).



Zimmer #19

Hellum

PHOTO COMPLEX 21

Photo #17. "...We are getting now a few more pictures here from what former logging access roads look like. This is what the company leaves them in when they are finished with harvesting;..." and "This eroded soil in this case is getting into the water-ways which is just on the other side of the car"...
Zimmer.

Photos 17, 18, and 21 were all taken at the junction of a logging road (eroding) and a fire road established in 1961. The junction is located in Section 1, Township 50, Range 23, W5. The adjacent land was logged in 1969 by N.W.P.&P. and scarified in 1970 and this access road should again have been treated. However, even if Mr. Zimmer's comments are warranted here it is doubtful whether or not the silt which is eroded does find its way into the nearby creek because this creek is at least 150 feet away from this road junction and the vegetation which covers the ground between the creek and this erosion impedes water flow considerably, (See Photo Complex 22), should water and silt flow across the road during heavy rains.

Zimmer #18

Zimmer #21

Hellum

PHOTO COMPLEX 22

Zimmer #17

Hellum

Photo #20. "...We were always informed or people in Alberta had been informed by the former government, I should say, that the company has only the right to place these signs if there is work going on in the area, or if the road is wet and muddy, and neither one had seemed to have been the case on this nice Sunday afternoon when the road was absolutely dry"...

Zimmer.

Photo Complex 23 shows Mr. Zimmer's black and white photo and a color photo taken a year later. The sign was by this time lying face down, on the side of the road, but it was raised to show that it was still in the approximate location in Mr. Zimmer's photo.

N.W.P.&P. officials told the Silviculture Section of the Department of Lands and Forests that the sign was placed on the road in July of 1971, when Mr. Zimmer visited the site, because vandals had caused considerable damage to machinery left unattended in the area. The validity of this statement can not be determined but it is a well-known fact that the public is prone to damage forestry equipment left unattended in the field.

Zimmer #20

Hellum

SUMMARY

Mr. Zimmer's and S.T.O.P.'s charges that N.W.P.&P. secured no or little regeneration in the eleven photo locations listed above (1, 2, 5, 8, 12, 15, 30, 41, 49, 52, and 64) are basically inaccurate. There were more than 400 coniferous seedlings growing per acre in eight of the eleven locations sampled and in the remaining three the stocking was between 335 and 382 seedlings per acre. The latter three locations had been scarified so recently that further seed germination might be expected over the next one or two years. All samples were typical for all respective photo locations.

The stocking to lodgepole pine after the Gregg fire in 1956 created an overstocking situation which already today showed its effect on growth in the seedlings. Thinning of the pine is essential for the maintenance of good growth as the "accidental" thinning in photo 60 should witness in another five to ten years.

None of the three locations listed by Mr. Zimmer as showing proof of logging to waters' edge were correct. Even though there probably may be examples of such logging elsewhere on the N.W.P.&P. lease area, it would appear that Mr. Zimmer is unable to distinguish between bonafide violation and normal logging operations.

There is proof in Mr. Zimmer's photos of erosion on logging roads left untreated after logging operations have finished, but the bulk of the erosion Mr. Zimmer talks about was apparently the cause of highway construction rather than logging or scarification.

CONCLUSION

It would appear from Mr. Zimmer's slide show and commentary that he has damaged rather aided good forestry practices in Alberta. His photographic evidence is of such questionable quality, proving wrong in many cases, that the Silviculture Section of the Department of Lands and Forests found itself defending N.W.P.&P. operations almost exclusively. This response is not meant as a complete endorsement of all forestry practices by N.W.P.&P. but rather as a set of specific comments on Mr. Zimmer's charges in very specific and limited locations on the N.W.P.&P. lease area.

A.K. HELLUM

APPENDIX I

Presentation to the Minister of Lands and Forests

Clear-cut Operations Undertaken By

North Western Pulp and Power Limited at Hinton

Mr. Zimmer

Ladies and Gentlemen, the slides you are about to see have been photographed in the lease area of North Western Pulp and Power Company Limited, the pulpmill operation at Hinton, Alberta. The slides and this tape recording are part of a brief submitted to the government by STOP - Save Tommorrow Oppose Pollution. This organization herewith wish to express their concern and wish to bring to the attention of the government concern shared by many other Alberta citizens in respect to environmental damages which were found and exist in that pulpmill lease area. Examples of these damages will be seen on these slides and the nature of the damages found was described in the brief submitted to the government by STOP. My name is Armin Zimmer. I have done much work on this research project for STOP. I guided the photographer into the Hinton pulpmill lease area and pointed out these scenes which to photograph. I subsequently prepared a report for STOP outlining my findings, the report was entitled Keep Alberta Green. A copy of this report was made part of the brief to the government. I also did much research for this brief to the government. I may add at this point that I may impose on you to be patient if I am sometimes looking for words. I am in an awkward position here at home trying to adjust my own slides, focus them at the same time look up at the tape recording and make the tape recording. So would you please save sufficient patience to listen to the presentation. Thank you very much. I shall now describe the slides which were photographed during an extensive field trip last summer, starting with slide number 1.

Slide No. 1

This slide was taken just east of the Yellowhead tower along the trunk road from Hinton towards Nordegg and about five miles east - southeast of the McLeod River campsite. What we see on the slide is a remaining stand of timber that probably was left there as the forestry tower is just within feet of the edge of the stand as it appears. In the foreground we see the roadside ditch at the very left side we see gravel of the road. This picture has been taken very close to the road and it can be seen that the area is a most completely devoid of regeneration at least it appears to be that. As a matter of fact, as far as I can recollect I've seen this very same area in the very same state in 1963. Let us go to slide number 2.

/-

Slide No. 2

Slide number 2 has been taken on the Grande Cache highway I believe. What we see here is aá completely denuded area almost bald from horizon to horizon which we are just approaching by car. A little immature timber is left in the foreground. The area here shows very little reforestation evident. Let us go to slide number 3.

Slide No. 3

Slide number 3 has been taken on a portion of the old Grande Cache highway and is a close-up of the area which we have seen before. Here we can see what has happened. There are a few trees left near the roadside which apparently had seeded themselves before the mature timber was cut. Other than that we see that very fine silty soil lays loosely along side the road and towards evening of the same day, we saw this silty sand, very light weight sand, or silt drifting merrily along the roadside. Here we have a case of wind erosion which is quite evident and the moisture in the ground seems to be such that nothing is left there for new regrowth or even growth of sufficient grass. Let us go to slide number 4.

Slide No. 4

Slide number 4 shows some more of this Grande Cache highway area. It is a very sad sight if one has to believe that this is the future of Alberta Forests. The environment, it has been said, adapts, in this case it seems to have already adapted, namely from forest to desert environment. Let us go to slide number 5.

Slide No. 5

Slide number 5 shows another shot alongside this old Grande Cache highway which we have seen on slide number 3, again we see this drifted, freshly drifted soil, alongside the road in the ditch. And we also see some pine advance growth on the right hand side. Advance growth as far as I know which has not been stocked by the company but which seems to have stocked itself from mature trees prior to harvesting. It only seems to appear along the ditch side in this case and therefore I'm assuming that the mature trees seeded this young regeneration before they were harvested. Let us go on to slide number 6.

Slide No. 6

Slide number 6 again is taken east of the Yellowhead tower a little bit further east of the Yellowhead tower. All we can see here is very few trees; this is an area in which, to my knowledge, or very much of the timber anyways, had been cut before 1963. The area is almost bald from horizon to horizon and seems to extend for miles in all directions without any trees in between, any mature trees in between. We see a few single trees appearing here and there but most of the plant life you're looking at is small willows and brush which is not coniferous forest and will never grow to any size. The grass growth in this area is very sparse. Let us go to slide number 7.

Slide No. 7

On slide number 7 you're again back in the Grande Cache highway area. We are parked right on the highway here and we're looking over the shoulder of the road towards a creek on the far side of the road. In the angle which the picture is taken it is not very apparent that there is a creek. However, just beyond the road in the foreground we can see, next to the road, willow flats covered with some grass extending up to a white line in the centre of the picture. This white line is actually the creek bank which we tried to photograph here, unfortunately we could not get any of the water into the same picture. However, it can be seen from this picture that the pulp cut on the far side of that creek bank extends right into this creek. If I'm not mistaken, I haven't got the picture location in front of me, that the creek bed here belongs to either Pinto Creek or Little Berland Creek. If we take another look at this pulp cut area beyond we see that most of the timber remains are still strewn over the ground which appears to be a sign that the scarification equipment has not yet been in that area. What is remarkable here is that there was no attempt made to leave a margin to protect the watershed, of course this is not the only place where this is the case. We took countless other pictures and films where we can see the water and where we can see the clear cutting operations being carried right into the creek or river. Let us now go to slide number 8.

