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a growing understanding

Foothills Growth and Yield Association

Annual Meeting

March 6-7, 2002

Information Package

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Meeting Program and Agendas

FOOTHILLS GROWTH AND YIELD ASSOCIATION

ANNUAL MEETING

March 6 - 7, 2002

Crown Plaza-Chateau Lacombe
10111 Bellamy Hill
Edmonton, Alberta

PROGRAM

- Technical committee meeting, Wednesday March 6, 2.00 p.m. - 5.00 p.m., River Valley Room, committee members only.

- Icebreaker and dinner, Wednesday March 6, Salon C, 6.30 p.m., open to members and invited guests. Guest speaker: Bob Fessenden, Deputy Minister, Alberta Sustainable Resource Development.

- Technical session, Thursday March 7, Lacombe Room, 8.15 a.m. – 12 noon, open to members and guests. Theme: *Lodgepole Pine Management and Research: Are We on the Right Track?* Speakers:
  - Barry White, Alberta Research Council
  - Ken Mitchell / Jim Goudie, B.C. Ministry of Forests
  - John Paul McTague, International Paper Company
  - John Parkins / David Watson, Canadian Forest Service

- Steering committee meeting, Thursday March 7, River Valley Room, noon – 4.30 p.m., committee members only.

ANNUAL MEETING
SPEAKERS AND ABSTRACTS

Dinner (March 6, 2002)

Speaker: R.J. (Bob) Fessenden

Dr. R. J. (Bob) Fessenden completed his B.Sc. degree in Forestry at the University of Toronto in 1965, his M.Sc. in Microbiology at the University of Guelph in 1967, and his Ph.D. in Microbiology at McGill University in 1976.

From 1967 to 1978, Dr. Fessenden was a staff member at the University of Toronto's Faculty of Forestry, where he taught courses in forest soil science. From 1978 to 1982, he was Head of the Terrestrial Environment Section in the Environmental Affairs Department of Syncrude Canada Ltd.

Dr. Fessenden held a variety of positions at the Alberta Research Council from 1982 to 1995, from department head to vice-president. He was appointed President of the Alberta Science and Research Authority in October 1995. Dr. Fessenden served in that position until 1999 when he was appointed Deputy Minister of Alberta Economic Development.

On March 15, 2001, he was appointed Deputy Minister of Sustainable Resource Development.

Technical Session (March 7, 2002)

Lodgepole Pine Management and Research: Are We on the Right Track?

8:15 – 8.30	Introduction
8.30 – 9.15	*Challenges for density and nutrition management of fire-origin lodgepole pine in Alberta*, Barry White, Alberta Research Council
9:15 – 10.00	*Juvenile spacing in British Columbia: beliefs, data and analyses*, Ken Mitchell and Jim Goudie, B.C. Ministry of Forests
10.00 – 10.30	Coffee
10.30 – 11.15	*Comparative review of approaches to modeling pine growth and yield*, John Paul McTague, International Paper
11.15 – 12.00	*Dealing with public perception:* *Environmental risk management and the construction of public preferences*, John Parkins, Canadian Forest Service *Social science contributions: methods and benefits*, David Watson, Canadian Forest Service

Technical Session Abstracts

***Challenges for density and nutrition management of fire-origin lodgepole pine in Alberta*, Barry White**

Silviculturists need the ability to accurately predict stand response following a specific treatment. This ability is required to distinguish which stands will respond to treatment from those that will not, and to rank responsive stands. The density and nutritional management of dense, previously unmanaged stands of lodgepole pine present unique challenges. These involve a lack of knowledge as to the extent that poor leaf area, previous height repression, low soil temperature and crown abrasion limit both the magnitude and the predictability of response to thinning, fertilization, or a combination of both treatments.

Barry White is a Research Silviculturist with the Alberta Research Council in Vegreville, specializing in tree nutrition and applied research providing innovative solutions to forest productivity and sustainability problems.

***Juvenile spacing in British Columbia: beliefs, data and analyses*, Ken Mitchell and Jim Goudie**

A brief history of juvenile spacing will focus on the forces that motivated massive silviculture programs in B.C. Simplistic and innovative analytical techniques contrast sharply in their assessment of the merits of spacing.

Kenneth J. Mitchell is Leader of Stand Modeling Research with the Research Branch of the B.C. Ministry of Forests, coordinating the research of scientists studying site productivity, tree growth, and stand development in coastal and interior forests. James W. Goudie is Biometrician, Growth and Yield, with the Research Branch, involved primarily in data collection and analysis supporting the development of simulation models depicting tree growth, crown structure and wood quality.

***Comparative review of approaches to modeling pine growth and yield*, John Paul McTague**

Several common features of some Canadian lodgepole pine models will be traced. Modeling approaches used elsewhere in the world will be introduced. These include the simultaneous fitting of prediction and projection equations as applied in the southern United States, individual-tree diameter growth models, and concepts derived from South African thinning studies. The application of such approaches to lodgepole pine will be discussed and demonstrated. Modeling techniques will be described for forecasting the response of dominant height and basal area to genetic improvement, fertilization, and competing vegetation control in fast-growing plantations.

John Paul McTague is Biometrics Section Manager, Forest Resources Division, of International Paper, based in Savannah, Georgia U.S.A. His responsibilities include growth and yield research of the Company's US forests, forest planning, and harvest scheduling.

***Dealing with Public Perception*, John Parkins and David Watson**

Enhanced forest management practices will not work in Alberta if they are not acceptable to the public.
Environmental risk management and the construction of public preferences. John Parkins will explore how the public's perception of forest management is constructed in terms of environmental risks, and the broader implications of how the public perceives enhanced silvicultural activities in Alberta.
Social science contributions to forest management: methods and benefits. David Watson will summarize the major ways in which social scientists determine the attitudes of the public, how various aspects of the forest are valued, and studies that show how, in some cases, best practices are contrary to the public's beliefs.

John Parkins is a Resource Sociologist with the Canadian Forest Service in Edmonton, where he leads the sociology research program and is active in the areas of public involvement, criteria and indicators, and the sustainability of forest-dependent communities. David Watson is a Field Economist with the Canadian Forest Service. His work has been focused on the valuation of non-timber and non-market benefits from the forest.

Foothills Growth and Yield Association
Technical Committee Meeting

Date: March 6, 2.00 p.m. - 5.00 p.m.

Location: River Valley Room, Crown Plaza-Chateau Lacombe, 10111 Bellamy Hill, Edmonton

AGENDA

1. Regeneration Project
   - Status report
   - Verification reports
   - Outstanding data issues
   - Fieldwork schedule for 2002 (establishment, measurement and treatment)

2. Comparison of Pre-harvest and Post-harvest Site Indices
   - Review of project proposal
   - PSP credits and work allocation
   - Selection of contractor
   - Next steps

3. Cooperative Management of Historic Research Trials
   - Review of project proposal
   - Recommendations to Steering Committee

4. Regional Yield Estimates
   - Review of project request
   - Recommendations to Steering Committee

5. New Nutrition and Density Management Trials
   - Status update
   - Evaluation of opportunities for nutrition and density management
   - Recommendations to Steering Committee

6. Other business

Foothills Growth and Yield Association
Steering Committee Meeting

Date: March 7, 12 noon – 4:30 p.m. (lunch included)

Location: River Valley Room, Crown Plaza-Chateau Lacombe, 10111 Bellamy Hill, Edmonton

AGENDA

1. Review of minutes (meetings March 14 and August 28, 2001)

2. Director's report

3. Draft Business Plan
   - Policies and strategic directions
   - Project review
   - Selection and approval of 5-year program (business plan and FRIAA proposal)
   - Selection and approval of 1-year program (annual work plan, membership fee, and program contribution levels April 1, 2002 – March 31, 2003)

4. Assignments (director, field coordinator, other contracts)

5. Other business

Meeting Minutes

Foothills Growth and Yield Association
Minutes of Steering Committee Meeting # 2

Date: March 15, 2001

Location: Chateau Louis Conference Centre
11727 Kingsway Avenue
Edmonton, Alberta

In Attendance:

Alberta Land and Forest Service	Daryl Price
Alberta Newsprint Company	Pauline Fluet
Blue Ridge Lumber	Daryl D'Amico
Canfor	Lorne Greenhorn
Foothills Model Forest	Dick Dempster, Mark Storie
Millar Western Forest Products	Jonathon Russell
Spray Lake Sawmills	Ed Kulcsar
Sundance Forest Industries	John Huey
Sunpine Forest Products	Keith Branter
Weldwood of Canada (Hinton Division)	Bob Udell, Hugh Lougheed
Weyerhaeuser Canada (Grande Prairie)	Pat Wearmouth

Chairperson: Hugh Lougheed

Minutes:

- Meeting called to order at 1230 hrs.
- Introduction of attendees.
- The Director (Dick Dempster) tabled a document entitled ***Second Steering Committee Meeting of the Growth and Yield Association***. This document contained the following:
  1. Annual Meeting Notice and Agenda
  2. Minutes of Steering Committee Meeting #1
  3. Director's Report
  4. Conceptual Plan – Fire Origin Lodgepole Pine
  5. Annual Work Plan
  6. Field Co-ordinator – Request for Proposals
  7. Memorandum of Agreement

I. ***Review and approval of agenda***
- Agenda reviewed and approved.

II. Minutes of Steering Committee Meeting #1

- Minutes from Steering Committee meeting #1 dated March 23, 2000 reviewed and accepted.

III. Director's Report

1. **Income and Expenditures** - Dick Dempster went through last year's budget to give an update on how income and expenditures compared to 2000/2001 budget (see director's report). No questions or concerns from the Steering Committee.
2. **Activities** – Dick reviewed his activities during the last year (see director's report). No questions or concerns from steering committee.

3. **Achievement, Shortfalls, Problems and Opportunities**
   - **3.1 - Regenerated Lodgepole Pine Project** – Dick reviewed progress and challenges related to this project over the last year (see Director's report).
   - Draft field manual has been prepared and still being revised. The manual does not include actual treatment procedures. The Technical Committee have addressed this and recommendations will be brought forward to the Steering Committee.
   - Some member companies have agreed to establish 6 plots even though their commitment was 5 (see Table 2 – Director's report). This was to meet with plot grouping objectives.
   - Blue Ridge has had problems identifying areas due to the location of their operations (mainly burn areas). (Decision/Action Item made on this topic is covered under the workplan section of these minutes.)
   - Dick discussed the umbrella FRIAA proposal. Question from Pat Wearmouth regarding methodology to be used for these proposals. Dick confirmed that FMF will submit these proposals in order to streamline the process. Companies will submit a supplementary form (2 pager to back up the FMF proposal). Companies will only have to state deviations form the umbrella proposal.
   - Dick discussed confounding effect of LFS fuel abatement policy. Greg Behuniak (Weyerhaeuser) has informed Technical Committee that this has been dealt with.
   - Vegetation Control – Technical Committee recommends establishing competitive thresholds and then making recommendations for control (i.e. herbicide (glyphosate)). LFS will be consulted regarding treatment and streamlining of approval process. (Covered in workplan section.)
   - The LFS senior biometrician has suggested the Association consider a short term Site Index (paired plot) project. It was decided to discuss this under the workplan.
   - **3.2 - Fire Origin Lodgepole Pine Project Proposal** – Dick covered this as a separate item under the workplan.

- **3.3 - Personnel Assignments** – covered under agenda item #5
- **3.4 – Dissemination of Information and Education of Members** – No discussion on this topic.
- **3.5 – Workplan and Budgeting** – there was discussion on options in Table # 4. It was decided to cover this topic as a separate item under the workplan section

- **No further questions of Director's report. Report accepted.**

IV. Conceptual Project Plan

- **Fire Origin Lodgepole Pine Project Proposal**

- Dick went through the project proposal (see PowerPoint presentation – section 4 of meeting package). Dick highlighted the fact that the dollar amount for the proposal reflects amount requested under the funding request/preliminary business plan submitted by the Foothills Model Forest to the Alberta Forest Research Institute (AFRI).
- Dick asked for a decision from the Steering Committee on whether to proceed.
- Discussion around the Schedule and components of the project.
- Question as to the feeling of the Technical Committee regarding this project. Dick stated Technical Committee felt it was a good concept. They liked the fact that the project was being broadened to include various growth stage evaluations.
- Question about doing the scoping exercise prior to committing to the project. Discussion ensued in that a commitment beyond scoping could be made once potential AFRI funding is determined.
- Ed Kulcsar felt that the Site Index (Paired Plot) proposal was a higher priority for his company given current FRIAA funding situation.
- Concern was expressed on the timing and philosophy of member companies as it relates to timber supply in the future.
- Decision covered in workplan section.

V. Workplan

- **Fire Origin Lodgepole Pine Project Proposal**

Decision **- Proceed with Scope Assessment. Scope assessment includes:**

- ✓ **Situational Review**
- ✓ **Literature and expert review**
- ✓ **Preliminary site selection**

Cost of Scoping Assessment = $45,000. This will come out of Foothills Growth and Yield Association 2001/2002 program budget.

- **<u>Site Index Proposal – Brought forward in page 5 of Director's Report.</u>**

  - Put forward for Steering Committee consideration as an addition to the Regenerated Lodgepole Pine Project. This project would fill the gap in knowledge on site index increment.
  - Project would consist of 50 paired plots. Breakdown would be as follows:
    - **5 Ecosite groupings**
    - **10 stands within each ecosite group**
    - **6 paired plots within each stand type. (3 fire origin , 3 regen)**
  - It is felt this project would lend credence to assumptions laid out in DFMP's.
  - Would be handled as a 3rd party "arms length" assessment.
  - Bob Udell made a suggestion to do similar work in PSP's to contribute to the study. This would be done by companies in the association that have a well-established PSP database. This could be time step data.
  - Lorne Greenhorn asked if a 50-plot sample would be credible. Dick suggested it would be statistically adequate. His rationale was that we want good data on a few sites, rather than so-so data on a lot of sites. This initial dataset would set the parameters, then companies could decide if they wanted to expand the project.
  - It was suggested that this could be built into a modified umbrella FRIAA proposal.
  - Weyerhaeuser's ratio for contribution to the Regeneration Trial (as computed in the currently approved FRIAA proposal), including the site index proposal, will increase due to an increase in pine landbase with the consolidation of their operations.