Slide No. 8

Slide number 8, we are back in the Yellowhead tower area and again we can see how sparse coniferous tree life is in this area which I described earlier as being bald from horizon to horizon. I can only notice one or two trees with large magnification, or one or two young trees that is with large magnification on this entire landscape. The grass here is very sparse in the foreground; at the very left we see some siltation from apparently from the clear-cut has washed down over the hillside. Let us now go to slide number 9.

Slide No. 9

On slide number 9 we can see a detail of what has happened to the area as far as plant life is concerned. By process of scarification all roots, all remaining tree stumps had been torn out of the ground, together with the soil reinforcing rootwork near the surface of the soil. All moss, all plant life, all shrubs, everything was torn out. This area here I believe was treated before 1963; this is what grows there now, a little bit of clover which seems to have been seeded. If there would have been coniferous trees in between one wouldn't have to crawl on his hands and knees to see the trees within this sparse growth. Let us go now to slide number 10.

Slide No. 10

Slide number 10, another last shot at the Yellowhead tower timber. I think what you see there at top right sticking out between the timber is the Yellowhead lookout tower. This is a similar shot then our first slide, just a little bit more close up here but still we can not detect anything of significance as far as regeneration is concerned. Let us now go to slide number 11.

Slide No. 11

This appears to be the other side of the road here of this McLeod River area where there have been a few where a few mature trees have been left standing. There is not very much to be added here except that it is apparent that this area extends from horizon to horizon. We drove along for miles and took one picture after another just like this. Let us now go to slide number 12.

Slide No. 12

On slide number 12 you are now west of the Yellowhead tower. The timber at the very left is the stand of timber which extends in a triangular fashion to the top of the hill in which the Yellowhead tower is at the very top. In the far distance we see a denuded hill and the area in the foreground of course doesn't look any better. Scarification most likely had been done in the foreground area, even though it still looks rough with debris, we couldn't detect any stumps in the area, a sure sign that scarification most likely had taken place. We didn't detect any regenerated trees either. Later on we will have a picture through a telephoto lens under the far hill across, which I think will show us more of what's going on up there. Let us now go to slide number 13.

Slide No. 13

There is the telephoto shot of this hill, I don't know whether it can get enough magnification and sharpness out of your projector but there is quite some erosion going on on the very top of that hill, just about at the very top centre of the hill, a little bit to the right. This is where it starts and it goes all the way along the top of the hill and seems to come down the hill towards the right. Let us now go to slide number 14.

Slide No. 14

This is another close-up of this area just east of the, pardon me, just west of the Yellowhead tower where we had walked in awhile and looked at some detail, found this one single tree left standing here. This particular area we found also lots of grass and what appeared to be a stump in the foreground so even scarification had taken place on this particular spot. It would indicate that it had missed this stump and this tree. There's quite some dense grass growth in this particular area, we didn't find it in very many places, but some places appear to be completely grown in with this grass some reason or other. It would be extremely hard to say whether there is small trees under this type kind of grass, therefore I wouldn't make any suggestion whether there are or are not. However, I'd like to say again that in the areas where there was very little grass that the regeneration is usually was very poor as well. Let us now go on to slide number 15.

Slide No. 15 .

Slide number 15 again shows some close-up of this area. Here we see again this dense grass growth, I'm not sure now whether this particular shot was taken in the same area, there seems to be too many hills in the back ground; it could be that this was taken along the Moberly road this should be checked out with the locations, which I have not got in front of me at this very moment. The grass growth here is very dense; again, it would make beautiful environment for pheasants, I would believe, if there would have been enough water there but it sure makes a poor environment for a forest. Let us now go on to slide number 16.

Slide No. 16

Slide number 16 gives us a beautiful shot again of the light structured soil as it is eroding from a clear-cut area along an old logging access road running off the old Grande Cache highway. The trees we see there is what is called advance growth and there's trees which were left standing during the harvesting operation of mature timber. The road is right in the foreground, we can see that the roads originally had washed out or were quite deep and have in the meantime filled themselves with some of the light weight silt which seems to make up this. Silt or sandy silt seems to make up most of this particular area and it is quite susceptible to erosion by wind and water. Let us now go to slide number 17.

Slide No. 17

We are getting now a few more pictures here from what former logging access roads look like. This is what the company leaves them in when they are finished with harvesting; and this one was taken about two miles farther west, I should say two miles east, of the McLeod River bridge taking the first eastern fire road from the trunk road and we got about half a mile in. The road was closed to the public; we drove in anyways; that's how far we got and this is what we found. There is no excuse at all for this kind of condition. This eroded soil

in this case is getting into the water-ways which is just on the other side of the car you see in the back ground. The area just to the left top of the car had been reforested and there is quite a bit of tree growth that can be seen, even if I do not consider it sufficient; however it has definite appearances that it has been regenerated. I would like to ask why was the road bed not filled and why was the soil not staked into place so that further erosion could be prevented and why was the area not replanted as well as being part of the forest which had been harvested by the company? This type of road is of course no forest environment at all, it had been completely destroyed. There is one of these access roads to be found in just about every former pulp cut. Let us go to the next picture which is slide number 18.

Slide No. 18

Here we see another detail of the very same road I have just described as I am trying to get far around to the top and give the photographer a chance to present some scale of the size of the erosion. I'm trying to go around to the top here and I find myself getting stuck in the silt which had been washed down the road. Let us go on to the next slide which is slide number 19.

Slide No. 19

Now this of course looks very similar to the one we had just seen but it was actually taken a long distance away from that area, namely about twenty miles southeast of that area. Just one more proof that these kinds of conditions exist all over the area. Here we see a large washout going transverse to the direction of the access road which I'm looking at, which is not the case in the picture which we had just seen in the picture before. The washout here seems to be about three feet in depth and of course there goes our top soil. It takes a thousand years in that area to build an inch of top soil. It appears that no consideration has been given to that or had been given to that by the company; and it also appears that the former government just was not strict enough in enforcing repair of areas like this which had been destroyed by company operations. Let us now go on to the next slide namely, slide number 20.

Slide No. 20 .

On slide number 20 we see another type of road incident. I should call it from this an access road, a timber access road or logging access road which is leading off the Grande Cache highway towards the west; it is about forty miles, I would say, or forty five miles northerly along the road from Hinton and here we found one of these signs which post the road as closed for public travel. We were always informed, or people in Alberta had been informed by the former government I should say, that the company has only the right to place these signs if there is work going in the area, going on in the area, or if the road is wet and muddy, and neither one had seemed to have been the case on this nice Sunday afternoon when the road was absolutely dry and there was no work going on in the area as we drove all the way in on that road. Let us now go to slide number 21.

Slide No. 21

On slide number 21 we are getting now into some more pictures of erosion. What we see here is a loading area, I don't know if your projectionist can tilt the picture in such a way that the tall trees in the back ground appear vertically. The photographer who took this picture apparently just held the camera at an angle, the terrain is actually not sloped as it would appear, but it is never-the-less very excessively eroded. This again is an area which was found on a place called Norris Creek road, I believe there's reference made to it in the picture codes locations, and this area in there was a light loam type of soil I would say and it was subject to much water erosion even in flat areas, it seemed to wash itself very smooth on the surface. Let us now go on for some more of these erosion pictures to slide number 22.

Slide No. 22

Slide number 22 I think is another shot of this fire road in which I got stuck in the silt, it's just another shot of this very same area. It shows you a detail here of what has happened. The road is just about ready to wash out from the river wash-out this spring. It is getting very soft in there, water standing all the way down and of course it's got no where's to go but down hill. Let us go on to slide number 23.

Slide No. 23

Oh there's a dandy. This is taken along the Grande Cache highway right beside the major highway. It shows some of the area we looked over earlier which was denuded from horizon to horizon. We saw a picture approaching the area. We followed the highway here; what you see here is the road cut off the highway where the highway is somewhat lower than the surrounding terrain and we see also a wash-out which seems to extend about half ways up the up hill pulp clear-cut area. The wash out in the foreground seems to be about ten feet in depth, it does not only damage to this wide area here, below the bankments, it also fills up the highway ditch in the process and it fills up the creek which is at the end of the highway ditch with silt. It can be seen here very clearly that this erosion is not caused by the road but is caused by water which could not be retained on that clear-cut hill side and thus float towards the road causing excessive erosion. The erosion, as a matter of fact, starts quite far back and of course once it comes to the steeper cut of the road it does all it's major damage, but it's not caused by the road, it's caused by the run off which is no longer slowed down by plant life and the clear-cut area and therefore becomes excessive. The surface water which comes for a long distance down hill over this clear-cut, due to the fact that it is not absorbed into the soil, forms a large head of water by the time it approaches the highway embankment and thus starts washing starting at the very top of the embankment. We will have some more of these pictures shortly. Let us go to the next slide, slide number 24.