<u>Action Item</u> – Companies wishing to provide PSP data for a time step component may have this considered as their contribution. They are to provide specifications of their data to Dick Dempster.

<u>Action Item</u> - Dick will provide a list of what info he needs for the Site Index project by next week to committee members.

<u>Decision</u> – Proceed with the Site Index (paired plot) concept. Paired plots would come out of companies' FRIAA budgets. Will use existing allocation formula, as it is an extension of the existing regenerated pine stand project. Weldwood will be allowed to offer time step (PSP) data.

- **<u>Regen Trial – Vegetation Control</u>**

  - Vegetation control should be based on a "to be established" competition threshold.

<u>Action Item</u> – Dick, Murray Hubscher and Phil Comeau to establish this threshold.

- Vegetation control will potentially be carried out on ½ hectare plots. (50 metres x 100 metres).
- Recommendation to pursue a streamlined herbicide application/ approval process. The association should have a letter made up and ready to go in case a company needs to submit within an application window. This process will be triggered by a plot achieving a competition threshold.

<u>Action Item</u> - Daryl Price will discuss streamlining of application process with Rob Kessler (LFS) and get back to Dick.

- **<u>Blueridge Plot Establishment ("h" Sites)</u>**

  - Some options were discussed. Options were as follows:
    1. Throw in with Millar Western and ANC and Blue Ridge pays for plots.
    2. Delay for one year until such time that sites can be identified.
    3. Some combination of both options.

<u>Action Item</u> – Blue Ridge will identify sites within and outside of their FMA by May 1, 2001. If the decision is to establish the plots on the Blue Ridge FMA, sites will be established in the next fiscal year (2002/2003). If the decision is to establish the plots off Blue Ridge's FMA, the sites will be established in this fiscal year (2001/2002).

- **<u>Annual Workplan and Operating Budget</u>**

  - Several options for funding this year's program were discussed. In the end it was decided that Option "E" was the most suitable/desirable option. Option E was based on Table 4 and is as follows:

Income / Expense	Option E
Income	
Carry-forward	$140,697
Membership fees – FRIAA	$ 70,000
Membership fees – Non FRIAA	$ 20,000
Total Income	**$230,697**
Expenses	
Director – fees	$ 64,800
Director – expenses	$ 9,720
Other contract services	$ 45,000
4WD vehicle (rental)	$ 4,358
Travel expenses (field coord.)	$ 5,250
Meetings	$ 7,321
Equipment & misc.	$ 12,809
GST	$ 9,400
Total Expenses	**$158,658**
Ending Balance	**$ 72,039**

Resolution – Director to develop a revision to the workplan relevant to decisions made in this March 15 Steering Committee meeting that reflects details laid out in option 'E'. Moved: Lorne Greenhorn; Seconded: Jonathan Russell. Carried

- **Annual Membership Fee**

Resolution - Membership Fee will be $10,000.00 for the 2001/2002 Fiscal year, thus leaving program funding level (70K) consistent with Option 'E'. Moved: Lorne Greenhorn; Seconded: John Huey. Carried

- **Assignments**

- **Field Co-ordinator**
  - Mark Storie and Bob Udell indicated that the Foothills Model Forest would pick up the *per diem* fee for the Field Co-ordinator for the 2001/2002 fiscal year. Rationale for this decision was that under the original agreement, the Foothills Model Forest had committed to providing a field co-ordinator on a ½ time basis for the 2000/2001 and 2001/2002 fiscal years. It was felt this commitment should be honoured. The Foothills Model Forest commitment for the 2001/2002 fiscal year is to pay the per diem fee of the Foothills Growth and Yield Association field co-ordinator to a maximum of 100 days or $50,000.00.
  - Dick brought up the Request for Proposal and the assessment method used to rate candidates.

- Dick indicated that the FGYA has a preferred candidate. Rand McPherson had the best ranking in assessment.
- Concern was expressed over Rand's vehicle mileage and quad/snowmobile rate. Committee was informed that this had been discussed with Rand and he was willing to negotiate on these rates.
- Dick informed the Committee that Rand would be interviewed on March 21, 2001.
- Mark Storie/ Dick Dempster sought authorization to hire Rand if he turned out to be a suitable candidate and issues surrounding vehicle and ATV rates could be resolved.

Direction – Proceed with interviewing Rand and if issues cannot be resolved then proceed with 2nd ranking Deci-con (Harry Ullrich) pending satisfactory reference check.

- **Foothills Growth and Yield Director**
  - Current Director – Dick Dempster.
  - Dick was asked to leave meeting room while this position was discussed.
  - Strong and unanimous support for his leadership was expressed.

Resolution – Retain Dick Dempster as Foothills Growth and Yield Co-ordinator for the 2001/2002 fiscal year. Carried

- **Policies and Strategic Direction**

- **Business Plan**
  - Is the association looking for a more coherent strategic direction?
  - Discussion on whether the Association has identified all of the main project for the foreseeable future. If so then it is felt we already have our business plan.
  - ANC has concerns over securing long-term funds for the association that may not be obtained without a business plan.

Action Item – Dick Dempster to develop deliverables and a budget for a 5 year period. This should be extended to include maintenance, monitoring, measurement etc. over that period.

- **Natural Yield Curves**
  - Daryl Price discussed the need for transparency and a need for the group to produce deliverables in the public domain. He suggested the collective group consider the development of lodgepole pine natural yield curves for the Foothills Growth and Yield Association area (ecological scale). He inquired as to whether the member companies were prepared to provide data to the LFS for the development of these natural yield curves Alberta.

- Daryl also suggested developing a set of managed stand yield curves for Alberta.
- Daryl indicated that if member companies provide the data for these projects, the province would contribute the analysis.
- After questions and discussion as to the need and merit of this request the following action item was produced.

<u>Action Item</u> – Daryl Price will make a written request to the Association, clarifying the information needs and the rationale for regional yield curves. The Committee will respond within 1 month of receiving Daryl's letter.

Meeting adjourned at 1610 hrs.

Foothills Growth and Yield Association – Meeting Minutes

August 28, 2001
Environmental Training Centre, Hinton AB

(Refer to Foothills Growth and Yield Association Information Package, August 2001.)

Participants:

John Huey	Sundance Forest Industries
Kent MacDonald	Sundance Forest Industries
Mark Storie	Foothills Model Forest
Thomas Braun	Weldwood of Canada
Dick Dempster	Foothills Growth and Yield Association
Hugh Lougheed	Weldwood of Canada
Greg Behuniak	Weyerhaeuser
Wally Rude	Weyerhaeuser
Gord Lehn	Spray Lakes Sawmills
Darrell Panas	Spray Lakes Sawmills
Pat Ewan	Canfor
Lorne Greenhorn	Canfor
Dave Morgan	Government of Alberta
Greg Greidanus	Government of Alberta
Jim McCammon	Alberta Newsprint Company
Greg Branton	Alberta Newsprint Company
Pauline Fluet	Alberta Newsprint Company
Jonathan Russell	Millar Western Forest Products
Murray Summers	Blue Ridge Lumber
Daryl D'Amico	Blue Ridge Lumber
Bob Udell	Foothills Model Forest
Rand McPherson	Foothills Growth and Yield Association

Project 1. Program Development and Management

Revised Annual Work Plan

- No formal resolution to approve work plan. Work plan reflects minutes from previous meeting. Proceed with work plan unless the FGYA hears otherwise from a member.

Outstanding FRIAA authorizations to transfer funds from FRIAA to FMF

- Form letters available for members and to be filled out before the end of the tour.

Action item: D. Dempster to find out who the outstanding members are follow-up with them individually.

Staff and contract update

- D. Dempster contract renewed to March 31, 2002.

- R. McPherson hired as Field Coordinator April 2001 – March 2002.
- Retained services of B. White (ARC) and S. Chang (U of A), with input by D. McNabb (ARC) and V. Lieffers (U of A), to conduct an expert review of nutrition and density management, as part of scope assessment for Nutrition and Density Management Project.

Long term plans

- The current FRIAA proposal and contract covers member fees until March 2002 and is the umbrella agreement for Lodgepole Pine Regeneration Trial establishment. There is no measurement component in the existing proposal.
- D. Dempster tabled a draft revised proposal for the 5 year period commencing April 1, 2000, that includes remeasurements and treatments, an updated project plan and experimental design, and revised cost estimates and delivery schedule.
- FRIAA will require the proposal to be formally endorsed by all the members as a basis for continuation of the Project passed March 31, 2001, and approval of individual applications for use of FRIP funds for post-establishment treatment and measurement activities.
- At current levels of staffing, the annual membership fee will have to increase from $10,000 to $15,000, commencing next fiscal year, due to the cost of the field coordinator no longer being covered by provincial funding.
- Notwithstanding the budget schedule for sub-project 1 (Association Development and Management) contained in the proposal, the amount of annual fees payable will be subject to Steering Committee review and approval each year.
- Budgets for sub-project 2 (Lodgepole Pine Regeneration Trial) contained in the proposal are indicative only. The proposal recognizes that the actual amount and timing of expenditures will vary among the sponsors.

Decisions:

1) Motion to submit the proposal to FRIAA, seconded, carried.

Action item: D. Dempster to allow 2 weeks for review and comment by members, and then proceed with submission of proposal. Formal application will be by the Foothills Model Forest, (the Applicant) and signed by Mark Storie.

2) Written endorsement by members (the Sponsors) will be required subsequently. Membership fees for fiscal year 2002-03, plus 5-year cost projections, will be reviewed, revised as necessary, and approved by the Steering Committee at the annual meeting to be held before March 31, 2002.
3) The above budget approvals will be dependent on the completion and approval of a 5-year Business Plan (D. Dempster scheduled to complete draft by January 31, 2002).

Project 2. Lodgepole Pine Regeneration

Vegetation control and herbicide use

- Proposed vegetation control procedures and protocols summarized in handout.

- The LFD has permitted the FGYA to send in one application to cover off all the herbicide treatments required for the Project. If the total area to be treated is kept under 20ha annually, then the application and approval process is simple, and does not require public disclosure.
- The FGYA is to prepare and submit a blanket proposal and a monitoring plan. The members are required to conduct actual treatment. Collaboration using 1-3 contractors in total is encouraged.
- Using the 2 types of herbicide as proposed will not compromise the study design, which is dependent on maintaining non-crop vegetation below specified competition thresholds.

Establishment delays

- The installation will be completed in 2002 due to delays in locating and establishing suitable "h" sites.
- There was clarification that 2 of the installations assigned to Blue Ridge Lumber have already been installed at BRL's cost on ANC and Millar Western areas.

Action item: D. Dempster to update Table 6, Appendix 1, of revised FRIAA proposal, to reflect Blueridge's progress.

- The final establishment report will be delayed until fiscal year 2002.
- A preliminary establishment report will be submitted at end of this fiscal year (March 31, 2002). However, the final report, including the yield forecasting component, will not be completed until after the 2002 field season. (Updated schedule included in Table 1 of revised FRIAA proposal
- No vote required for the delayed submission.

Audit protocols

- D. Dempster asked for clarification of the preferences of members regarding conducting of field audits.
- The FGYA would like to keep the process simple. While the audit must meet due diligence requirements (i.e. satisfy the members and FRIAA that the work has been properly conducted), it should also provide an opportunity for mentoring and improvement. Two options were presented: 1) contractors provide their data directly to the Field Coordinator, who conducts the audit independently; 2) have the respective member and the Field Coordinator conduct the inspections together.
- The decision was that the member would contact the Field Coordinator (R. McPherson) when they were ready to conduct an audit of the establishment / measurements and the member and R. McPherson will conduct the audit. The data is to be channeled from the contractor, through the member to R. McPherson.

Comparison of pre-harvest and post-harvest site indices

- The proposal incorporates comments and feedback from 3 members who at the previous (March 15) meeting had indicated possible contributions of existing PSP and / or paired-plot data.
- Shongming Huang of LFD (comments received after proposal drafted) suggested that we seriously consider permanent demarcation of the SI plots placed in stands regenerated after

harvesting. Temporary (samples) assessments are always in question because the actual plots cannot be revisited.

- We still need fine-tuning of technical and financial proposal. Decisions are needed on the following:
    1) Scheduling – when should the work start? It was decided that the fieldwork will be started in the 2002 field season. A proposal, including costs and their allocation, will be completed and submitted to the steering committee by March 2002.
    2) Permanent installation and ongoing measurement: the option and associated costs should be included in the above proposal.
    3) Equity – how should we share the effort and the data?

Action Item: It was decided that the 3 companies (Weldwood, Weyerhaeuser, and MWFP) and D. Dempster are to come up with an equivalency proposal and present it via email to steering committee for approval.

- Use available PSPdata from Weldwood (approximately 70 plots) and Weyerhaeuser (minimum of 10 plots) for "vertical" (true time series) comparison.
- Millar Western has paired plot data that could be used as a validation data set for comparison with new data to be collected across the full geographic and ecosite range
- The additional data (from establishing more plots under the FGYA) will significantly enhance and complement the value of existing SI work already completed.

Project 3. Nutrition and Density Management

Time schedule and scope assessment

- We won't have the complete scope assessment until December 31, 2001.
- What is the timing for some discussion and a decision? Concern was expressed that cost implications of scope assessments are needed before December 31 in order to enable members to budget for next year. Preliminary assessment and conclusions regarding follow-up work could be communicated to Steering Committee representatives.

Action item: D. Dempster to talk to B. White about accelerating the scope assessment and providing earlier feedback to members on implications for future work and budgeting.

Arrangements for scope assessment input by members

Two components to the scope assessment:

1) Situational - need to get member feedback on priority age classes, forest types, forest management objectives, and interventions. D. Dempster will need answers to questions listed on page 1 (Part A: *Situational Review – Questions to Members*) of section 6 of the information package.

Action item: Members will submit answers to Nutrition and Density Management questions (listed on page 1 of section 6) to D. Dempster by September 21, 2001.

2) Scientific expert and literature review – Questions listed on p. 2-3 of section 6 are being addressed by B. White and the contracted ARC / U of A team.

Director's Report

W.R. Dempster

02/23/02

Foothills Growth and Yield Association

Third Annual Steering Committee Meeting – March 7, 2001

Director's Report

1. Income and Expenditures

This report is for the period from April 1, 2001 to date, with projections to March 31, 2002. Table 1 shows budgeted and forecast income and expenditures of the 2001-02 fiscal year (April 1, 2001 – March 31, 2002). The budgeted amounts are consistent with those approved by the Steering Committee in March 2001 (with a small adjustment to reflect the actual amount of funds carried forward from the previous fiscal year), and subsequently included in the revised Annual Work Plan. The forecast amounts are based on actual expenditures incurred, and income received, to January 31 2002, and projected additional expenditures to March 31.

Table 1. Income and Expenses

Income / Expense	Budget $	Forecast $
Income		
Balance from 2000	145,962	145,963
Membership fees - FRIP (FRIAA contract)	70,000	70,000
Membership fees - FRIP (member direct)	10,000	10,000
Membership fees - non-FRIP	10,000	10,000
Total income	235,962	235,963
Expenses		
Director	64,800	64,800
Field Coordinator	-	2,500
Other contract services	45,000	42,056
Expenses (contractors & FMF staff)	19,328	16,302
Meetings	7,321	8,239
Equipment & miscellaneous	12,809	6,521
GST	9,400	12,694
Total expenses	158,658	153,112
Ending Balance	77,304	82,851

2. Activities

Activities of the Director are itemized in the appended quarterly activity reports for the first 3 quarters of the fiscal year i.e. April 1, 2001 to December 31, 2001. The Director's activities so far during the last quarter have been primarily:

- Development of Business Plan and work program;
- Development of collaborative proposals with the Canadian Forest Service (CFS) and Alberta Sustainable Resource Development (ASRD);
- Request for proposals to conduct fieldwork for Site-index Comparison Project ;
- Installation of web site;
- Ensuring Regeneration Project verification reports and data loading are completed;
- Liaison with Alberta research Council and the University of Alberta regarding completion of the nutrition and density management expert review;
- Attendance of CFS / Model Forest Network carbon budget workshop;
- Preparation for the Annual General Meeting (technical session and Technical Committee and Steering Committee meetings).

3. Achievements and Shortfalls

3.1. Lodgepole Pine Regeneration Project

Table 2 reports the current establishment status of the Project. Note that 10 installations remain to be established, and that 1 installation is lacking sponsorship.

Table 2. Establishment Report for Regeneration Trial

Ecosite	Group	Sponsor	Tenure	# of Installations*	
				Identified	Completed
1	1	SLS	SLS	6	6
1	2	WEY	WEY (G.Pr.)	6	6
1	3	SPI	SPI	6	6
2	1	WWC	WWC	6	6
2	2	ANC	ANC	5	5
2	2	BRL	ANC	1	1
2	3	WEY	WEY (G.Pr.)	6	6
3	1	WEY	WEY (G.Pr.)	6	6
3	2	SPI	SPI	6	6
3	3	SDA	SDA	6	6
3	4	WEY	WEY (D.Va.)	6	6
3	5	WEY	WEY (Edson)	6	6
4	1	WWC	WWC	6	6
4	2	WWC	WWC	6	6
4	3	CFP	CFP	6	6
5	1	MWF	MWF	5	5
5	1	BRL	MWF	1	1
5	2	BRL	BRL	6	0
5	3	SPI	SPI	2	2
5	3	WWC	WWC	3	0
5	3		WWC	1	0
Total				102	92

Sponsor	# of Installations	
	Committed	Completed
ANC	5	5
BRL	8	2
CFP	6	6
MWF	5	5
SLS	6	6
SDA	6	6
SPI	14	14
WWC	21	18
WEY	30	30
Total	101	92

ANC=Alberta Newsprint,
BRL=Blue Ridge Lumber
CFP=Canfor
MWF=Millar Western
SLS=Spray Lakes,
SDA=Sundance
SPI=Sunpine
WWC=Weldwood
WEY=Weyerhaeuser

* 6 installations are required in each ecosite / group combination; total number of installations planned = 102

Auditing and verification of fieldwork was completed in October 2001. Data has been received for all established installations, but data verification and editing has not been completed to date.

3.2. Comparison of Pre-harvest and Post-harvest Site Indices

This project was approved for implementation by the Steering Committee in March 2001, but was deferred to the 2002 field season because of limited contractor availability and other considerations. The Project Proposal, originally developed in 2001, was modified in February 2002 (see attached) to reflect data and effort sharing policies proposed in the draft Business Plan. Requests were issued on February 4, 2002, to 12 consultants for fieldwork proposals to be received by February 28. The Business Plan and Project Proposal contain recommendations for acquiring existing PSP information as well as new paired-data, and for cost and data sharing. The work is scheduled for completion in the 2002-03 fiscal year, and results will be incorporated into the yield forecasts required for the final Establishment Report of the Lodgepole Pine Regeneration Project.

3.3. Nutrition and Density Management

The Association contracted the Alberta Research Council to provide an "expert review" identifying the knowledge gaps and feasibility of operational fertilization of lodgepole pine in Alberta. Dr. Barry White is the principle investigator, assisted by Dr. David McNabb and fellow scientists at the University of Alberta, Dr. Scott Chang and Dr. Vic Lieffers.

A draft report by Drs. White and Chang was submitted January 16, 2002, but upon review by the Director, the authors, and Drs. McNabb and Lieffers, it was decided that deficiencies in the report should be remedied before distribution to Association members. The revised report has not been completed to date, but Drs. White, McNabb, and Chang provided interim conclusions and recommendations on February 15, 2001.

No detailed project proposal or experimental design has been developed. However, tentative recommendations, incorporating those of the expert reviewers and the original conceptual design (presented at the Second Steering Committee Meeting), have been included in the draft Business Plan.

3.4. Other Project Proposals

Two additional projects are proposed in the draft Business Plan, for implementation commencing in the 2002-03 fiscal year.

1. *Cooperative management of historic research trials.* In August 2001, representatives of the Association, the CFS, and ASRD visited historic CFS lodgepole pine trials. They concluded that these trials were invaluable resources for forecasting, monitoring and demonstrating the effects of nutrition and density management, and that links should be forged to ensure their ongoing protection, measurement and interpretation. A detailed Project Proposal is attached.

2. *Regional Yield Estimates.* As follow-up to discussion at the Second Steering Committee Meeting, the Executive Director of the ASRD Forest Management Branch submitted a request to the Association for support in the development of natural and managed stand yield curves (see letter attached, dated January 23, 2002). No detailed project proposal or design has been developed yet, but preliminary recommendations are included in the draft Business Plan, and are currently being discussed with ASRD technical representatives.

3.5. Personnel Assignments

Mr. Rand McPherson was assigned to the position of Field Coordinator for the contract term of April 1, 2001 – March 31, 2002. The Foothills Model Forest provided $50,000 out of provincial funds for the support of this position. It is recommended that Mr. McPherson's contract be renewed for the period April 1, 2002 – March 31, 2003.

The Foothills Model forest provided additional support by assignment of staff to Association tasks, including:

- Data base design and management, and data verification (GIS Coordinator);
- Word processing support for development of field manual;
- Contract administration;
- Financial accounting and reporting;
- Administrative and logistic arrangements for field tour;
- Internet web site development.

3.6. Dissemination of Information and Education of Members

The Association has taken the following steps to disseminate information:

- Field tour of historic lodgepole pine research trials, organized jointly with the Foothills Model Forest, Weldwood of Canada, and the Canadian Forest Service;
- Mid-year information update meeting (held in association with field tour);
- Retention of Mr. Stan Lux to assist in preparation of background information for field tour;
- Development and distribution of the Regeneration Project field manual, including data models, measurement and treatment protocols;
- Field visits and mentoring audits held by Field Coordinator with technical representatives and contractors;
- Informal information exchanges by e-mail;
- Creation of an interim internet web site, with home page, news, publications, and contacts sections;
- Organization of Annual General Meeting (program includes 6 national and 1 international expert speakers).

The major shortfall is the expert review of forest nutrition and density management, which to date has not been completed and disseminated (see Section 3.3 above).

3.7. Work Planning and Budgeting

The original work plan for the 2001-02 fiscal year, presented in March 2001, was updated to reflect direction of the Steering Committee. The original FRIAA proposal and contract (July 25, 2000) were updated in September 2001, extending the term to 5 years (April 1, 2000 to March 31, 2005. The presently approved proposal and contract cover only Association development and management (i.e. membership fee) and the Regeneration Project.

The attached draft Business Plan is an attempt to rationalize and define the Association's mission, strategies, projects, income and expenditures for the next 5 years. It includes estimated direct income and expenditures of the Association by year, plus indicative cost estimates of members' project contributions by year and project component.

No annual work plan has been submitted to the Foothills Model Forest (FoMF). A program prospectus was submitted as part of the FoMF's Phase 3 proposal to the CFS. It is proposed that the Association Director will participate on the FoMF Program Implementation Team, which will be responsible for developing annual work plans once Phase 3 is initiated.

Project plans were developed for site index comparison (see 3.2 above and attached proposal) and cooperative management of historic research trials (see 3.4 above and attached proposal).

Development of Lodgepole Pine Growth and Yield Association

Quarterly Activity Report – Dick Dempster Consulting Ltd.

Reporting Period	April 1 – June 30, 2001
Total reimbursable hours	112

Activities

- Fertilization research information exchange
- Development of technical procedures: RLP data model, measurements, competition index, and treatments
- Field coordination: briefing and supervision of field coordinator; response to contractor and member questions
- Develop terms of reference for nutrition and density management project expert review; consult with potential participants
- Information requests for site index change assessment
- Attend FMF Board meeting (Jasper)

Achievements

- Data model and measurement procedures developed and communicated to contractors
- Procedures and protocols developed, and agreed with LFS, for brush control treatments
- Field coordinator in place and coordinating contractor operations
- Experts interviewed and selected for assistance with nutrition and density management scope assessment
- Work plan highlights and revised budget reviewed by FMF Board

Shortfalls

- Field manual for Regenerated LP Project not completed and distributed to membership
- Contract arrangements not completed for expert scope assessment assistance
- Proposal for site index change project not completed

Tasks for next quarter

- Supervise completion of regenerated LP Project field manual
- Complete updates to workplan, FRIAA proposal and contract
- Design and contract site-index change project
- Lodgepole Pine Trials Tour: technical presentation and update meeting
- Contract and support expert review of nutrition and density management
- Situational review (part of scope assessment for nutrition and density management project)

W.R. Dempster

02/23/02

Development of Lodgepole Pine Growth and Yield Association

Quarterly Activity Report – Dick Dempster Consulting Ltd.

Reporting Period	July 1 – September 30, 2001
Total reimbursable hours	227

Activities

- Field manual revisions and additions
- Revisions to work plan, FRIAA proposal
- Development of SI change project proposal
- Preparation for and participation in field tour and Association meeting
- Initiation of expert review of nutrition and density management
- Situation review (questionnaire to members)

Achievements

- Field manual for Regeneration Project and other procedures documentation distributed to members and contractors
- 92 Regeneration Project installations established
- 5-year plan for Association management and Regeneration Project approved by FRIAA
- Design for SI change project completed
- Association meeting and field tour concluded successfully (August 28-31)
- Expert review contracted and membership input obtained

Shortfalls

- Annual fees overdue
- Contracting and implementation of SI change project – deferred until next year
- Establishment of 10 Regeneration Project installations deferred until next year
- Verification and auditing of Regeneration Project incomplete

Tasks for next quarter

- Supervision of verification and auditing
- Follow-up to field tour – development of proposal for cooperative trial management
- Communications program –web site and annual meeting preparation

Development of Lodgepole Pine Growth and Yield Association

Quarterly Activity Report – Dick Dempster Consulting Ltd.

Reporting Period	October 1 – December 31, 2001
Total reimbursable hours	137

Activities

- Proposal development
- Supervision and progress review of nutrition and density management contract
- Web site development
- Development and supervision of audit, work and data verification procedures
- Input to Foothills Model Forest Phase 3 proposal
- Arrangements for annual meeting commenced

Achievements

- Proposal developed with CFS for cooperative management of research trials
- FGYA prospectus included in Foothills Model Forest Phase 3 proposal

Shortfalls

- FRIAA payment of membership fees still outstanding
- Nutrition and density management report incomplete
- Web site not operational
- Work verification for Regeneration Project not complete

Tasks for next quarter

- Develop cooperative trial management proposal with SRD and membership
- Request and receive proposals for SI comparison Project
- Ensure web site operational
- Ensure Regeneration Project verification reports and data loading complete
- Initial assessment of Regeneration Project information: fill-in planting and herbicide requirements
- Ensure completion of nutrition and density management contract
- Develop 5-year business and work plan
- Arrange and hold Annual General Meeting (Technical Committee, Steering Committee and Information Exchange meetings)
- Prepare preliminary annual and project reports

Draft Business Plan

Foothills Growth and Yield Association

DRAFT BUSINESS PLAN

February, 2002

Prepared by:

W.R. (Dick) Dempster, Ph.D., R.P.F.

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1. Background

Companies holding Forest Management Agreements and Timber Quotas on the Eastern Slopes have recognized for some time the potential value of a co-operative lodgepole pine growth and yield program. In response to interest by industry and government, the Foothills Model Forest facilitated collaboration among these companies to create a Foothills Growth and Yield Association for co-operative forecasting and monitoring of managed stand growth and yield.

The Foothills Model Forest appointed a part-time Director in June 1999, with the mandate to develop a growth and yield co-operative. The Director reviewed background work and consulted with 9 companies holding timber tenures in the region, as well as the Alberta Land and Forest Service (now Alberta Land and Forest Division), and the Canadian Forest Service. During the summer of 1999 a scope assessment was undertaken to assess the needs of potential program participants. This was followed by a workshop among the potential co-operators on October 22, 1999. As a result of the workshop, a memorandum of agreement was developed and endorsed by the companies, the Land and Forest Service, and the Foothills Model Forest. Nine companies presently participate in the Association as voting members. The Alberta Land and Forest Division and the Foothills Model Forest participate as non-voting members, with the Model Forest acting as the coordinating agency.