Slide No. 24

This one has been taken on the highway from Hinton to Luscar, a new highway; as a matter of fact this very same wash out which again is not caused by the road but is caused by the clear-cut on the left side. This very same wash out already appears in a book which has already been photographed a long time ago and namely in the book entitled, Some Implications for Clear-cutting in Alberta, which had been issued by the Canadian Forestry Division, Edmonton. They discribe this very same cut, the very same shot of photographic evidence. Lets go on to the next picture namely side number 25.

Slide No. 25

Slide number 25 shows what happens on the other side of that highway just across from the erosion cut we had just seen. What we see in the back ground is part of the Gregg river tributary. I think it is called Berrys creek if I'm not mistaken. It flows into Gregg river just about another half mile. It's flowing away from the point of view here, and you see this creek just where the road vanishes in the background into the timber, just in the front of this road you see the water. Closer to the foreground on the left side you see a big puddle and some bolders laying around. This is water which had come down from this erosion scar. On the far side is a culvert what goes underneath the road and the silt is deposited in the flats between the road and the creek in the background. Let's go on to the next picture, namely slide number 26.

Slide No. 26

Here is another detail of this very same wash-out in the Berrys creek area as it rises in the culvert underneath the road. The wash-out in this place seems to be about five feet deep. Let's go on to the next slide, slide number 27.

Slide No. 27

You are again back at the very same location here along the Grande Cach highway where we saw the huge erosion-scar before. This is some more of this erosion going on along this particular stretch on clear-cut on the same side of the road, and if you look down the foreground in the ditch we see the siltage that has deposited there and it's running towards the next closest creek. In this case we notice also at the very top of the road what appears to be a mud slide. I can not test that it has been a mud slide but the sudden change in angle of the terrain seems to indicate this. Let us go on to the next slide, the next picture slide that is.

Slide No. 28

This is slide number 28 it shows some more of this area. This area extends for several hundred yards along side the road. It seems like the whole hill is coming down upon the highway. I think there has been a lot of damage done here by cutting timber in that foshion, that it results in surface water run offs which damage highway embankments to that extent. Let us go on to the next slide namely slide number 29.

Slide No. 29

One more of the same shots along that stretch of highway. Again we see that the erosion scars start at the very top of the road cut, a sure sign that they're not caused by the road-cut but instead are caused by water which flows unchecked from up-hill of the clear-cut side towards the road and builds up sufficient head and velocity when it approaches the additional slope of the road-cut to wash out the slope. Let us go on to the next slide.

Slide No. 30

This is slide number 30. In this area again we can see some erosion on the right hand side, I think that this is just taken at the very location where this Grande Cache highway erosion tapered out. The erosion is in the right foreground. I can not tell whether you can get this area clear enough, but it seems to have been completely stripped in that area of all plant life. Let us go on to the next slide namely slide number 31.

Slide No. 31

Here we have what happens when the timber is cut right into a water-shed, in this case you are looking at an Alberta river. This is water conservation, pulpmill style. This has been tolerated by the former government; I think the new government should put an end to this. The timber has been cut right into the Gregg river. This picture has been shot along the Gregg river road which starts about one mile west of the McLeod river campsite on a trunk road and from this point runs west towards the Luscar road. Let us go on to the next slide namely slide number 32.

Slide No. 32

Here we see the same tree at the very right hand, centre of the picture which appeared in the previous picture. These pictures here along the Grege river have been taken as sequence shots and what we see now is an extention of the damage there which has been done by the timber being cut right into the high-water mark of the creek bed. The silt has deposited all the way along on the left hand side in the high water area and we also can see where the silt comes from, mainly what appears to be some sort of wash-out which is visable just centered below the remaining stand of timber. Let us go on to the next slide, slide number 33.

Slide No. 33

Slide number 33 we see the same tree again which we just noticed before the one with that extra peeler logs taken out of the left end, right in the centre of the picture this time. We again are looking at the wash-out and some of the silt; and the wash-out area in this case appears to be straight above the left-hand of the tree in the centre. Let us go on to find out what the sign on the right hand side of the Gregg river picture reads.

Slide No. 34

The next slide is slide number 34. Here we get a full view of what has happened in the area. "Danger wash-out." Apparently the road has washed out at this point and it seems to me that a similar sign should have been put under the far side of the creek and where similar wash-outs had washed out the top soil which is necessary to maintain the plant life in that area. It is now necessary that we shut off the tape record over 40.

I am now ready to describe slide number 35.

Slide No. 35

On slide number 35 we see an area, this rig-road which has been described now a location code. This particular area has a very light brown soil, the consistency of wheat flour; at the slightest touch it seems to disintegrate. The damage here consists mainly of erosion inspite of the fact that the area appears to be almost level. Yet quite a bit of erosion is going on never the less. At the foreground here we see freshly deposited and eroded soil and we shall see some more of it on the next two slides. Let us go on to slide number 36.

Slide No. 36

On slide number 36 we have another viewing of the same area and here we can see the logging access road running through this area, former cut line, I suppose, which had been utilized for logging, and we also see that the area is washing out all over the place despite the fact that this is apparently flat on the surface. Tremendous damage has been done on this particular area and we shall see some more of this in slide 37. Let us go to slide 37 and have a look at it.

Slide No. 37

Again is in that same area and shows us some detail of what is going on there. The stumps have been either covered with silt or have been torn out by the scarification machinery, which one I can not tell. However, the situation is very excessive. It appears to me it has been caused by over-use of earth disturbing machinery. Let us go on to the next slide namely slide no. 37, pardon me I should say slide number 38.

Slide No. 38

Slide number 38. We are along the same road below the area where the timber has been cut right into a small creek, the head-waters of a small creek. All the silt we saw previously on those slides is finding it's way now into this creek, running along the road which is on the very left foreground, and running along the road in the ditch you can see at the top left of the picture as all the silt runs into this water-way. Let us go on for another shot of this area on the next slide namely slide number 39.

Slide No. 39

On slide number 39 we see another view of this particular location, a few trees remain on the right hand side and the silt from the remainder of the area plus logging debris are finding their way into this very creek. Let us go on to the next slide and see what happens to this silt. The next slide is slide number 40. Let us go to slide number 40.

Slide No. 40

This is a view down-stream just from the very edge of this last picture which you looked at, and here we see what happens to the silt. The silt has covered an area just down-stream from the timber operation extending in size at least 150 by 200 feet. The silt has deposited in that area to an average depth of about one foot. The little water-way is completely choaked up with silt and consequently has to channel it's way through the silt. It must be assumed, however, that much more silt, than what is deposited in this area here as we can see, has washed down that little creek already and finds it's way into larger water-courses or into places other than this particular place. Such water-shed protection is of course completely inacceptable, whether or not there are present regulations protecting the head-waters of our water-sheds I do not know; there has been some mention made to me which I could not verify that there is a regulation which requires a buffer-zone of a minimum of 66 feet from the shore line of small creeks.

As we have seen on the previous slides, this buffer zone was not established at this creek. It seems to be if such a regulation exists that it is not being enforced or was not enforced formerly. Let us go on to the next slide, slide number 41.

Slide No. 41

On slide number 41 we can see what slash looks like. This particular area of slash was found, I believe, west of the Yellowhead tower. This could be checked with the list of the coded locations. What we see here is that slash covers the area to an average depth of about one foot in solid wood. Another thing which we can easily notice here is the type of debris in that area. There are quite a..., there's quite a large amount of pieces of wood here which appear to have originated from immature timber which was of course cut-over during the clear-cutting operations and simply left in the form of slash since it couldn't be utilized by the company. The walking in this area would of course be very difficult and therefore the slash would require treating before any planting could be undertaken. Let us go on to some of our next pictures, namely slide number 42.

Slide No. 42

Slide number 42 shows another access and loading area with remains of timber laying in the foreground. This I believe was again taken on the Norris Creek road trip. Let us go on to the next slide, slide number 43.

Slide No. 43

Here we see slash as it appears a few years after the fact. The very year..., in the very foreground on the right-hand side we can see one stump still remains rooted in the ground; farther above that, directly above that, almost at the skyline we notice another stump still in the area; it appears that the scarification equipment had missed this area. This probably explains the debris laying on the surface which has not been broken up as yet. Let us go on to the next slide, namely slide number 44.

Slide No. 44

Now this is a picture some people may want to complain about. It shows an area of untreated slash west of the Yellowhead tower. Now some people of course will say that this also constitutes an environmental mess. However, I feel that actually the mess is not as bad as if the whole landscape erodes which is caused by scarification. We also notice that there is more plant life in the area than in a scarified area. These shrubs will soon grow to a size where they start to shape the soil thus providing a favourable conditions for regrowing of coniferous forests. Let's go onto the next slide, namely slide number 45.

Slide No. 45

On slide number 45 we have finally caught up with the culprits. What we see here is two large caterpillers used by the company for the scarification; and we also see in the left foreground along the highway we see the scarification ploughs, I should call them, I don't know what they're actually called but to me they have some relationship to a plough. We have a closer look at one in the next slides. At the right we see in the foreground the heavy harrows about fifteen by fifteen foot in size which are part of the set up and are dragged behind the machines. The ploughs attached to the front of machines and are of course hydraulically operated to lower them into the ground or above the ground wherever the operator feels necessary. Let's go to the next slide, slide number 46.

Slide No. 46

What we see here is the two huge bulldozers as used in the process. Other than the soil detail as it appears after scarification, there is not much to be said for this particular slide. Let us pass on to the next slide, slide number 47.

Slide No. 47

Slide number 47. We see detail of one of these ploughs which are attached to the front of the bulldozer. It is very heavy equipment, but the triangular ridges seem to be out of solid steel probably filled inside with some weighty equipment. The ploughs can be lowered into the soil or dragged above the timber to break up the timber and partially plough it into the soil. Of course these ploughs, together with the harrows behind, are capable of tearing out every root that is in the ground surface. Let us go on to the next slide, slide number 48.

Slide No. 48

Slide number 48 shows a close up view, I'm standing there to give the people some idea of scale of the actual size of the equipment used. We are looking, of course, at these chains which are about (chain harrows I should call them) which are about fifteen foot by fifteen foot in size and consist of heavy chain links about an inch and a half thick with spikes of the same diameter and about a foot long. Of course where this chain-harrow goes nothing will grow anymore for the next couple of years. It will tear everything out of the ground, every last mushroom, every piece of moss, every grass root, everything will go. It will turn practically the area into the same shape as a construction excavation. Let us go on to the next slide, namely slide number 49.

Slide No. 49

What you are looking at here is some remains of earlier methods of scarification used in the area. What you are looking at here is the windrow method. We are looking up between two windrows and notice that the entire top soil has been completely stripped from the area exposing bare gravel. If I may ask you to put the picture on the sharp focus you will probably agree with me that there is hardly a blade of grass which grows between those windrows. This area has been laying for approximately ten to twelve years in this fashion as the size of trees growing within the windrows tells us. The size of trees within the windrows is photographed in the next slide.

Slide No. 50

The next slide is slide number 50 which I shall describe now. Here we see why of course the windrows were not burned as usual, apparently because of the closeness of still remaining timber. The windrows in the foreground running from the very left foreground towards the middle on the right-hand side and behind that, running in the same general direction, we see another three or four of these windrows, each windrow grows trees apparently varing in age from six to eight years. It is therefore to be assumed that the windrows must have been in place, in this fashion, for at lease that time in order to show tree-growth of this nature in the windrow itself. It is remarkable, however, that there is no growth at all between windrows where the top soil had been scraped off. No growth whatsoever as far as trees are concerned can be found within areas between windrows. The area we are looking at is quite extensive in size and can be found along

the old Grande Cache highway just north of it's junction with the north end of the Moberly road. Let us now go to the next slide to look at some problems of regeneration namely this will be slide number 51.

Slide No. 51

On slide number 51 we are approaching an area which I think has been regenerated to an average density by the company, that is average compared to most of the regeneration areas which we have noticed. There is not very much regeneration on the very edge of it here, but we shall have a picture of how much regrowth there is in some of the next pictures. Let's go to slide number 52 and take a better look.

Slide No. 52

On slide number 52 we can see a mixture of regenerated fir and pine and what appears to be advance growth, that is trees, young trees, which were in this area before the harvesting operation was commenced. The trees in this particular area were found to be an average of ten to eighty feet apart. Translated, this could very well be that their spacing ranges ten times eighty feet, which in other words could again mean that there is one tree for each space ten times eighty namely one tree for each eight hundred square feet. The government prefers spacing standards which require more than that. First of all the standards at present require that of any ten thousand mill-acre area, four thousand mill-acres must contain one seedling, that is grown in the area for three years. In this way it would be possible to replant 40 percent of an acreage to that density and theoretically leave the remaining 60 percent completely unregenerated. However if we assume that the government intent and the pulpmill intent was to distribute this 40 percent restocking over the entire area, which appears to be happening in the case in this particular area in which we are looking at right now, then we could also assume that there will be a requirement of 400 trees per acre. That again amounts to approximately 1 tree for each one hundred square feet and would require therefore at even distribution trees spaced at approximately ten feet on centres. Now I'm not claiming that the company did not intend or did not plant at such a required spacing, and neither do I claim that the Forestry Department when they were cross-checking the planning of the company three years after regeneration did not find the trees in the area.

But I do claim that in all likelihood from the time when the government check was made three years after the replanting operation until the time when we came back into the area, that is, according to the age of the trees in which we find the trees are now, possibly seven out of eight died thus giving us a present figure of one tree for each 8 hundred square feet instead of one tree for each one hundred square feet. If we assume further that the government did make their checks when the growth was three years of age in that area, and if we also assume that the trees as we see them on the picture are from six to eight years of age, then we must asume that this mortality took place within the short span of three to five years. Let us now go on to the next one, namely slide number 53 and slide number 54.

Slides No. 53 and 54

Both of these slides show the same area again. No. 53 shows an overall view and number 54 shows a detailed view of what appears to be an old logging road extending way back into the area. Not only does the logging road extend way back but also we notice a wash-out on this logging road which has still not healed and is extending way back. We also notice that the tree growth in that particular logging road area is still less frequent than the remainder of the area, a sure sign that trees don't grow in wash-out. The last three slides and the next two they were all taken in the same area, the same harvest area, along the Grande Cache highway. Let us have a look at the other slides, next slide number 55.

Slide No. 55

This is more of that very same area on slide number 55. Sparse regrowth indeed. I think we shall not spend too much time on this one and go on to the next slide namely slide number 56.

Slide No. 56

Slide number 56 still shows us more of the same, so let us go on to slide number 57.

Slide No. 57

Well this is a picture of another different area now. This picture has been taken in the McLeod River area approximately east or generally east of the Yellowhead tower and I don't know whether this could be discribed as reforestation. However, not very far from this spot the area was described by a company sign as alpine fir regeneration. With close-up view we can see about, oh I would say about, twenty trees in this general area on the immediate foreground up to half ways up on the hill. Further up on the hill we see the influence of the margin timber resulting in what appears to be much denser forest tree growth. One reason why the brief to the government asks for strip cuts of lesser widths because the regeneration is obviously much easier, much better within margins of remaining timber. Let us go to the next slide, namely slide number 58.

Slide No. 58

What we are comparing now to these previous pictures is natural reforestation following fire. These particular areas show former forest fire areas. This is the first one of them. It shows regrowth of spruce or alpine fir, I can't quite make it out here on the picture. In between the old burnt post we see also a completely bare pulp cut in the background right next to this fire area. Let us go on to the next picture and compare fire reforestation again.

Slide No. 59

This is slide number 59. On slide number 59 we see just how dense mother nature seeds trees in order to prevent environment destruction following fire. With such dense regrowth of small trees it is evident that the soil will have no chance to erode as the immediate surface area of the soil is, immediately following the fire, covered with a net-work of small roots from these new seedlings. The trees further-more provide shade for each other and thus provide the necessary humidity conditions near the surface of the soil and immediately below the surface where these small roots take their nourishment. It protects the moisture from excessive evaporation by wind and sun and heat. This contributes to fast growth of the young trees and in no time at all some of the trees will grow to a size where they will crowd out other smaller trees. And thus natural selection will only let the strongest and healthiest trees survive this close competition, what remains then is a healthy forest. Let us now go on to the next slide, namely slide number 60.

Slide No. 60

On slide number 60 we are looking at the pine regeneration following fire along the Gregg River road. I estimate that the pine in this particular area regenerate at a density of at least one tree for every two square feet. To give you some scale of the height of those trees let us look at the next picture, slide number 61.