The Foothills Model Forest, acting as applicant on behalf of the 9 sponsoring members, submitted a proposal to the Forest Resource Improvement Association of Alberta (FRIAA) in July 2000. A contract was issued (FOOMOD-01-01 – *Foothills Growth and Yield Association*) on July 25, 2000, facilitating use of FRIP (Forest Resource Improvement Program) funds to cover membership costs and project activities. The original proposal and contract had an initial term of 2 years, and were amended in September 2001, extending the term to 5 years (April 1, 2000 to March 31, 2005).

During the 2001-02 fiscal year, the Association established a major project to forecast and monitor development of lodgepole pine regenerated after harvesting, and assessed opportunities and requirements for other cooperative projects. As instructed by the Steering Committee, the Director developed the following draft business plan, rationalizing the Association's mission, strategies, projects and financial requirements for the next 5 years.

2. Mission

The general **goal** of the Association is to accurately forecast timber yields from managed forest stands, especially of lodgepole pine.

The **interests** of the parties constituting the Association are stated in the Memorandum of Agreement among members as follows:

- The companies that are signatories of the Agreement wish to participate in a cooperative program for the forecasting and validation of managed stand growth and yield, particularly of lodgepole pine;
- The Alberta government wishes to promote the scientific development and validation of yield forecasts used by tenure holders in the development of forest management plans;
- The Foothills Model Forest wishes to promote cooperation and shared responsibility in the improvement of sustainable forest management practices.

The specific **mandate** of the Association is to:

1. Forecast and monitor the response of lodgepole pine to silvicultural treatments;
2. Facilitate the scientific development and validation of yield forecasts used by members in managing their tenures;
3. Promote knowledge, shared responsibility, cost-effective cooperation, and continual improvement in sustainable forest management.

The following **indicators** will measure success in performing the mandate, and may be used as criteria for evaluating and prioritizing project proposals and other Association activities.

1. ***Forecasts***: stand-level timber yield forecasts are defensible and accepted by the scientific and regulatory communities.
2. ***Validation***: recognized scientific, regulatory and certification standards for validation and monitoring of sustainable forest management practices are met.
3. ***Knowledge***: managers' knowledge, and their abilities to predict responses to management practices, are improved, facilitating management by objectives rather than by arbitrary prescription.
4. ***Awareness***: stakeholders influencing forest management decisions understand the probable effects of management interventions on stand development.
5. ***Cost effectiveness***: investments in growth and yield assessment are cost effective, and there is no unnecessary duplication of effort.
6. ***Equitable participation***: participants remain committed to the program, and share costs equitably.
7. ***Relevance***: work is user-driven, results-focussed, and directly applicable to management and crop planning.

3. Strategies

3.1. Project Development

The goals of the Association will be achieved through a series of projects developed cooperatively by members, in consultation with government agencies and other experts in growth and yield. Projects of the Association will be designed to forecast and validate yields for treatment regimes and site conditions of interest to all members.

Yield forecasts are defined here as quantitative estimates of future stand timber yields, agreed by the scientific and regulatory community as the most probable outcome of the treatment regime being applied to the range of stand and site conditions specified. *Validation* will involve the establishment or adoption of well-designed and replicated field trials, and their periodic re-measurement to compare actual results against forecasts.

The nature of tree growth requires the program to be long-term and ongoing. Continually improved forecasts will be made of the growth and yield parameters being tested, using the best models and data available when the project is initiated and each time it is re-measured.

Detailed methods are will be specified in project plans and experimental designs. Measured variables will include (a) stand and site parameters prior to or at time of treatment, and treatment parameters, and / or (b) stand and site parameters at benchmark stand development stages. These variables will include, or be stratified by, a common ecological site classification system.

Forecast variables will include future stand conditions, and timber yields from intermediate (if applicable) and final harvests, at utilization standards agreed by the members.

Recognized scientific experts in growth and yield, silviculture, biometrics, tree nutrition, and forest ecology will review project plans and results, and / or participate in analyses. Meetings will be held at least once a year, to which experts will be invited to attend and participate. Formal peer review will be encouraged through the publication of project results. Use of field trials for demonstration and ancillary research purposes will be promoted.

3.2. Project Priorities

A review of voting members' opinions conducted in 2001 indicated the following priorities for management interventions and stages of stand development that should be investigated:

1. Planting, vegetation management and density regulation in harvest-origin stands;
2. Density and nutrition management in young, pre-commercial and overstocked fire-origin stands;
3. Fertilization and commercial thinning in late-stage fire-origin, mid-stage fire-origin, and post-harvest stands.

This was consistent with the earlier scope assessment conducted in 2000, which identified consensus on proceeding with investigations of spacing, tending and pre-commercial thinning in harvest-origin stands, but variable opinions on the importance of commercial thinning and fertilization. The priorities are reflected in the identification and development of projects as described in Section 4.

As a basis for determining what stand variables (indicators) should be measured and forecast, the members were also asked to rate the importance (high, medium, low) of various forest management objectives, with the following results:

1. Timber volume (annual allowable cut) was rated high by all members;
2. Wood value (cost of production and / or price of product) was rated high by a majority of members;
3. Ecological (primarily biodiversity and habitat), protection, and risk management objectives were rated medium to high by a majority;
4. A majority rated social objectives (e.g. aesthetics) low.

3.3. Roles and Responsibilities

The Association is a cooperative initiative involving voting members (industrial sponsors), the Alberta Land and Forest Division (LFD), and the Foothills Model Forest (as Coordinating Agency).

3.3.1. *Voting Members*

Responsibilities of the voting members will include:

- Installation and measurement of growth and yield trials;
- Provision of error-free data, in a format defined by the Coordinating Agency and the Technical Committee, from these trials to the Coordinating Agency;

- Appointment of a representative to the Steering Committee with authority to represent the Member's strategic and financial interests;
- Assignment a representative to the Technical Committee with authority to represent the Member's technical views and interests;
- Installation and periodic measurement of growth and yield trials as specified in the work plan approved by the Steering Committee;
- On or before April 1 each year, payment of a membership fee approved by the Steering Committee to support the direct costs incurred by the Coordinating Agency in the management of the Association.

Field trials and associated silvicultural activities will be conducted under authority of the sponsors' timber tenures.

Overall control of management of the Association is vested in the Steering Committee, which will:

- Meet at least once each year;
- Elect from among the voting members' representatives a chairperson who calls and chairs meetings;
- Define, periodically review, and revise as necessary, a minimum project contribution level for voting members;
- Set, annually review, and revise as necessary, annual membership fees;
- Review and approve project plans, data standards, annual work plans, annual operating budgets, reports, and priorities for supporting research;
- Review and approve contracts for outside services, data sharing agreements, and other business arrangements proposed by the appointed Director;
- Approve assignment to the Association of personnel hired or contracted by the Coordinating Agency;
- Approve the publication and dissemination of information resulting from Association projects.

The Technical Committee, supported by the Director and a Field Coordinator, will:

- Develop project plans, experimental designs and standards for approval by the Steering Committee;
- Assist the Director in the development of work plans and budgets;
- Coordinate the installation and measurement of field trials;
- Monitor program implementation, quality control, and data delivery;
- Evaluate project results.

3.3.2. *Land and Forest Division*

The Land and Forest Division (LFD) of the Alberta Ministry of Sustainable Resource Development has undertaken to:

- Assign the Director of Forest Management, or other authorized senior official of the LFD, to participate on the Steering Committee in a non-voting advisory capacity;
- Assign a technical expert, or experts, knowledgeable in forest planning and yield forecasting, to the Technical Committee to provide advice on matters pertaining to project planning,

experimental design, quality control, data acquisition, model development and validation, project evaluation, and regulatory requirements for yield forecasting and validation.

3.3.3. *Foothills Model Forest*

The Foothills Model Forest, as Coordinating Agency for the Association, will be responsible for:

- Administration of the Association;
- Ensuring that project plans, experimental designs, and data standards are developed in a timely manner;
- Data compilation;
- Control of data quality consistent with plans and standards approved by the Steering Committee;
- Selection or development (as appropriate), testing, and validation of stand-level growth and yield models which best represent the experimental sites, practices and data evaluated;
- Dissemination of information to, and continuing education of, Association members in matters relevant to the Association;
- Preparation and submission of the reports.

The Foothills Model Forest will also:

- Retain the services of a Director to manage the Association;
- Retain or assign other staff and contract services, including the services of a Field Coordinator;
- Administer the annual operating budget of that portion of the Association's program for which it is directly responsible;
- Control expenditures in accordance with the approved operating budget, generally accepted Canadian accounting practices, and FRIAA requirements;
- Maintain books of account of all funds contributed and dispersed on behalf of the Association, in accordance with generally accepted Canadian accounting practices, and subject to annual independent audit;
- Procure and maintain equipment and supplies required by the Association;
- If applicable, procure, own, and maintain equipment requiring capital expenditures, and lease such equipment to the Association at rates not exceeding fair market value
- Maintain a secure repository of all Association data.

The Director, subject to the approval and supervision of the Steering Committee, will:

- Prepare an annual work plan and budget;
- Act as chairperson to the Technical Committee;
- Ensure that project plans, experimental designs, and data standards are developed in a timely manner;
- Supervise the Field Coordinator and other staff approved by the Steering Committee;
- Consult with the Technical Committee regarding the selection, establishment and measurement of field trials;
- Ensure the timely compilation of data consistent with approved project plans and quality standards;
- Undertake, or direct the undertaking of, analysis of data and the selection, development, testing, or validation of appropriate stand-level models;
- Report the results of projects to Association members;

- Arrange dissemination to Association members of relevant information, including a minimum of one educational meeting or field trip per year;
- Provide progress reports to the Coordinating Agency every three months, annual reports to the Steering Committee and FRIAA, and technical reports as required and scheduled elsewhere in this Plan;
- Collaborate, cooperate and confer with other agencies as appropriate and necessary to further the interests of the Association;
- Arrange the dissemination or publication of data and results as scheduled elsewhere in this Plan and as directed by the Steering Committee.

3.4. Allocation of Effort and Costs

Each voting member will be charged an equal annual membership fee. The total amount levied will be sufficient to cover costs incurred by the Coordinating Agency in carrying out its responsibilities as defined in Section 3.3.3 above. Requirements are discussed in Section 5.1 and projected in Table 5, but will be subject to Steering Committee review and approval each year.

Unless otherwise provided for under special agreements with external cooperators (see Section 3.5 below), the costs or direct effort for installing, maintaining, treating and measuring field trials will be shared among voting members. Costs and effort will be allocated according to the net operable pine-leading land area in the members' tenures. Where the member shares annual allowable cut (AAC) for a management unit, the contributing land base for that unit will be calculated as the total AAC land base multiplied by the member's portion of the AAC. Table 1 shows areas and percentage allocations as currently calculated.

Table 1. Work Allocation Based on Pine-leading Area

Member	*Net area (ha)*	*% of total*
Alberta Newsprint	106,870	5.2
Blue Ridge Lumber	180,323	8.8
Canfor	106,271	5.2
Millar Western	112,406	5.5
Spray Lakes	114,988	5.6
Sundance	121,848	6.0
Sunpine	293,655	14.4
Weldwood	451,713	22.1
Weyerhaeuser	557,433	27.3
Total	2,045,507	100.0

Situations have arisen where members have already collected growth data from permanent sample plots (PSPs), potentially contributing to an Association project with considerable timesaving. Such contributions may be recognized and encouraged by offsetting the value of the data against the contribution that the member would otherwise make to the project under the allocation formula. This will require recognition and agreement by the Technical Committee of the value of the PSP data relative to the cost of new data collection. The Association will not normally reimburse the member directly, or allow credits to be accumulated from one project to another, so the maximum value that can be recognized is the project cost that would otherwise be

allocated to the member for collecting new data. In the event that such an offset is made, the cost of new data collection will be shared among the other members, in proportion to their net areas.

3.5. Collaborative Agreements

Where project implementation can be achieved most effectively by cooperation with an outside cooperator, the Association will enter into an appropriate arrangement with that party, formalized by a memorandum of cooperation and / or collaborative research agreement approved by the Steering Committee and signed by the Association's chairperson.

The agreement between the Association and cooperator will specify:

- Purpose and scope of the cooperation;
- Administrative roles and responsibilities;
- Contributions (financial and / or in-kind) and deliverables of the Association and the cooperator;
- Data ownership and access;
- Terms and schedules for work commencement and completion;
- Appropriate provisions and clarifications regarding liability, indemnification, amendment, notice, and dispute settlement.

3.6. Data Sharing

Data directly collected and funded by a member as part of an approved cooperative project will be provided to the Association but will also remain the property of the sponsoring member. The Association's use of the data will be limited to that specified in project and work plans approved by the Steering Committee (unless otherwise directed by the Steering Committee). Data will be distributed among the project participants as necessary for compilation and analysis. Digital files and data bases funded through FRIAA may be subject to access through provincial freedom of information legislation. Otherwise data will not be distributed to third parties without the agreement of the owner.

If individual members or external agencies contribute data not collected directly as part of a cooperative project, such data will not be released to third parties, including individual members of the Association, without the agreement of the owner. Such data would not be accessible through provincial freedom of information legislation unless directly funded through FRIAA.

Analytical results, including crop performance reports and yield forecasts, will be shared among members. The data and results obtained will not be further distributed or published without the approval of the Steering Committee. This consent will not be unreasonably withheld. Reports and scientific manuscripts for projects funded through FRIAA will ultimately be accessible to the public.

3.7. Justifications for FRIP and External Funding

Members may elect to fund contributions from their FRIP (Forest Resource Improvement Program) accounts. The Association's program fulfils the proposal evaluation criteria of FRIAA. Funding and collaboration will also be sought from other sources, given the program's:

- Alignment with provincial forest management and research priorities;

- Alignment with federal priorities for science and technology transfer and sustainable forest management;
- Opportunities for research and demonstration provided by field trials.