Slide No. 61

I'm standing in the background here in the young growth and I have reasons to smile because here is what I can call regeneration. I agree that some forester's might call it excessive regeneration and in some ways I share their feelings, however. Regeneration, pine regeneration of this nature, has taken place for thousands and ten thousands of years. The forests we harvest today are the result of such dense regeneration. I can not agree with some foresters' opinions who claim that such dense regeneration will result in stagnation of the entire regrowth. Since most nature pine forests of today have started in this manner. If you compare this particular regrowth to the pulp mill regrowth within a mile of that very area then I say that I'd rather have this particular regrowth as I see it here on the picture than that of the pulp mill, because, at least if nothing else, this dense regrowth protects the soil from erosion and protects the environment of the forest and it conserves our water shed. These are things which I can not necessarily say of pulp mill clear-cutting. Let us go on to the next pictures, namely slide number 62.

Slide No. 62

Slide number 62 has been taken across from the Nojack campsite it shows thinning out with a stand of mature timber which could be used as a favourable environment for regrowing young timber below the canopy of the remaining mature stands. Now I have reasons to call this a method of selective cutting. It protects the forest environment, the soil is never disturbed, the best possible conditions are left to remain within this environment for young regrowth to take place. I understand that this operation was started by Muttart Lumber at one time and I also understand that at the present time the thinning of the stand is being continued by inmates of a close by limited security camp. Let us now look at the next slide, namely slide number 63.

Slide No. 63

And this slide we are again looking at the same thinning operation across from the Nojack campsite. The trees of course in this area I don't think are thinned for the purpose of regeneration, I think they are thinned for other reasons possibly for extention of the campsite etc. However, it gives other people some idea of what I mean by selective cutting, namely creating a canopy of mature trees which can be cut at a later stage, possibly in such selective cutting the trees could be thinned somewhat more than this particular operation here shows and trees could either regenerate naturally within that area depending on the species of trees of course or could be replanted to grow one of the best possible environmental conditions. Once the new regeneration has successfully been established, and following another five years of that, the remaining mature timber can then be cut without too much damage to the still flexible young growth and the forest environment will never suffer. Let us go to the last slide now, namely slide number 64.

Slide No. 64

STOP had promised 65 slides but I'd like to apologize on behalf of STOP that we have lost one of these slides and therefore we only have 64 slides. We are now looking at slide number 64 as being the last picture. This picture has been purposely chosen as the last picture since it very well represents the forest of the future in Alberta if we continue with present regulations under which the pulp mill is allowed to operate. What we are looking at is an area bald from horizon to horizon; there is not very much forest environment left, there is not much water-shed protection left, there is not much water-conservation within the soil left, what we are looking at is an area that used to have all these properties when it was still beautiful forest before it was clear-cut and scarified by the Hinton pulp mill operation. Much of the area we are looking at was cut before 1963 and little has changed in that area since. Is this the forest of the future in Alberta? Does this compare with regrowth after fires? Should we not become sufficiently concerned to change the harvesting methods to more rational methods than the one which was practised when this particular area which we are looking at was harvested? People from all over Alberta are becoming concerned about what is going to happen in this area. We trust that the government will share this concern. On behalf of STOP and myself I like to thank everybody for showing sufficient concern to view these pictures and to listen to this presentation. Thank you very much ladies and gentlemen.

TELEPHONE NO.

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T/M S 6.53

GOVERNMENT OF THE PROVINCE OF ALBERTA

DEPARTMENT OF LANDS AND FORESTS
NATURAL RESOURCES BUILDING
109TH STREET AND 99TH AVENUE
EDMONTON, ALBERTA

September 14, 1972.

Edmonton Journal,
101 Street - 100 Avenue,
Edmonton, Alberta.

Dear Sir:

It would be appreciated if you would publish the following letter in the Edmonton Journal at your earliest convenience.

"The S.T.O.P. organization of Edmonton contracted the services of a Mr. A. Zimmer in 1971 to prepare a brief to the Minister of Lands and Forests of Alberta to draw attention to forestry malpractice in the North Western Pulp & Power Ltd. lease area near Hinton, Alberta. Mr. Zimmer urged in the brief that the Department check out his photographic evidence of alleged damages by visiting the specific areas in the field. This was done and field checking was carried out in August of this year by the Silviculture Section upon request from the Timber Management Branch of the Department of Lands and Forests.

The field survey of Mr. Zimmer's photo locations showed that in eight of eleven areas cited as being devoid of coniferous regeneration, stocking exceeded 540 trees per acre. The Department of Lands and Forests recognizes 400 seedlings per acre to be adequate for proper stocking of trees. In the remaining three locations there were between 335 and 385 seedlings per acre judging all eleven cases by sample plots located at photo centres in Mr. Zimmer's choice locations. The three latter areas had been logged as recently as in 1969 and seed shed from cones in the logging slash may still be expected to increase stocking also here to near or above the lower limit of 400 trees per acre. Mr. Zimmer simply did not look for seedlings or he could not have made the sweeping charges that forest environments were destroyed by logging.

Three charges were also made in the brief that trees had been logged to waters' edge on the lease area. None of these proved factual. Careful checking by Mr. Zimmer of field situations and of cut control records compiled by the North Western Pulp and Power Ltd. could reveal the inaccuracy of the charges.

Charges were also made that erosion results from logging and scarification. In possibly three of ten cases checked in the field, erosion could be blamed on logging roads but in no area could erosion be blamed on tree felling or scarification.

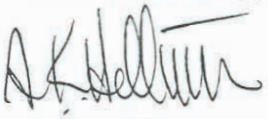
The charges made against scarification and logging, against logging to waters' edge, and against erosion damages portrayed a lack of ability to distinguish between good and bad forest practice thus suggesting strongly that the brief deals with AESTHETICS and NOT with FACTS. Aesthetic views vary among people and serve poorly to condemn tried and effective methods of reforestation in Alberta.

Had Mr. Zimmer chosen his examples carefully he might have helped the cause of good forestry practice in Alberta for no industry is likely to be entirely free of all blame in areas of dispute among users of a common resource. However, the approach used by Mr. Zimmer casts doubt on his reporting thus potentially damageing good forestry practices in this province.

If the S.T.O.P. organization of Edmonton is to prove effective in its worthwhile monitoring of man's use of his environment, it should choose its facts far more carefully than it did for this brief to the province.

Silviculture Section,
Timber Management Branch,
Alberta Department of Lands & Forests.

Yours sincerely,



A.K. Hellum,
Silviculture Section.

Model Forest STOP Report 2006
Photo Points and Silvicultural History for Zimmer Blocks
Revised Sept 26, 2006

W.C/ Compt	Block	Year Cut	Photopoints		Photo Perspective	Silvicultural History		Comments
McLeod 2	509	1968	1	N 53 12.643 W 117 29.764	Shooting S from Gregg R Road and Hwy 40 jct.	1969 1974 1979	Scarified for Nat Planted Planted	Much of this block was erased by Hwy 40
	Helicopter Perspective		From above Hwy 40, shooting South					
	Gregg Burn	1956	1	N 53 13.854 W 117 25.824	Gregg Burn 1956 Juvenile Spacing early70s	1956 1972	Gregg Burn Hand Thinning	Zimmer Block Jack Wright advised that the stand at the junction of the wellsite road and Gregg River Road was thinned in the early 70s by a small crew of "juvenile offenders".
	Helicopter Perspective		Image taken from above Gregg River, shooting SE into Gregg Burn					
McLeod 6	139	1961	1	N 53 16.435 W 117 12.271	Shooting N along original PR road grade into stand	1961 1979	Scarified for Natural Juvenile Spacing	
	Helicopter Perspective		H1 – From south of block, shooting NW across PR road H2 – closer to block, same perspective					
	183	1969	1	N 53 17.457 W 117 04.562		1970,71 2000	Scarified for Natural Manual cleaning/ girdling	
	Helicopter Perspective		H1 – Shooting NW across block, parallel to access road H2 – Shooting SW across block across access road					
	211	1966	1	N 53 16.787 W 117 11.093	Old access trail, shooting NE into block	1967	Scarified for Natural	
	Helicopter Perspective		H1 – Shooting S across Robb Road, ground photopoint is just off access road along old trail H2 – Shooting W along Robb Road, block on left side of road					

	213	1966		No ground reference point		1967	Scarified for Natural	
	Helicopter Perspective		H1 From above PR road at big elbow, shooting east across blocks 534a and 210; 213 dominates the skyline					
	532	1969	1	N 53 16.718 W 117 10.120	Shooting SW from Robb Road	1969	Scarified for Natural	
	Helicopter Perspective		H1 – from SE of pond, N of Robb Road, shooting South. Seismic line just visible in left side of image is just inside the top part of the block. H2 – same perspective, shifting slightly W – note same large bush at road edge. This image blends into block 211, cannot distinguish boundary between the two blocks (only 3 yrs difference between harvest)					
	534	1969	1	N 53 16.605 W 117 12.065	Shooting across PR road big elbow to WSW	1969	Scarified for Natural	
	Helicopter Perspective		H1 Shooting from big elbow on PR road to east across 534a and 210					

Berland 3	C14	1966	1	N 53 43.348 W 118 16.126	From Road	1966	Scarified for Natural East side planted Pl 1976, 1980	Zimmer Block
			2	N 53 43.363 W 118 16.106	Interior stand			
	C20	1970	1	N 53 43.348 W 118 16.126	From Road	1971	Scarified for Natural	Zimmer Block
			2	N 53 43.363 W 118 16.106	Interior stand			
	Helicopter Perspective		C14, C20 View is from southwest of blocks, shooting across Hwy 40					

Berland 4	K10	1965	1	N 53 39.438 W 118 13.377	Shooting NW from Hwy 40	1966 1976, 1980	Scarified for Natural Small part of block (3 ha) planted Pl	Zimmer Block
	Helicopter Perspective		H1 – From SW side of Hwy 40, shooting NW					
Berland 8	26	1956	1	N 53 36.436 W 118 05.009	Shooting NE		Left for Natural	
			2	N 53 36.297 W 118 04.413	Shooting N from Hwy 40			Zimmer Block
	Helicopter Perspective		H1 – shooting NNE across the junction of the pipeline and old Lower Road just above Hwy 40 north of Fred Creek. Ground photopoint is at the junction.					
	28	1959	1	N 53 35.842 W 118 03.743	Stand Interior	1960 1962 1976, 1979	Scarified for Natural Seeded by hand 8 ha replanted	Zimmer Block
			2	N 53 35.888 W 118 03.707	Shooting SW from Hwy 40			
	Helicopter Perspective		H1 – from old Lower Road, shooting northerly, Block 28 is the large block on the hill north of the pond. H2 – from east of the Railnet railway, shooting SW across the railway and Hwy 40					

Zimmer Plot Summary

Number	Plot ID	Historical Cut Block	Natural Subregion	Ecosite/ Phase	Soil Texture	Year of Harvest	Site Prep Equipment	Site Prep Year	Reforestation Method	Reforestation Year	Evidence of Tending	Growth Intercept (m/yr)	Site Index (m)
1	Z24/26	727-4-2	UF	C1	SL	1982	Brac	1984	Planted	1984	PCT	0.22	18.0
2	Z25	509-4-2	UF	E1	SL	1968	Crosley Plow	1969	Planted	1978	PCT	0.22	20.0
3	Z31/34	101-4-2	UF	E1	fSL	1963	Crosley Plow	1964	Planted (3.8ha)	1970	PCT	-----	16.5
4	Z60/61	Old Burn McLeod-2	UF	D1	SiCL						PCT	-----	16.0
5	Z58/59	Old Burn McLeod-4	UF	D1	fSL						-----	-----	-----
6	Z14/15	139-4-6	UF	C1	SiL	1961	Crosley Plow (9.3ha)	1961	Natural	-----	PCT	0.37	17.0
7	Z12/13	209-4-6	UF	F1	SiL-SL	1966	Crosley Plow	1967	Natural	-----	-----	0.22	18.0
8	Z6/8/11/57	139-4-6	UF	C1	SiL	1961	Crosley Plow (9.3ha)	1961	Natural	-----	PCT	0.37	-----
9	Z43/44	534-4-6	UF	C1	SL	1969	Crosley Plow	1969	Natural	-----	PCT	0.22	19.0
10	Z17/18/21/22	56-4-6	UF	D1	SiL	1964	Crosley Plow	1965	Natural	-----	PCT	0.42	18.5
11	Z1/9/10/41/42	211-4-6	UF	D1	SiL	1966	Crosley Plow	1967	Natural	-----	PCT	0.27	16.0
12	Z64	130-4-6	UF	E1	SiL-SL	1963	Crosley Plow	1964	Natural	-----	PCT	0.27	22.0
13	Z35/37	183-4-6	UF	E2	SiCL	1969	Crosley Plow(1.0ha)	1971	Natural	-----	-----	0.23	20.5
14	Z38/40	190-4-6				1970	Crosley Plow	1971	Planted (17.2ha)	1977	-----	-----	-----
15	Z19	190-4-6	UF	H1	Oh	1970	Crosley Plow	1971	Planted (17.2ha)	1977	-----	0.26	18.5
16	Z7	Roadside Berland-3									-----	-----	-----
17	Z20	500-5-3				1973	Crosley Plow	1974	Natural	-----	-----	-----	-----
18	Z23/27/29	C19-5-3	UF	C/B1	SiL-SL	1970	Crosley Plow	1971	Planted	1977	-----	0.22	16.0
19	Z3/4/5	C15-5-3	UF	D1	SiL	1970	Crosley Plow	1971	Planted	1976	-----	0.28	19.0
20	Z16	C13-5-3	UF	D1	SiCL	1966	-----	-----	Planted	1966	-----	0.37	21.0
21	Z30	K10-5-4				1964	-----	-----	Natural	-----	-----	-----	-----
22	Z49/50	27-5-8	UF	H1	SiCl	1956	-----	-----	Natural	-----	-----	0.23	18.0
23	Z51/56	28-5-8	UF	D1	SiCL	1959	Crosley Plow	1960	Planted (8.1ha)	1979	-----	0.27	17.5
24	Z2	28-5-8				1959	Crosley Plow	1960	Planted (8.1ha)	1979	-----	-----	-----

Note

1. The above table lists the last known recorded activity
2. No plot data available
3. 1:30,000 scale overview maps only denots the first number of the Zimmer ID
4. Site Index was determined using the provincial polymorphic curves for total height and breast height age (Shongming, 1997)

ECOLOGICAL ASSESSMENT FORM

Page 1 of 1

Plot No. Zimmer 1/9/10/41/42 | Location McLeod - 6 Historical Blk. 211 | Date Yr 00 Mo 08 Day 25

POC 2.1km from junction Pr & Robb Rd.

Strip Line Off of siesmic line 22m@79deg | Surveyed by: Students (Denis & Sherri) / Field checked by Lynn Bergeron Dec. 2/00

SITE

Ecoregion	UF	Aspect	N	degrees	EDATOPE
Ecosite	D	Slope Pos.	C U **M** L T D E		MR 1 2 3 4 **5** 6 7 8 9
Phase	1	Slope Class	8	%	NR A **B** C D E F
Parent Material	**M** L E F GF O R	Surface Expression			A B F H **I** L M R S T U V
Ecosite Fit	G F P				

SOILS

Duff Depth	6-8 cm
Humus Form	Mor Moder Mull
Decomp. Org. Soil	Of Om Oh

Depth to:		
Water	N/A	cm
Mottles	N/A	cm
Gleying	N/A	cm
Calcar.	N/A	cm
ERD	20	cm
Bedrock	N/A	cm

Evidence of fire @ 18cm

Layer 1:	Aej		0 - 4
Depth:	4	cm	5 - 14
Texture	SiL		30 - 49
Coarse Frag. %	0		50 - 79
Coarse Frag. Type	G C S B		80 +
Layer 2:	Bfj/Bm		0 - 4
Depth:	25+	cm	5 - 14
Texture	SiL		30 - 49
Coarse Frag. %	10		50 - 79
Coarse Frag. Type	**G C** S B		80 +
Layer 3:			0 - 4
Depth:		cm	5 - 14
Texture			30 - 49
Coarse Frag. %			50 - 79
Coarse Frag. Type	G C S B		80 +

VEGETATION

Forest Cover Type 50%-9.2m-1500sph Pl10(AwSb) Diam - 16.7cm Age Counted 24yrs BHA

Vegetation Structure	SW	SE	SB	PL	PJ	FB	LT	FD	AW	PB	BW
Main Canopy				E					A		
Understory > 10m											
Understory 4 - 10m			A	A					A		
Understory < 4m			B	A					B		