Justifications and qualifications for funding through FRIAA, and possibly from other sources, are summarized as follows.

3.7.1. *Application of Results*

The Association's activities will enhance the management of forest resources by providing a continually improved, scientific, quantitative, and credible basis for:

- Evaluating and selecting silvicultural regimes and crop plans for the enhanced management of lodgepole pine;
- Forecasting the sustainable supply of timber from forest tenures containing lodgepole pine, and validating estimates of allowable cut;
- Improving the sustained yield of these forests through enhanced forest management.

Results will apply directly to over two million hectares of tenured and operable pine stands with a current allowable cut of about 5 million cubic metres per year, within the forest tenures of the 9 member companies of the Association. Information gathered will be used to assess, develop, and approve strategies for enhanced and sustainable forest management within these forest tenures. It will be incorporated into regeneration standards, silvicultural prescriptions, crop plans, managed stand yield tables, and forest management plans. Because trials are stratified on an ecosystematic basis, rather than by tenure, the results will be generally applicable to the natural range of lodgepole pine in Alberta.

The Association will enhance the integrated and sustainable management of forest ecosystems through:

- Improved assessment of ecosystem productive capacity;
- Improved assessment capability of the sustainable use levels of a biological resource;
- Promotion of cooperation, partnership, and shared responsibility among forest managers and researchers;
- Increased levels of knowledge and awareness of sustainable forest management;
- Continual improvement of sustainable forest management practices;
- Stand-level data providing the basis for assessing impacts of enhanced forest management practices on biological diversity, natural ecosystem processes, fire spread, and contributions to global ecological cycles.

3.7.2. *Relationship to Existing Responsibilities*

The work proposed pertains to the voluntary enhancement of forest management information and practices, and is not the responsibility of the industrial sponsors under any legislation, regulation, tenure, policy or specific agreement. The program will assist the Government of Alberta in meeting its responsibilities for sustainable resource management, by providing improved assessment of forest growth and yield through the development of scientifically rigorous data and third-party evaluations.

3.7.3. *Standards*

Standards of experimentation will meet those accepted by the scientific community for biometric research. This is being achieved by third-party participation in project planning, and / or review of experimental designs, by recognized experts at the Canadian Forest Service, University of Alberta, the Alberta Research Council and other recognized centres of excellence. Measurement standards will follow or exceed those used by the Canadian Forest Service (CFS) and the Alberta Land and Forest Division (LFD) for monitoring stand dynamics. Standards for forest site classification and evaluation are based on the latest published and government-approved field guides for west central and southwestern Alberta. High standards of analysis will be ensured by use of qualified personnel, extensive networking with growth and yield analysts and modelers, and peer review of results.

The Association's activities will not have any adverse impacts on any other forest resource values or users.

3.7.4. *Fair Market Value*

Work will be undertaken using a combination of contractors and employees of the Foothills Model Forest and sponsors. Equipment will be leased. General benchmarks, used to ensure that fair market value is obtained for planned expenditures, will include:

- Director: Prevailing consulting or salary rates for senior registered professional foresters with formal post graduate qualifications in forest science and twenty or more years relevant experience.
- Field Coordinator: Prevailing salary or contract rates for a registered professional forester or technologist with a minimum of five years leadership experience in forest field measurements.
- Other contractors and field personnel: Prevailing contract or wage rates based on the respective categories of work.
- Equipment rental: Market rates will apply where these can be established. If equipment is leased (e.g. by the Foothills Model Forest to the Association) for which comparable market rates are not available, values will be based on an appropriate depreciation rate on capital value.

4. Projects and Deliverables

The activities of the Association during the next 5 years will focus on the following 6 projects:

1. Development and management of the Association;
2. Lodgepole pine regeneration;
3. Comparison of pre-harvest and post-harvest site indices;
4. Cooperative management of historic research trials;
5. Regional yield estimates;
6. New nutrition and density management trials.

Justification, purpose, methods and deliverables are briefly described below. Required levels of effort and cost are addressed in Section 5.

4.1. Development and Management of the Association

4.1.1. *Justification and Purpose*

The Memorandum of Agreement among members of the Association requires a Coordinating Agency to administer the Association and a Director to plan, develop and manage the Association's program, as directed by the Steering Committee and with the assistance of the Technical Committee.

4.1.2. *Methodology*

The roles, responsibilities, and activities for developing and managing the Association are described in Section 3.3 above, and in the Memorandum of Agreement.

4.1.3. *Deliverables*

- Project plans and experimental designs;
- Annual work plans and budgets;
- Project reports and publications;
- Information exchange meetings, field tours and technical sessions (minimum of 1 major meeting per year);
- Active publicly-accessible web site;
- Quarterly and annual progress reports;
- Financial statements (annually and / or as required);
- Steering committee meeting minutes.

4.2. Lodgepole Pine Regeneration

4.2.1. *Justification and Purpose*

The purpose of the Project is to forecast and monitor the growth and yield of lodgepole pine, regenerated after harvesting, in relation to site, initial spacing of planted stock, natural ingress and mortality, competing vegetation (brush), and density regulation (pre-commercial thinning). These effects and factors were considered by all members of the Association to be the highest priority for project development, given their implications for silvicultural prescriptions, crop planning, regeneration standards, and allowable cut, and the lack of controlled data currently available for assessing alternative practices.

4.2.2. *Methodology*

The Project consists of a long-term field trial, established in 2001, and interim forecasting of effects using available models and data. The trial is a three-level split-plot design. The basic balanced design consists of 90 field installations (5 ecosites x 6 spacings x 3 replications), with each installation split 2 ways into 4 treatment plots (brushing / no brushing and thinning / no thinning). Twelve additional installations (6 spacings x 2 replications) have been added in the modal ecosite category, to produce a total of 102 installations. Details of the design and procedures are provided in the *Lodgepole Pine Regeneration Project Field Manual*, version 1.1, January 2002. FRIP funding for the Project is currently approved by FRIAA for the period April 1, 2000 to March 31, 2005.

4.2.3. *Deliverables*

Deliverables of the Project from its initiation in 2000 to March 31, 2007 are itemized in Table 2.

Table 2. Delivery Schedule for the Lodgepole Pine Regeneration Project

Phase	*Deliverable*	*Due*
Establishment and measurement (June 15, 2000 – March 31, 2007)	Status reports	Annually
	Establishment and measurement verification reports	Prior to final payments by FRIAA to sponsors
	Establishment report (including yield forecast)	March 31, 2003
	Crop performance reports & scientific paper	March 31, 2005, 2007
Treatment (August 1, 2002 – March 31, 2007)	Industrial evaluation herbicide project proposal	May 31, 2002
	Herbicide monitoring reports	Annually following herbicide project approval

4.3. Comparison of Pre-harvest and Post-harvest Site Indices

4.3.1. *Justification and Purpose*

Site index change is a serious impediment to initial forecasting of the growth and yield responses being monitored by the Lodgepole Pine Regeneration Project (see 4.2. above). In March 2001, the Association Steering Committee approved proceeding with a comparison of pre-harvest and post-harvest site indices. The work was subsequently approved by FRIAA for FRIP funding as an extension to the Regeneration Project. The purpose of the comparison will be to provide credible and reliable forecasts of post-harvest site index, for the main ecosite categories of interest to members, relative to pre-harvest values.

4.3.2. *Methodology*

The approach involves paired-plot sampling of a total of 50 stands located in the 5 ecosite categories recognized in the Regeneration Project, in combination with analysis of data contributed by members from permanent sample plots (PSPs) where measurements of SI are available before and after harvesting. The proposed methodology is described in detail in the *Project Proposal: Comparison of Pre-harvest and Post-harvest Site Indices*, revised February 2002.

Weldwood and Weyerhaeuser will provide the PSP data. The paired-plot fieldwork will be undertaken by a single contractor, funded by the other voting members, and administered by the Field Coordinator.

4.3.3. *Deliverables*

- Technical report and scientific paper (by March 31, 2003);
- Results will be incorporated into the yield forecasts developed as part of the Lodgepole Pine Regeneration Project.

4.4. Cooperative Management of Historic Research Trials

4.4.1. *Justification and Purpose*

In August 2001, representatives of the Association, the CFS, and ASRD (Alberta Sustainable Resource Development) visited historic CFS lodgepole pine trials. They concluded that these trials were invaluable resources for forecasting, monitoring and demonstrating the effects of nutrition and density management, and that links should be forged to ensure their ongoing protection, measurement and interpretation.

The purpose of the Project is to provide forest managers the full and continued benefit of relevant established long-term field trials assessing responses of fire-origin lodgepole pine to nutrition and density management. The Project applies primarily to the 13 research trials listed in Table 3, of which 7 (bolded in the Table) are judged to have highest priority based on relevance and / or quality of the experimental design.

Table 3. Historic Lodgepole Pine Field Trials

Owner/ #	*Title / Location*	*Established*
CFS / A34	**Lodgepole pine pre-commercial thinning, Mackay**	1954
CFS / A100	**Spacing trials – 7 year old fire origin stand of lodgepole pine, Gregg River**	1963/64
CFS / NOR-402	Spacing trials – 28 year old fire origin stand of lodgepole pine, Gregg River	1984
CFS / NOR-405	**Thinning and fertilization of 40-year-old semi-mature lodgepole pine, McCardle Creek**	1984-85
CFS	**Early development of lodgepole pine after three different mechanical thinning treatments, Swan Lake**	1977
CFS	Fertilizing after thinning 70-year-old lodgepole pine, Clearwater	1968
CFS / NOR-008	**Juvenile spacing of 25-year-old lodgepole pine, Teepee Pole Creek**	1967
CFA	Strip thinning of lodgepole pine, Teepee Pole Creek	1966
CFS / K-57	**Development of a 77-year-old lodgepole pine stand following heavy thinning, Kananaskis**	1941
CFS / K-3	Various thinnings based on European practices, Kananaskis	1938-39
CFS / K-58	Economic possibilities of commercial thinning in an 88-year-old lodgepole pine, Kananaskis	1950
CFS	Commercial thinning in 85-year-old lodgepole pine, Strachan	1952
ASRD	**Fertilization and thinning of 26-year-old lodgepole pine, Edson**	1980

4.4.2. *Methodology*

The Project will involve 3 main tasks:

1. Maintenance and protection of the field installations;
2. Synthesis of results to date;
3. Ongoing measurement and analysis.

This will be a cooperative effort shared between the Association, CFS and ASRD. Details of proposed objectives, data sharing arrangements, activities, level of effort, and contributions are contained in the *Proposal for Cooperative Management of Alberta Lodgepole Pine Research Trials*, revised February 2002.

4.4.3. *Deliverables*

Deliverables for the period April1, 2002 – March 31, 2007 are listed by main task item in Table 4.

Table 4. Delivery Schedule for Cooperative Management of Research Trials

Task	Deliverable	Dates
1. Maintenance and protection of trials	• All trials marked and signed • Registration updated • Descriptions posted on internet; regional managers briefed • Prompt response to inquiries and trespass	Ongoing
2. Synthesis	• Publication-ready information report including trial descriptions, result summaries, and management interpretations	March 31, 2003
3. Ongoing measurement and analysis	• Compiled data from scheduled measurements • Newsletter / quick-notes • Updated synthesis	See project proposal Minimum 2 per year March 31, 2007

4.5. Regional Yield Estimates

4.5.1. *Justification and Purpose*

The Alberta government is unable to credibly report the state of provincial timber resources, including the rate of growth. This inability has negative implications for both government and industry, and has prompted the Executive Director of LFD to seek the Association's support.[1] LFD wishes to produce generalized stock, stand volume, and yield tables for each natural region, differentiated by broad AVI (Alberta Vegetation Inventory) cover groupings, and based on combined industry and Crown data. The product would include some measure of precision, as recommended by the Alberta Reforestation Standards Science Council. The intent is consistent with the Association's mandate regarding improved forecasting, validation, knowledge and awareness, at least in relation to lodgepole pine cover types.

It is proposed that the Association endorses and participates in development of natural and harvest-origin yield estimates by the LFD for the Foothills and Sub-alpine natural sub-regions of Alberta.

4.5.2. *Methodology*

No project plan or design has been developed yet, but logical steps would likely be:

1. Assess availability of suitable data and develop initial analytical design accordingly.
2. Procure and screen data.

[1] D. Sklar, Executive Director, Forest Management Branch, personal communication to H. Lougheed, January 23, 2002

3. Use suitable data and models to generate initial trend estimators for broad ecological and AVI strata. Parameters used and / or estimated would be distributions and / or means and bounds of some combination of: stand density, site index, diameter, height, taper, basal area, volume at any utilization standard, age, and mean annual increment.
4. Identify and rectify major data gaps.
5. Enhance initial trend estimators and / or produce adjusted or conditioned estimates by stratum.

Note that requirements for collection of new data cannot be determined before assessment and analysis of existing available data.

4.5.3. *Deliverables*

- Estimates of mean merchantable volume (any utilization standard), and associated variance statistics by natural sub-region, height and crown closure class.
- Conditioned estimates of equivalent "normal" or "fully-stocked" volumes for the same strata.
- Volume by stratum estimated as a function of age, or mean annual increment estimated by stratum.

It should be noted that the mean estimates, which will be based on uncontrolled region-wide data, would not be useable for assessing yield estimates produced from inventories of individual tenures.

4.6. New Nutrition and Density Management Trials

4.6.1. *Justification and Purpose*

In a report commissioned by the Association,[2] White *et al* conclude that existing information and trials on thinning and fertilization of fire-origin lodgepole pine stands are inadequate for operational management of stand density and nutrition. The magnitude of response that can be realized across a range of site and stand types is not known, the treatments needed to optimize response and economic return are not understood, and the predictive tools required to identify the most responsive stands are absent. As a consequence, they recommend that further research be undertaken or encouraged by the Association to address these knowledge gaps. A replicated regional trial should be established for the purposes of:

- Developing techniques to accurately predict response;
- Accurate quantification of response across a range of site and stand types;
- Improved understanding of the factors that influence response.

White *et al* also recommend that a series of special trials with limited replication be undertaken to better understand: the effects of nitrogen source on uptake efficiency, timing of fertilizer applications, and nitrogen application rate, and to address public concerns about the effect of forest fertilization on streamwater chemistry.

[2] Barry White, David McNabb and Scott Chang, *Evaluating Opportunities for Nutrition and Density Management of Fire-origin Lodgepole Pine in Alberta*, draft in preparation, February 15, 2001, Alberta Research Council.

4.6.2. *Methodology*

Appropriate methods will be addressed in, and developed from, the report by White *et al* currently in preparation. No project plan has yet been developed, but implementation of the main regional trial will probably involve the following steps:

1. Site selection and assessment (in summer preceding treatment);
2. Treatment (in Fall);
3. Foliar response assessment after 1 growing season;
4. Measurements after (approximately) 3, 6 and 9 growing seasons.

Steps 1 and 2 could be undertaken in 2002, or in 2003 following synthesis of data from existing trials. Indicative costs based on the latter assumption are included in Section 5, Table 6.

Because the magnitude of response is expected to vary with the stage of stand development, the trial ideally should be replicated within different stages of stand development. However, if available resources limit replication, priority will be given to pre-commercial stands subjected to density-related height repression.

4.6.3. *Deliverables*

Deliverables for the proposed regional trial would include reports and scientific publications on techniques applied, responses measured, and conclusions regarding factors influencing response, at:

- Establishment (2002 or 2003);
- 1 year after treatment: foliage response and nutrient uptake (2003 or 2004);
- 3 years after treatment: identification of initially responsive and non-responsive stands (2005 or 2006);
- Approximately 6 years after treatment: magnitude and ranking of responses (2008 or 2009).

5. Finance

Financing of the Association and its activities falls into 3 main categories:

1. **Development and Management of the Association.** This is Project 1 as described in Section 4.1. It involves technical direction, field coordination, administrative, analytical, and information exchange activities conducted by the Coordinating Agency as defined in Section 3.3.3. It is funded centrally, and supported through a membership fee approved each year by the Steering Committee. It has received start-up assistance from provincial sources through the Foothills Model Forest, and will continue to do so during the 2002-03 fiscal year.
2. **Project Contributions by Voting Members.** This category applies primarily to fieldwork for other projects listed in Section 4. Costs are distributed among voting members by agreement of the Steering Committee and an allocation formula (see Section 3.4). Work and funds may be administered directly by the member (as in the *Lodgepole Pine Regeneration Project*) or by the Coordinating Agency (as proposed for smaller projects like the *Comparison of Pre-harvest and Post-harvest Site Indices*).
3. **Project Contributions by Collaborating Agencies.** Contributions are being sought through collaborative agreements (see Section 3.5) with other agencies for the implementation of Project 4 (*Cooperative Management of Historic Research Trials*), Project 5 (*Regional Yield*

Estimates), and may be sought for Project 6 (*New Nutrition and Density Management Trials*). Contributions may be financial or of in-kind services.

5.1. Development and Management of the Association

Table 5 contains estimated costs and expenditures for development and management of the Association over the next 5 years (Project 1, as described in Section 4).

Table 5. Estimated Direct Income and Expenditures of the Association

Income / Expenditure	2002	2003	2004	2005	2006	Total
Income						
Balance from 2001	82,851					82,851
Membership fees - FRIP (FRIAA contract)	105,000	105,000	105,000	105,000	105,000	525,000
Membership fees - FRIP (member direct)	15,000	15,000	15,000	15,000	15,000	75,000
Membership fees - non-FRIP	15,000	15,000	15,000	15,000	15,000	75,000
Other contributions	70,000	0	0	0	0	70,000
Total income	287,851	135,000	135,000	135,000	135,000	827,851
Expenditures						
Director (contract)	70,000	70,000	70,000	70,000	70,000	350,000
Field Coordinator (contract)	50,000	50,000	50,000	50,000	50,000	250,000
Other contract services	5,000	5,000	5,000	5,000	5,000	25,000
Travel, field and incidental expenses	16,000	16,000	16,000	16,000	16,000	80,000
Meetings and tours	7,300	7,300	7,300	7,300	7,300	36,500
Contingency and miscellaneous (5%)	7,415	7,415	7,415	7,415	7,415	37,075
GST	9,780	9,780	9,780	9,780	9,780	48,900
Total expenditures	165,495	165,495	165,495	165,495	165,495	827,475
Ending Balance	122,356	91,861	61,366	30,871	376	376

The estimates in Table 5 include the following assumptions.

- Fiscal year commences April 1 and ends March 31 (i.e. "2002" is the period April 1, 2002 to March 31, 2003).
- Balance forward from 2001 is based on actual income and expenditures to January 31, 2002, and forecast income and expenditures to March 31, 2002.
- 9 members each contribute a fee of $15,000 per year (as per approved proposal to FRIAA).
- Members select same options for payment with FRIP funds as in 2001.
- Foothills Model Forest contributes a one-time payment of $70,000 from provincial funds.
- Level of input required of the Director and Field Coordinator remains constant during the period.
- Annual fee payments to the Director are increased 8% from the level established in 1999.
- GST will be fully chargeable on all expenditures except travel and incidental expenses of contractors and staff.

5.2. Project Contributions by Voting Members

Table 6 contains estimates of the total costs to voting members of implementing Projects 2 - 6 (described in Section 4). Estimates for Projects 2, 3 and 4 are based on project plans and, in the case of Project 2, initial implementation experience. No project plans have been developed yet

for Projects 5 and 6. Whether new data need be collected in the field for Project 5 has not been established. Members may not incur costs for Project 5 other than those associated with submission of data already collected. Estimates for Project 6 are very approximate should be regarded as only indicative orders-of-magnitude.

The timing shown for expenditures in Table 6 is also necessarily approximate. (For example, it has been assumed for Project 2 that 50% of installations will require brushing, fill-in planting, or other maintenance twice during the 5-year period. Timing of these activities is not known, so the costs have been equally distributed over the period.)

General indications of the project costs that would be incurred by an individual voting member may be obtained by multiplying the values in Table 6 by the percentages in Table 1. Possible exceptions are Project 2 (where the costs of fieldwork may be shared among members other than Weldwood and Weyerhaeuser, who instead would contribute PSP data) and Project 4 (where Weldwood may be credited for costs incurred in recent measurements of the trials).

Table 6. Indicative Costs of Project Contributions by Voting Members

#	Project	Component	2002	2003	2004	2005	2006	Total
2	Regeneration	measurements	168300	0	168300	0	168300	504900
		checks	0	35700	0	35700	0	71400
		treatments	6120	6120	6120	6120	6120	30600
		overhead	8721	2091	8721	2091	8721	30345
		total Project 2	183141	43911	183141	43911	183141	637245
3	Site Index Comparison	fieldwork	50000	0	0	0	0	50000
		overhead	2500	0	0	0	0	2500
		total Project 3	52500	0	0	0	0	52500
4	Historic Trials	fieldwork (high priority)	18400	18400	18400	18400	18400	92000
		fieldwork (medium priority)	29000	29000	29000	29000	29000	145000
		overhead	2370	2370	2370	2370	2370	11850
		total Project 4	49770	49770	49770	49770	49770	248850
5	Regional Yield Estimates	(no costs currently identified)	0	0	0	0	0	0
6	New Nutrition & Density Trials	pre-assessment	0	75000	0	0	0	75000
		installation	0	270000	0	0	0	270000
		measurements	0	0	45000		80000	125000
		special trials	0	0	50000	50000	50000	150000
		overhead	0	17250	4750	2500	6500	31000
		total Project 6	0	362250	99750	52500	136500	651000
		Total all projects	285411	455931	332661	146181	369411	1589595

Table 6 does not include costs of the following contributions by members that will be essential for proper and successful functioning of the Association:

- Participation on Technical and Steering Committees;
- Attendance of meetings;
- Review of minutes, reports, and scientific papers;
- Contribution of existing information and data;
- Provision and support of models (e.g. use of LFD's GYPSY for yield forecasting in Project 2);
- Protection of trials, and restoration in event of damage or loss;

- Direct participation in analysis and interpretation of data and publication of results (see specific requirements in Section 5.3).

5.3. Project Contributions by Collaborating Agencies

The following contributions will be sought through special collaborative agreements with Association members and external agencies.

Project 2 (Lodgepole Pine Regeneration):

- Access, support and advice for use of GYPSY (LFD) and TIPSY (BC Ministry of Forests);
- Spatial modeling using TASS (BC Ministry of Forests Research Branch);
- Results of comparable trials (CFS Northern Forestry Centre and Petawawa Research Station, BC Ministry of Forests).

Project 3 (Site Index Comparison):

- PSP data from Association members (permitting direct comparison of pre-harvest and post harvest site index);
- Participation of LFD Senior Biometrician in interpretation of results and preparation of scientific paper.

Project 4 (Historic Trials):

- Participation in protection of trials, and associated communications program (LFD and CFS);
- Data compilation and analysis (CFS and LFD);
- Re-measurement of Edson fertilization and thinning trial (LFD);
- Interpretation and publication of results (CFS and LFD);
- Participation in project management and quality control (CFS and LFD).

Project 5 (Regional Yield Estimates):

- Provision of sample plot data stratified by AVI classification (Association members);
- Analysis of data (LFD).

Project 6 (New Nutrition and Density Trials):

- Assessment, measurement, and analytical components that Association members are unable to fund; plus ancillary and special research (Alberta Research Council, NSERC[3] / University of Alberta, other).

[3] Natural Sciences and Engineering Research Council of Canada

Project Proposal:

Comparison of Pre-harvest and

Post-harvest Site Indices

Project Proposal

Comparison of Pre-harvest and Post-harvest Site Indices

1. Justification and Purpose

The *Lodgepole Pine Regeneration (LPR) Project* was designed to forecast and monitor the growth and yield of regenerated lodgepole pine stands in relation to site, early crop performance and stocking, vegetative competition and density regulation. While monitoring is a long-term undertaking, initial forecasts will be developed as part of the *Project Establishment Report.*[1]

Site index (SI) change is the most serious impediment to initial forecasting of the growth and yield responses being monitored by the LPR Project field trial. In an address to the Foothills Growth and Yield Association (FGYA) March 15, 2001, Shongming Huang, Senior Biometrician of the Alberta Land and Forest Division (LFD) suggested that time-series and contemporaneous comparisons of SI between fire origin and post-harvest stands are key to the scientific credibility and reliability of lodgepole pine yield forecasts. He proposed a paired-plot "vertical" and "horizontal" comparison approach, the former based on time-series data from permanent sample plots, and the latter from contemporaneous paired plots comparing fire-origin and regenerated (post-harvest) portions of the same original stand and site.

The Steering Committee decided that the FGYA should proceed with the project as follows[2]:

- The work should be a cooperative extension to the current LPR Project, involving paired-plot sampling of stands in each of the Project's 5 ecosite categories, preferably in combination with permanent sample plot data contributed by members.
- The Director should itemize the required information and develop a project proposal for implementation.
- Work on the contemporaneous paired plots should be funded on the same allocation formula and basis as the main LPR Project.
- Companies able and wishing to provide appropriate PSP data may have this credited to their contribution.

The purpose of the *Comparison of Pre-harvest and Post-harvest Site Indices* will be to provide credible and reliable forecasts of post-harvest SI, for the main ecosite categories of interest to members, relative to pre-harvest SI values.

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[1] Originally scheduled for March 31, 2002, finalization of the establishment report will be delayed until later in 2002 because a small number of installations will not be completed until the 2002 field season.

[2] See Minutes of Steering Committee Meeting # 2, March 15, Chateau Louis Conference Centre, Edmonton.

2. Available Tools and Data

The primary models that will be used for initial growth and yield forecasting in the LPR Project are GYPSY and TASS. The model developers at the LFD (GYPSY) and the B.C. Ministry of Forests Research Branch (TASS and the associated TIPSY computer program) have agreed to the models being available for this purpose. Both these models require SI as input.

Shongming Huang *et al* (1997)[3] developed reliable subregion-based SI models for lodgepole pine that are capable of forecasting SI from tree height and age, including from young trees with ages older than two years at breast-height. He also developed a series of growth-intercept models predicting SI from initial height growth based on a range of base heights and growth intervals[4]. These tools will be used for estimating SI from height, age and growth intercept data collected or assembled in the proposed project extension.

Two members of the FGYA indicated they already have data that may be relevant, and that they would be willing to contribute to the project.

Weldwood of Canada pioneered growth intercept, paired plot, and PSP time series comparisons in Alberta, as reported by Udell and Dempster in 1987.[5] More recently, the Company used Permanent Growth Sample (PGS) and other data to evaluate the relationship between pre-harvest and post harvest SI. The results were used to forecast regenerated stand SI in Weldwood's 1999 Detailed Forest Management Plan. At the time of the evaluation, 92 fixed-area PGS plots were identified which:

- occurred in pure pine stands;
- had been measured both before and after harvest;
- had reached at least 1.3 m in stand height since harvest.

Of these 92 plots, probably between 75 and 85 exceeded 5 years of growth above 1.3 m (breast-height). More plots meeting these criteria may have been added to the database since 1999.

Weldwood PGS plots were originally established on a systematic grid, in clusters of 4, with a plot size of 1/5 acre (0.08 ha). Plots were re-established in regenerated stands with a plot size of 1/10 acre (0.04 ha). Tree measurements include diameter, height, and crown dimensions. Top height trees are identified as the largest-diameter valid four or eight trees per plot (depending on plot size), regardless of species. Site height trees are identified as the largest-diameter valid four or eight trees of each major species. Height and breast-height ages are measured on all top height and site trees. The plots used in the pre-post harvest investigation were classified ecologically.

Weyerhaeuser Canada has installed a system of permanent sample plots in its Grande Prairie forest management area. The plots are 0.08 ha in area, with nested sub-plots. Twenty-one plots were identified in which the parent and / or the regenerated stand were pure pine, and

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[3] Shongming Huang, Stephen Titus and Grant Klappstein. April 1997. *Development of a subregion-based compatible height-site index-age model for young and mature lodgepole pine in Alberta.* Forest Management Research Note #T/353, Alberta Environmental Protection.