Cover Classes (%) A: < 1 B: 1 - 5 C: 6 - 20 D: 21 - 50 E: > 50

Comments: Pl/Ledum | 3YR Growth intercept = 0.80m = .27m/yr

History | Total height SI = 16

Harvested - 1966

Site Prep - Crossley Plow 1967

Refor - Naturals | Porcupine or Squirel Damage Heavy

Heavy gall rust

Thinned | Photos - LB5 - 9,10,11,12

ECOLOGICAL ASSESSMENT FORM

Page 1 of 1

Plot No. Zimmer 51/56 | Location Berland-8 Historical Blk. 28 | Date Yr 00 Mo 08 Day 28

Strip Line POC off Road 58m@230deg. | Surveyed by: Students (Denis & Sherri)

SITE

Ecoregion	UF	Aspect	SE	degrees	EDATOPE
Ecosite	D	Slope Pos.	C U M L T D **E**		MR 1 2 3 4 **5 6** 7 8 9
Phase	1	Slope Class	0	%	NR A B **C** D E F
Parent Material	**M** L E F GF O R	Surface Expression			A B F **H** I L M R S T U V
Ecosite Fit	G F P				

SOILS

Duff Depth	7 cm
Humus Form	Mor Moder Mull
Decomp. Org. Soil	Of Om Oh

Depth to:		
Water	>41	cm
Mottles	N/A	cm
Gleying	N/A	cm
Calcar.	N/A	cm
ERD	15	cm
Bedrock	N/A	cm

Layer 1:	Ae		0 - 4
Depth:	0-4	cm	5 - 14
Texture	SiL		30 - 49
Coarse Frag. %	0		50 - 79
Coarse Frag. Type	G C S B		80 +
Layer 2:	Bm		0 - 4
Depth:	13	cm	5 - 14
Texture	SiCL		30 - 49
Coarse Frag. %	5		50 - 79
Coarse Frag. Type	**G C** S B		80 +
Layer 3:	Bt		0 - 4
Depth:	28	cm	5 - 14
Texture	C		30 - 49
Coarse Frag. %	0		50 - 79
Coarse Frag. Type	G C S B		80 +

VEGETATION

Forest Cover Type 60%-12m-2100sph Pl8Sb2 Diam - 15.9cm Age Counted 30yrs BHA

Vegetation Structure	SW	SE	SB	PL	PJ	FB	LT	FD	AW	PB	BW
Main Canopy			C	E							
Understory > 10m											
Understory 4 - 10m			B								
Understory < 4m			A	A							

Cover Classes (%) A: < 1 B: 1 - 5 C: 6 - 20 D: 21 - 50 E: > 50

Comments: | 3YR Growth intercept = 0.81m = .27m/yr

History | Total height SI = 17.5

Harvested - 1959

Site Prep - Crossley Plow 1960

Refor - Naturals (8.1ha planted)

ECOLOGICAL ASSESSMENT FORM

Plot No. Zimmer 14/15/6/8/11/57 | Location McLeod-6 Historical Blk. 139 | Date Yr 00 Mo 08 Day 24

Strip Line 700m down PR-rd. | Surveyed by: Students (Denis & Sherri) / Field checked by Lynn Bergeron Dec. 2/00

SITE

Ecoregion UF | Aspect Varia NW degrees | EDATOPE
Ecosite C | Slope Pos. C U M L T D E | MR 1 2 3 4 5 6 7 8 9
Phase 1 | Slope Class 7 % | NR A B C D E F
Parent Material M L E F GF O R | Surface Expression A B F H I L M R S T U V
Ecosite Fit G F P

SOILS

Duff Depth RawModer 5 cm
Humus Form Mor Moder Mull
Decomp. Org. Soil Of Om Oh

Depth to:
Water N/A cm
Mottles N/A cm
Gleying N/A cm
Calcar. N/A cm
ERD 18 cm
Bedrock N/A cm

Layer 1: Ae | 0 - 4
Depth: 0-3 cm | 5 - 14
Texture SiL | 30 - 49
Coarse Frag. % 5 | 50 - 79
Coarse Frag. Type G C S B | 80 +

Layer 2: Bm | 0 - 4
Depth: 15 cm | 5 - 14
Texture SiL | 30 - 49
Coarse Frag. % 15 | 50 - 79
Coarse Frag. Type G C S B | 80 +

Layer 3: BC | 0 - 4
Depth: 22 cm | 5 - 14
Texture SiCL | 30 - 49
Coarse Frag. % 15 | 50 - 79
Coarse Frag. Type G C S B | 80 +

VEGETATION

Forest Cover Type 60%-11.6m2000sph PL10(Aw) | Diam - 14.2cm | Age Counted 30yrs BHA

Vegetation Structure	SW	SE	SB	PL	PJ	FB	LT	FD	AW	PB	BW
Main Canopy	A			E					A		
Understory > 10m	A			B							
Understory 4 - 10m	A			C					A		
Understory < 4m	A										

Cover Classes (%) A: < 1 B: 1 - 5 C: 6 - 20 D: 21 - 50 E: > 50

Comments: Pl/Grass-Alnus | 3YR Growth intercept = 1.10m = .37m/yr

History | Total height SI = 17
Harvested - 1961
Site Prep - Crossley Plow 1963 (9.3ha)
Refor - Naturals | Gall rust / Thinned

ECOLOGICAL ASSESSMENT FORM

Plot No. Zimmer 43/44 | Location McLeod-6 Historical Blk. 534 | Date Yr 00 Mo 08 Day 24

Strip Line POC curve in Rd. 1km down PR-rd. | Surveyed by: Students (Denis & Sherri) / Field checked by Lynn Bergeron Dec. 2/00

SITE

Ecoregion UF | Aspect S degrees | EDATOPE
Ecosite C | Slope Pos. C U M L T D E | MR 1 2 3 4 5 6 7 8 9
Phase 1 | Slope Class 13 % | NR A B C D E F
Parent Material M L E F GF O R | Surface Expression A B F H I L M R S T U V
Ecosite Fit G F P

SOILS

Duff Depth RawModer 4 cm
Humus Form Mor Moder Mull
Decomp. Org. Soil Of Om Oh

Depth to:
Water N/A cm
Mottles N/A cm
Gleying N/A cm
Calcar. N/A cm
ERD 20 cm
Bedrock N/A cm

Layer 1 Ae | 0 - 4
Depth: 0-4 cm | 5 - 14
Texture SiL | 30 - 49
Coarse Frag. % 5 | 50 - 79
Coarse Frag. Type G C S B | 80 +

Layer 2 Bm/Bfj | 0 - 4
Depth: 20+ cm | 5 - 14
Texture SL | 30 - 49
Coarse Frag. % 25 | 50 - 79
Coarse Frag Type G C S B | 80 +

Layer 3: | 0 - 4
Depth: cm | 5 - 14
Texture | 30 - 49
Coarse Frag. % | 50 - 79
Coarse Frag. Type G C S B | 80 +

VEGETATION

Forest Cover Type 55%-9.7m-1300sph Pl10 | Diam - 12.0cm | Age Counted 21 yrs BHA

Vegetation Structure	SW	SE	SB	PL	PJ	FB	LT	FD	AW	PB	BW
Main Canopy				E					A		
Understory > 10m				C							
Understory 4 - 10m			A								
Understory < 4m			B	A							

Cover Classes (%) A: < 1 B: 1 - 5 C: 6 - 20 D: 21 - 50 E: > 50

Comments: PL/Grass-Vaccvit | 3YR Growth intercept = 0.65m = .22m/yr

History | Total height SI = 19
Harvested - 1969
Site Prep - Crossley Plow 1969 | Gall rust
Refor - Naturals
Photos - LB5 - 3 & 4
Thinned | Photo - LB5 - 5 Zimmer6

ECOLOGICAL ASSESSMENT FORM

Page 1 of 1

Plot No. Zimmer 12/13 | Location McLeod-6 Historical Blk.209 | Date Yr 00 Mo 08 Day 24

Strip Line | Surveyed by: Students (Denis & Sherri) / Field checked by Lynn Bergeron

POC 1km from junction Pr & Robb Rd. | Dec. 2/00

SITE

Ecoregion UF | Aspect NE degrees

Slope Pos. C U M L T D E | EDATOPE MR 1 2 3 4 5 6 7 8 9

Slope Class 14 % | NR A B C D E F

M L E F GF O R | Surface Expression I L M R S T U V

G F P

SOILS

Duff Depth	12-15 cm
Humus Form	Mor Moder Mull
Decomp. Org. Soil	Of Om Oh

Depth to:		
Water	N/A	cm
Mottles	N/A	cm
Gleying	N/A	cm
Calcar.	N/A	cm

Layer 1:	Ahej	0 - 4
Depth:	2-4 cm	5 - 14
Texture	gravelly SiL-SL	30 - 49
Coarse Frag. %	0-5	50 - 79
Coarse Frag. Type	G C S B	80 +
Layer 2:	Bm	0 - 4
Depth:	30+ cm	5 - 14
Texture	gravelly SiL-SL	30 - 49
Coarse Frag. %	20	50 - 79
Coarse Frag. Type	G C S B	80 +
	Sandstone	
Layer 3:		0 - 4
Depth:	cm	5 - 14
Texture		30 - 49
Coarse Frag. %		50 - 79
Coarse Frag. Type	G C S B	80 +