[4] Anon. June 12 1996, *Growth intercept models for site quality evaluation in regenerated lodgepole pine stands.* Unpublished report available from Alberta Land and Forest Service.

[5] R.W. Udell and W.R. Dempster. 1987. *Predicting the growth and yield of regenerated lodgepole pine.* CPPA Woodlands Section Paper presented at 67th Annual Meeting of the Woodlands Section, Canadian Pulp and Paper Association, Montreal, 1986.

measurements of both pre- and post-harvest conditions are available. Of these, 10 plots were sufficiently developed to provide SI estimates for the regeneration as well as the parent stand. Ecosite information has not been gathered on all of these plots, but Weyerhaeuser would be willing to make the assessments.

Several companies (e.g. Millar Western Forest Products (MWFP), Weldwood, and Weyerhaeuser) have already conducted paired-plot studies using temporary plots. The methods vary somewhat, and the combined data set would not provide for a totally defensible region-wide assessment. However, the studies would provide an excellent opportunity for comparison with, and short-term validation of, the proposed contemporaneous study.

3. Proposed Approach

3.1. Time-series (Vertical) Comparison

The development by Weldwood and Weyerhaeuser of permanent sample data with pre- and post harvest measurements provides an unprecedented opportunity for evaluating changes in SI and stand height development using true time-series information.

Data for at least 80, and possibly as many as 100, plots are expected to meet minimum criteria for site index assessment of the regenerated, as well as pre-harvest, condition. Site indices will be estimated from height and age data using the previously referenced models for young and mature lodgepole pine. Differences between pre-harvest and post-harvest values will be evaluated by t-tests of paired samples. The data are not controlled with respect to ecosite category, but evidence of differences between ecosite categories will be evaluated.

The applicability of early and late rotation SI comparisons based on the available models is dependent on the assumption that the largest-diameter trees early in the rotation survive and remain as SI / top height trees in the final crop. Time series data provide the opportunity to test this assumption. Where more than one measurement is available per plot before harvest, or more than one measurement per plot is available after harvest, change in candidate SI / top height trees over time will be investigated.

3.2. Contemporaneous (Horizontal) Comparison

Fifty lodgepole pine stands throughout members' tenures will be identified, in which regeneration following harvest has reached at least 5 years breast-height age, and portions of the original parent stand are still standing on the same ecosite as the regeneration. If possible, 10 such stands will be located for each of the 5 ecosite categories recognized in the LPR Project (see Table 1). The Association's Field Coordinator, in consultation with the tenure holders and the contractor, will undertake initial selection of stands for sampling throughout Association members' tenures.

For each selected stand, the Contractor will identify pre- and post-harvest areas that have similar physiographic site characteristics as candidate sampling areas. Three pairs of plots will be located within these candidate sampling areas, each with one plot in the regenerated portion and one in the parent portion of the stand. The location of the initial plot in each pair will be randomized. The second plot will be located systematically, but in such a way that both plots occur in the same soil moisture and nutrient regimes. Plots will be sufficiently distant from the

cut-block boundary to avoid edge effects. The plots will be circular, with a radius of 9.77 m, (area 300m^2).

Table 1
Ecosite Categories

#	Category	Ecosite (WC)	Ecosite (SW)	NSR
1	Bearberry/lichen/hairy wild rye *(submesic/subxeric, medium-low)*	b,c	b	any
2	Labrador tea –mesic *(mesic-poor)*	d	c	UF LF
3	Billberry/cranberry/sarsaparilla/rhododendron *(mesic-medium)*	e	d	SA/UF LF
4	Honeysuckle/fern (subhygric-rich)	f	e	UF LF
5	Labrador tea-hygric *(hygric-poor)*	h	f	any

At each plot the contractor will undertake the following tasks:

1. Using procedures described in the latest published field guides to ecosites of West-central and Southwestern Alberta, identify the moisture regime, nutrient regime, and ecosite. (If the moisture or nutrient regime differs between the two plots, one or both plots must be re-located.)
2. Measure and record the DBH and species of all trees exceeding 1.3-m height.
3. Select the 3 largest DBH lodgepole pine trees as potential site trees. If one of these trees does not meet the *site tree* criteria (see below), 2 site trees will be considered sufficient. If more than one of the 3 potential site trees does not meet the criteria, the plot must be re-located.
4. Measure the total height (from ground to base of terminal bud) and breast-height age of each site tree.
5. On the plot falling in the regenerated stand, also record the last 5 annual internode lengths of the site trees. This will normally require felling the tree. Splitting of the stem may be necessary to locate pith nodes in the event that annual whorls are indistinct, or there is an inconsistency between breast-height age as measured by whorl-count versus by number of growth rings

A *site tree* should:

- have no damage affecting height growth (dead top, broken stem, fork, crook);
- be standing and alive, with good vigor;
- be a dominant or co-dominant;
- be accurately measurable for breast-height age;
- not be a veteran or a wolf.

Measurements will be made following terminal bud set in the 2002 growing season, and completed by September 15, 2002. Data will be submitted in an electronic database format acceptable to the Association, by September 31, 2002.

The experimental design will permit the following statistical tests and analyses:

1. Paired samples t-test: a sensitive test to evaluate the overall difference in SI between pre- and post-harvest SI.
2. One-way repeat-measure analysis of variance: will determine the significance of origin (pre- and post-harvest) effects relative to between-stand and within-stand variance.
3. Two-way analysis of variance and associated range tests: will allow evaluation of site and origin effects, and assessment of site and origin mean SI values and differences.

4. Arrangements for Sharing Effort and Data

The FGYA Steering Committee directed that the cost of paired-plot installations should be distributed according to the formula developed for the main LPR Project (i.e. in proportion to net tenured lodgepole pine land base area). However, it also decided that existing available PSP data may be recognized as a valid contribution, and therefore should be offset against a member's required level of contribution to the new paired plot data. This will require agreement on equivalence between the value of existing PSPs and the cost of new paired plots.

The following policy for dealing with this situation is recommended in the Association's draft Business Plan:

Situations have arisen where members have already collected growth data from permanent sample plots (PSPs), potentially contributing to an Association project with considerable timesaving. Such contributions may be recognized and encouraged by offsetting the value of the data against the contribution that the member would otherwise make to the project under the allocation formula. This will require recognition and agreement by the Technical Committee of the value of the PSP data relative to the cost of new data collection. The Association will not normally reimburse the member directly, or allow credits to be accumulated from one project to another, so the maximum value that can be recognized is the project cost that would otherwise be allocated to the member for collecting new data. In the event that such an offset is made, the cost of new data collection will be shared among the other members, in proportion to their net areas.

Considering only direct measurement costs, the value of each PSP re-measurement is conservatively estimated at $1000. On this basis a minimum contribution of 2 measurements for each of 10 PSP's would have a credit value of $20,000. Taking into account overhead and interest costs would at least double this amount.

The ultimate product of the overall study will be a published peer-reviewed scientific report. Although the intent is to make the results public (subject to Steering Committee approval), the data contributed by members will remain their property. Members' rights and privileges in this regard would be protected under the data sharing policy proposed in the draft Business Plan:

Data directly collected and funded by a member as part of an approved cooperative project will be provided to the Association but will also remain the property of the sponsoring member. The Association's use of the data will be limited to that specified in project and work plans approved by the Steering Committee (unless otherwise directed by the Steering Committee). Data will be distributed among the project participants as necessary for compilation and analysis. Digital files and data bases funded through FRIAA may be subject to access through provincial freedom of information legislation. Otherwise data will not be distributed to third parties without the agreement of the owner.

If individual members or external agencies contribute data not collected directly as part of a cooperative project, such data will not be released to third parties, including individual members of the Association, without the agreement of the owner. Such data would not be accessible through provincial freedom of information legislation unless directly funded through FRIAA.

Analytical results, including crop performance reports and yield forecasts, will be shared among members. The data and results obtained will not be further distributed or published without the approval of the Steering Committee. This consent will not be unreasonably withheld. Reports and scientific manuscripts for projects funded through FRIAA will ultimately be accessible to the public.

5. Costs

A Request for Proposals has been sent to prospective contractors for acquisition of the new paired-plot data. The contract cost is provisionally estimated at $50,000. Table 2 provides indicative costs to each member, assuming:

- Allocation of costs in proportion to pine-leading net land area;
- A total contract cost of $50,000, plus a 5% overhead allowance;
- The minimum credit to Weyerhaeuser and Weldwood for PSP data exceeds their contribution otherwise required under the allocation formula.

Table 2
Estimated Costs to Individual Members

Member	Total area (ha)	% of total	Applicable area (ha)	% of applicable	Share of cost ($)
Alberta Newsprint	106,870	5.2	106,870	10.3	5,414
Blue Ridge Lumber	180,323	8.8	180,323	17.4	9,135
Canfor	106,271	5.2	106,271	10.3	5,383
Millar Western	112,406	5.5	112,406	10.8	5,694
Spray Lakes	114,988	5.6	114,988	11.1	5,825
Sundance	121,848	6	121,848	11.8	6,173
Sunpine	293,655	14.4	293,655	28.3	14,876
Weldwood	451,713	22.1	-	-	-
Weyerhaeuser	557,433	27.3	-	-	-
Total	2,045,507	100	1,036,361	100	52,500

Project Proposal:

Cooperative Management of

Historic Lodgepole Pine Research Trials

Project Proposal

Cooperative Management of Historic Lodgepole Pine Research Trials

1. Introduction

The Canadian Forest Service (CFS) has been instrumental since 1938 in the establishment and analysis of research trials evaluating the growth response of lodgepole pine to thinning and fertilization in Alberta. Continuation of this research supports one of the major Science and Technology priorities of the CFS, namely to evaluate and enhance Canada's ability to practise sustainable forest management and to develop techniques to enhance timber production.

The Land and Forest Division (LFD) of Alberta Sustainable Resource Development (SRD) maintains a system of permanent sample plots, including 331 plots in dominantly lodgepole pine stands in the Foothills, Sub-Alpine and Montane natural sub-regions. In 1980 it established a trial near Edson, Alberta, to evaluate the effects and interactions of thinning and fertilization on lodgepole pine growth.

The Foothills Growth and Yield Association (FGYA) was formed in April 2000. Nine companies holding major forest tenures, the LFD, and the Foothills Model Forest are members. The mandate of the Association is to:

1. Forecast and monitor the response of lodgepole pine to silvicultural treatments;
2. Facilitate the scientific development and validation of yield forecasts used by members in managing their tenures;
3. Promote knowledge, shared responsibility, cost-effective cooperation, and continual improvement in sustainable forest management.

During 2000 and 2001 the FGYA installed a major trial for monitoring the effects of site, vegetative competition, and initial density management on the early crop performance and subsequent growth and yield of lodgepole pine.

In August 2001, representatives of the above-mentioned organizations toured the historic CFS lodgepole pine trials. They concluded that links should be forged to ensure the ongoing protection, measurement and interpretation of these trials. The following proposal is in response to that conclusion.

2. Project Purpose, Scope and Objectives

The purpose of the Project is provide forest managers the full and continued benefit of relevant established long-term field trials assessing responses of lodgepole pine to nutrition and density management.

The Project applies to the listed research trials (see Table 1). Installations may be added or deleted from the list by the mutual agreement of all parties. The last two items listed (SRD

permanent sample plots and FGYA regeneration study) are included only because they will form part of the Project data sharing arrangements (see Section 3). Because SRD and FGYA respectively already have provided for their protection and measurement, they are not included as activities under this Project. The scope of the Project will initially be limited to lodgepole pine and species growing in association with pine on the listed research trials. This does not preclude the identification of other opportunities for cooperation, and extension of the project to other species and trials upon the mutual agreement of the parties.

Specific objectives of the Project are:

1. Maintain and protect the identified trials. This includes:
   - Ensuring trials are clearly demarcated and signed for protection and demonstration purposes;
   - Provision and maintenance of appropriate land reservation status;
   - Communication of the protection status and its purpose to land managers, and creating awareness of status to land users.

2. Synthesis of results to date. The synthesis will involve:
   - Standardized analysis and presentation of trial results. The intent here is to ensure that results of the various trials are comparable, comprehensible, and useful to forest managers. Examples are: the use of common and ecologically-referenced taper equations and site index equations; reporting of merchantable volume using applicable utilization standards; referencing of sites to the provincial ecological classification; standardized thematic presentation of results on stand density management diagrams or other frameworks facilitating comparison and management interpretation.
   - Interpretation of implication of results for forest managers. This component is crucial given the interests and priorities of the FGYA membership and SRD, and the science and technology objectives of the CFS.
   - Publication of results and interpretations. The intent would be to have a publication-ready report completed by March 31, 2003.

3. Ongoing measurement and analysis, involving:
   - Scheduled re-measurement on prioritized basis (5 year schedule);
   - Timely compilation, analysis, and distribution of results;
   - Update of synthesis (by March 31, 2007.

3. Data Access and Use

Data will remain the property of the trial owner (see Table 1).

Data will be shared among the three agencies for the purposes of:

- Cooperative syntheses of results as provided for in this Proposal, including scientific analysis and expert interpretations of the data for the benefit of forest managers;
- Assessment and validation of growth and yield assumptions and models.

The data and results obtained will not be published, in whole, in part, or in summary form in any public document without the written consent and acknowledgement of the owner that the data has been fairly and accurately used and represented. This consent will not be unreasonably withheld.

Data will not be released to third parties, including individual members of the FGYA, without the agreement of the owner. Distribution of data to third parties would be carried out under a separate data-sharing agreement between the data owner and the party requesting the data.

Syntheses of results will be published after the first and fifth year of the Project, following review by representatives of the CFS, LFD and FGYA. Compiled interim results will be distributed among the 3 organizations via a Quicknotes / Newsletter arrangement.

Table 1
Lodgepole Pine Field Trials

Owner/ #	*Title / Location*	*Established*	*Publication*
CFS / A34	Lodgepole pine pre-commercial thinning, Mackay	1954	W.D. Johnstone, 1981, NOR-X-237
CFS / A100	Spacing trials – 7 year old fire origin stand of lodgepole pine, Gregg River	1963/64	W.D. Johnstone, 1981, NOR-X-236 R.C. Yang, 1991, NOR-X-322
CFS / NOR-402	Spacing trials – 28 year old fire origin stand of lodgepole pine, Gregg River	1984	Kolabinski and Lux, unpublished establishment report
CFS / NOR-405	Thinning and fertilization of 40-year-old semi-mature lodgepole pine, McCardle Creek	1984-85	R.C. Yang, 1998, Can J For Res 28
CFS	Early development of lodgepole pine after three different mechanical thinning treatments, Swan Lake	1977	I. Bella, 1990, For Chron
CFS	Fertilizing after thinning 70-year-old lodgepole pine, Clearwater	1968	I. Bella, 1978, Bi-monthly Research Note 34
CFS / NOR-008	Juvenile spacing of 25-year-old lodgepole pine, Teepee Pole Creek	1967	W.D. Johnstone, 1981, NOR-X-244 R.C. Yang, 1986, Forest Management Note
CFA	Strip thinning of lodgepole pine, Teepee Pole Creek	1966	
CFS / K-57	Development of a 77-year-old lodgepole pine stand following heavy thinning, Kananaskis	1941	J. Quaite, 1950, Silviculture Leaflet #47
CFS / K-3	Various thinnings based on European practices, Kananaskis	1938-39	Smithers, 1961, Dept. For. Bulletin # 127
CFS / K-58	Economic possibilities of commercial thinning in an 88-year-old lodgepole pine, Kananaskis	1950	D.I. Crossley and R.S. Jewesson, 1952 (unpublished)
CFS	Commercial thinning in 85-year-old lodgepole pine, Strachan	1952	
SRD	Fertilization and thinning of 26-year-old lodgepole pine, Edson	1980	S.K. Takyi, 1984 (internal Alberta Forest Service report)
SRD	Lodgepole pine PSPs, Foothills and Subalpine subregions	various	
FGYA	Regenerated lodgepole pine study	2000	

4. Activities and Required Level of Effort

Consistent with the Project objectives, activities and the required level of effort are outlined below under three task groupings:

1. Maintenance and protection of the field installations;
2. Synthesis of results to date;
3. Ongoing measurement and analysis.

Table 2 summarizes the activities and effort required for Task 1. The participation of all 3 parties is important for successful maintenance and protection of the trials. The role of SRD, as the land management authority, is crucial. A shared protocol will be developed whereby the trials are profiled in a publicly-accessible web-site, LFD field staff are well-informed and actively involved in protection, and all 3 parties respond quickly and effectively to inquiries, encroachment risks, and trespass.

Table 2
Task 1: Maintenance and protection

Activity	Required Level of Effort
• Markers and signage • Registration, maintenance and update • Notification and communications • Response and enforcement	The listed activities are, in total, expected to require approximately 30 person days per year. Maintenance of markers and signage can be incorporated with measurement field visits.

Table 3 summarizes the activities and effort required for Task 2. The significant amount of analytical and compilation support is justified because the data is of variable format, having been collected over a long period of time by different researchers.

Table 3
Task 2: Synthesis

Activities	Required Level of Effort
Data compilation, analysis, management interpretations, report preparation, publication and editorial support	• 100 days senior analysts (2) • 150 days assistant analyst and compilation support • 40 days forest management expert(s) • $30,000 publication costs

Tables 4 and 5 schedule and summarize the activities required under Task 3. Table 4 incorporates a tentative schedule for field measurement of the trials listed in Table 1. The schedule is based on importance of the trials, and dates of last measurements. It is indicative only, and will be subject to revision and smoothing to harmonize annual workloads and respond to resource availability. Trials and measurements have been grouped into two categories: *highly important* and *moderately important.* Measurements in the *highly important* category represent the recommended minimum level of effort. Those in the *moderately important* category will be undertaken subject to available resources and further review of their priority and timing. The Project is expected to formally commence in fiscal year 2002 (i.e. April1 2002 – March 31 2003);

and inputs are totaled for the five-year period 2002 – 2006. However, inputs made in 2001, already contributing towards the Project objectives, are also shown in the table.

In Task 3, data collection will follow formats and quality control standards agreed to by all 3 parties.

Table 4
Task 3: Fieldwork (required person days)

Site	2001	2002	2003	2004	2005	2006	Total 2002-2006
Gregg spacing 1963 (A-100)	(46)						0
McCardle fertilization & thinning				36			36
MacKay thinning (A34)		56					56
Swan Lake thinning		8					8
Teepee Pole Creek spacing (NOR-008)		74					74
Kananaskis heavy thinning (K-57)			10				10
Edson fertilization and thinning (Takyi)			75				75
Sub-total: highly important	**(46)**	**138**	**85**	**36**	**0**	**0**	**259**
Gregg spacing 1963 (A-100)						46	46
MacKay thinning (A34)						56	56
Teepee Pole Creek spacing (NOR-008)						74	74
Gregg spacing 1984 (NOR-4-02)					32		32
Clearwater fertilization & thinning		22					22
Strachan thinning		8					8
Teepee Pole Creek strip thinning			30				30
Kananaskis European thinning (K-3)			18				18
Kananaskis economic thinning (K-58)			4				4
Sub-total: moderately important	**(0)**	**30**	**52**	**0**	**32**	**176**	**290**
Total: all trials and measurements	**(46)**	**168**	**137**	**36**	**32**	**176**	**549**

Table 5
Task 3: Ongoing measurement and analysis

Activity	Required Level of Effort
Fieldwork (see Table 4)	• 259 person days minimum (includes only those trials and measurements rated as highly important) • 549 person days total (includes all trials and measurements rated as highly or moderately important)
Data verification, storage, compilation (assistant analyst)	• 20 days per year average, excluding 2002 which is covered by assistant analyst under Task 2 • 80 days total 2003 - 2006
Analysis (senior analyst)	• 20 days per year senior analyst 2003 – 2005 • 60 days senior analyst 2006 (synthesis update)

Table 6 shows the estimated total personnel requirement for the five-year period (2002 – 2006), summarized from Tables 2 through 5, plus indicative financial costs. A project management allowance of 100 days (approximately 10% of personnel inputs) has been added for technical direction, field coordination, and quality control. Financial costs for protection and maintenance are excluded, on the assumption that the activity will be absorbed under existing budgets of the three parties.

Table 6
Summary of personnel requirements and indicative costs

Item	Person days	Indicative costs ($)
Senior analysts	220	187,000
Assistant analyst	150	90,000
Field measurement services	259 - 549	129,500 – 274,500
Data compilation services	80	32,000
Forest management expert(s)	40	34,000
Publication	-	30,000
Protection and maintenance	150	-
Project management & QC	150	90,000
Total	**~~1053~~ - ~~1343~~**	**592,500 – 737,500**

1049 1339

5. Roles, Responsibilities and Contributions

Allocation of effort and costs among cooperators has not been finalized. It is suggested that:

- The FGYA will assume responsibility for direct field measurements, except those for the SRD (Edson) trial, which will be undertaken by SRD as part of its ongoing permanent sample plot program.
- The FGYA Director and Field Coordinator will provide project management services, with assistance in quality control provided by the CFS.
- The CFS will allocate 220 person days of senior analyst time over the five-year period.
- All three parties will share the responsibility of protection and maintenance.
- SRD may be able to provide or support assistant analytical and compilation services and contribute to the provision of forest management experts. It may also be willing to participate in other aspects of analysis and project management.
- Several options exist for expert management interpretations e.g. contracting of one expert, or use of volunteer expertise within the 3 organizations.

Costs of the assistant analyst, compilation services and forest management experts have not yet been allocated. The potential distribution of effort, based on discussions so far, is shown in Table 7.

Table 7
Potential distribution of effort (person-days over 5 years)

Personnel	FGYA	CFS	Other	Total
Senior analyst		220		220
Assistant analyst			150	150
Field measurement services	184-474		75	259-549
Compilation services			80	80
Forest management expert(s)			40	40
Protection and maintenance	50	50	50	150
Project management	100	50		150
Total	**334-624**	**320**	**395**	**1049-1339**

6. Deliverables

Table 8 itemizes the Project outputs.

Table 8
Deliverables

Task	Deliverable	Dates
Task 1. Maintenance and protection of trials	• All trials marked and signed • Registration updated • Descriptions posted on web; regional managers briefed • Prompt response to inquiries and trespass	Ongoing
Task 2. Synthesis	• Publication-ready report	March 31, 2003
Task 3. Ongoing measurement and analysis	• Compiled data from scheduled measurements • Newsletter / quick-notes • Updated synthesis	See Table 4 Periodic March 31, 2007

Letter from Executive Director

Forest Management Branch

Alberta Sustainable Resource Development

Alberta
SUSTAINABLE RESOURCE DEVELOPMENT

Land and Forest Division

Forest Management Branch
9th Floor 9920 - 108 Street
Edmonton, Alberta
Canada T5K 2M4

Telephone (780) 427-8474
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January 23, 2002

Mr. Hugh Lougheed, Chairman
Foothills Growth and Yield Association, Steering Committee
Foothills Model Forest
1176 Switzer Drive
Hinton, AB
T7V 1V3

Dear Mr. Lougheed:

At the Foothills Growth and Yield Association Steering Committee meeting on March 15, 2001 Daryl Price discussed the need for the Association to produce deliverables in the public domain that are transparent and credible. He suggested that the collective group give consideration to developing lodgepole pine "natural" yield curves for the ecological (natural) areas represented by the Association's membership, and inquired as to whether the member companies were prepared to provide data to the Land and Forest Division (LFD) for this purpose. He also suggested jointly developing a set of managed stand yield curves for Alberta, and that, if member companies provide the data for these projects, LFD would contribute the analysis. This letter is to clarify LFD information needs and the rationale for regional level natural and managed stand yield curves.

Alberta Vegetation Inventory (AVI) maps now cover much of the commercial forest land base within the Green Area of Alberta. Both the Government of Alberta and various forest industry companies funded this coverage. Because it is a publicly owned resource, the Crown has a responsibility to periodically report on the state of that resource, including its rate of growth, to provincial, national and international audiences. Such reports must be credible and show whether or not the resource is being managed in a sustainable and responsible manner. The Crown must also provide the public (including quota and permit holders and its own staff) with stock tables that enable them to use AVI maps for various purposes including fire suppression. This responsibility requires that LFD produce volume tables that describe the growing stock at an appropriate level of detail.

The Phase 3 Forest Inventory was completed almost 20 years ago. Since that time, most forest management planning and operational activities have switched to dependence upon AVI as the inventory of choice.

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At the present time the only provincial level volume tables that have been compiled are the cover type volume tables that were developed following completion of the Phase 3 Forest Inventory program in 1982. These tables were developed by volume sampling region. Provincial level yield curves are limited to the fully stocked yield tables that were developed by Dr. Dick Dempster in 1985 using LFD PSP data. Exceptions to this include specific volume sampling programs and analyses that were undertaken by LFD in non-FMA forest management units, primarily located along the eastern slopes. None of these have been published nor released to the general public. The above sources of data are insufficient to fulfil LFD's responsibility to provide credible and current provincial level volume and growth summaries.

Responsibility for conducting forest resource inventory within FMA areas has been largely delegated to the FMA holders. Most of those companies have voluntarily provided the Crown with copies of their AVI sample plot data. Our intent is to combine that plot data with data the Crown has collected to create generalized stock tables for each natural region. The tables will likely be differentiated based on broad species (C, CD, DC and D) and crown closure (Low {A+B} and High {C+D}) classes. Site class will likely not be considered. Because volumes are very sensitive to height, 3m height classes will be used if the data permits.

Some form of yield curves, or at least a listing of mean annual increments (MAI) at their maximum ± 10%, will also be created for generalized cover groups to meet our need to report on forest growth. Both the volume tables and the yield curves will need to be created based on average rather than "fully stocked" conditions due to a lack of data for fully stocked stands.

The most recent request for specific provincial level growth and yield data was through the questionnaire LFD received from the US Department of Commerce on the Countervailing Duty investigation;

> *"Provide complete descriptions of each species of softwood commonly found on provincially-owned timber tracts. Include information on the specific characteristics, the relative quality, and the usual end uses of each species. Also include the average yield on a per unit basis for each species. Describe the methodology used to calculate this yield".*

In addition, a cross-border comparison between Alberta and Montana of tree size and average sawlog volume had to be compiled. This particular question required significant staff time on the part of both industry and government to assemble and compile existing data. Both of these questions bring to the forefront the serious limitations of existing compiled and published data for responding to basic questions on forest productivity.

The creation and distribution of credible volume tables and yield estimates complete with some measure of their precision, as recommended by the Alberta Reforestation Standards Science Council, is a necessary part of demonstrating that we are sufficiently knowledgeable about the forest resource to be capable of managing that resource in a sustainable manner.

.../3

If we don't take this step, products developed by non-foresters will be used to evaluate forest management practices in Alberta.

The tables we create will be applicable to the whole forest landbase if the sample data permits, not just to the stands currently considered "commercially productive" and included in AAC determination. The broader the database used for their creation the better will be the products that result. Initially both sets of tables will focus on stands of "natural" origin. However, tables for harvest-origin stands that have been treated in some basic way to enhance their productivity will need to be added, as more data becomes available.

The tables we propose to create are not intended to provide a basis to assess the accuracy of forest industry yield curves nor how well individual FMA holders are managing their FMA areas. They will provide a major improvement in the crude indirect estimates of forest productivity that are currently being used e.g. AAC ÷ forest land area = MAI. Before creation of this material begins we plan to consult with representatives of the forest industry.

The above summarises provincial information needs and provides the rationale for the Association supporting LFD developing natural and managed yield curves on an ecological basis, incorporating plot data collected by the member companies individually and through the Association. I encourage the Association to support LFD in completing this initiative and look forward to receiving a letter from the Association endorsing this initiative.

Sincerely,

D. (Doug) A. Sklar
Executive Director
Forest Management Branch

cc: Daryl Price, Resource Analysis Section
Howard Gray, Assistant Deputy Minister, Land and Forest Division
Dr. Dick Dempster, Director, Foothills Growth and Yield Association