VEGETATION

Forest Cover Type 80%-6.5mNCBr + 2%-10.3m-100sph Pl10 | Age Counted 24yrs BHA

Vegetation Structure	SW	SE	SB	PL	PJ	FB	LT	FD	AW	PB	BW
Main Canopy				A					A		
Understory > 10m											
Understory 4 - 10m											
Understory < 4m	A			A							

Cover Classes (%) A: < 1 B: 1 - 5 C: 6 - 20 D: 21 - 50 E: > 50

Comments: Alnus/Pl-Vibued | 3YR Growth intercept = 0.65m = .22m/yr

History | Total height SI = 18

Harvested - 1966

Site Prep - Crossley Plow 1967 | Photos - LB5 - 6,7,8

Refor - Naturals

Noncommercial brush type - Alnus

ECOLOGICAL ASSESSMENT FORM

Page 1 of 1

Plot No. Zimmer 51/56 | Location Berland-8 Historical Blk. 28 | Date Yr 00 Mo 08 Day 28

Strip Line POC off Road 58m@230deg. | Surveyed by: Students (Denis & Sherri)

SITE

Ecoregion UF | Aspect SE degrees

Ecosite D | Slope Pos. C U M L T D E | EDATOPE MR 1 2 3 4 5 6 7 8 9

Phase 1 | Slope Class 0 % | NR A B C D E F

Parent Material M L E F GF O R | Surface Expression A B F H I L M R S T U V

Ecosite Fit G F P

SOILS

Duff Depth	7 cm
Humus Form	Mor Moder Mull
Decomp. Org. Soil	Of Om Oh

Depth to:		
Water	>41	cm
Mottles	N/A	cm
Gleying	N/A	cm
Calcar.	N/A	cm
ERD	15	cm
Bedrock	N/A	cm

Layer 1:	Ae	0 - 4
Depth:	0-4 cm	5 - 14
Texture	SiL	30 - 49
Coarse Frag. %	0	50 - 79
Coarse Frag. Type	G C S B	80 +
Layer 2:	Bm	0 - 4
Depth:	13 cm	5 - 14
Texture	SiCL	30 - 49
Coarse Frag. %	5	50 - 79
Coarse Frag. Type	G C S B	80 +
Layer 3:	Bt	0 - 4
Depth:	28 cm	5 - 14
Texture	C	30 - 49
Coarse Frag. %	0	50 - 79
Coarse Frag. Type	G C S B	80 +

VEGETATION

Forest Cover Type 60%-12m-2100sph Pl8Sb2 | Diam - 15.9cm | Age Counted 30yrs BHA

Vegetation Structure	SW	SE	SB	PL	PJ	FB	LT	FD	AW	PB	BW
Main Canopy			C	E							
Understory > 10m											
Understory 4 - 10m			B								
Understory < 4m			A	A							

Cover Classes (%) A: < 1 B: 1 - 5 C: 6 - 20 D: 21 - 50 E: > 50

Comments: | 3YR Growth intercept = 0.81m = .27m/yr

History | Total height SI = 17.5

Harvested - 1959

Site Prep - Crossley Plow 1960

Refor - Naturals (8.1ha planted)

ECOLOGICAL ASSESSMENT FORM

Page 1 of 1

Plot No. Zimmer 24/26 — Location: McLeod-2 Historical Blk. 727 — Date: Yr 00 Mo 08 Day 30

Strip Line: POC off of spur Rd. — Surveyed by: Students (Denis & Sherri) Check by Lynn Bergeron (Nov. 2000)

SITE

Ecoregion: UF — Aspect: WSW degrees
Ecosite: C — Slope Pos.: C U M L T D E
Phase: 1 — Slope Class: 12 %
Parent Material: M L E F GF O R — Surface Expression: A B F H I L M R S T U V
Ecosite Fit: G F P

EDATOPE
MR: 1 2 3 4 5 6 7 8 9
NR: A B C D E F

SOILS

Duff Depth: 4 cm
Humus Form: Mor Moder Mull
Decomp. Org. Soil: Of Om Oh

Depth to:
Water: N/A cm
Mottles: N/A cm
Gleying: N/A cm
Calcar.: N/A cm
ERD: 35 cm
Bedrock: >100 cm

Layer 1: Ae
Depth: 3 cm
Texture: SiL
Coarse Frag. %: 0
Coarse Frag. Type: G C S B

Layer 2: Bm
Depth: 3-11 cm
Texture: SL
Coarse Frag. %: <20
Coarse Frag. Type: G C S B

Layer 3: BC/Bm
Depth: 11-35 cm
Texture: SL
Coarse Frag. %: <20
Coarse Frag. Type: G C S B

(Coarse frag. scale: 0 - 4, 5 - 14, 30 - 49, 50 - 79, 80 +)

VEGETATION

Forest Cover Type: 45%-6.1m-1800sph PL10 — Diam 9.1cm — Age Counted: 13yrs BHA

Vegetation Structure	SW	SE	SB	PL	PJ	FB	LT	FD	AW	PB	BW
Main Canopy				E					B		
Understory > 10m											
Understory 4 - 10m											
Understory < 4m			A	A							

Cover Classes (%) A: < 1 B: 1 - 5 C: 6 - 20 D: 21 - 50 E: > 50

Comments: Photos 14,15 & 17 — 3YR Growth Intercept = 0.65m = 0.22m/yr

History — Description: Pl/Grass
Harvested - 1982
Site Prep - Brac May 1984 — Total height SI = 18
Refor - Planted June 1984
Thinned

ECOLOGICAL ASSESSMENT FORM

Page 1 of 1

Plot No. Zimmer 1/9/10/41/42 — Location: McLeod - 6 Historical Blk. 211 — Date: Yr 00 Mo 08 Day 25

POC 2.1km from junction Pr & Robb Rd.

Strip Line: Off of siesmic line 22m@79deg — Surveyed by: Students (Denis & Sherri) / Field checked by Lynn Bergeron Dec. 2/00

SITE

Ecoregion: UF — Aspect: N degrees
Ecosite: D — Slope Pos.: C U M L T D E
Phase: 1 — Slope Class: 8 %
Parent Material: M L E F GF O R — Surface Expression: A B F H I L M R S T U V
Ecosite Fit: G F P

EDATOPE
MR: 1 2 3 4 5 6 7 8 9
NR: A B C D E F

SOILS

Duff Depth: 6-8 cm
Humus Form: Mor Moder Mull
Decomp. Org. Soil: Of Om Oh

Depth to:
Water: N/A cm
Mottles: N/A cm
Gleying: N/A cm
Calcar.: N/A cm
ERD: 20 cm
Bedrock: N/A cm

Evidence of fire @ 18cm

Layer 1: Aej
Depth: 4 cm
Texture: SiL
Coarse Frag. %: 0
Coarse Frag. Type: G C S B

Layer 2: Bfj/Bm
Depth: 25+ cm
Texture: SiL
Coarse Frag. %: 10
Coarse Frag. Type: G C S B

Layer 3:
Depth: cm
Texture
Coarse Frag. %
Coarse Frag. Type: G C S B

(Coarse frag. scale: 0 - 4, 5 - 14, 30 - 49, 50 - 79, 80 +)

VEGETATION

Forest Cover Type: 50%-9.2m-1500sph Pl10(AwSb) — Diam - 16.7cm — Age Counted: 24yrs BHA

Vegetation Structure	SW	SE	SB	PL	PJ	FB	LT	FD	AW	PB	BW
Main Canopy				E					A		
Understory > 10m											
Understory 4 - 10m			A	A					A		
Understory < 4m			B	A					B		

Cover Classes (%) A: < 1 B: 1 - 5 C: 6 - 20 D: 21 - 50 E: > 50

Comments: Pl/Ledum — 3YR Growth intercept = 0.80m = .27m/yr

History — Total height SI = 16
Harvested - 1966
Site Prep - Crossley Plow 1967
Refor - Naturals — Porcupine or Squirel Damage Heavy
Heavy gall rust
Thinned — Photos - LB5 - 9,10,11,12