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a growing understanding

Inaugural Steering Committee Meeting

of the

Foothills Growth and Yield Association

March 23, 2000

University of Alberta
Edmonton

Agenda

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Dick Dempster Consulting Ltd.
Tel: 604 886 0461
Fax: 604 886 0462
Cell: 604 454 7090
dick_dempster@dccnet.com

Inaugural Steering Committee Meeting of the Foothills Growth and Yield Association

Date: Thursday, March 23, 2000

Time: 11 a.m. – 3 p.m.

Location: Weldwood Room, 812 General Services Building, University of Alberta, Edmonton

Agenda

1. Election of Chairperson
2. Director's Report
3. Memorandum of agreement
4. Project plans
5. Work plan and operating budget
6. Annual membership fee and program contribution level
7. Assignments, purchases and business arrangements
8. Policies and strategic directions
9. Other business

Note: a light lunch will be served at 12 noon; please confirm your attendance by e-mail, fax, or telephone to Dick Dempster Consulting by noon, Monday, March 20, in order to facilitate arrangements.

Director's Report

Foothills Growth and Yield Association
Inaugural Steering Committee Meeting – March 23, 2000

Director's Report

1 Reporting Period

This report is for the period from April 1, 1999 to date, with projections to March 31, 2000. Activity reporting commenced June 21, 1999, when the Foothills Model Forest retained the services of a Director, with the mandate to develop a cooperative program in Lodgepole Pine growth and yield.

2 Income and Expenditures

Table 1 itemizes income and expenditures of the program, and time inputs by the Director.

Table 1. Hours, Income and Expenses for the Period April 1, 1999 – March 31, 2000

Item	*Apr - Oct 1999*	*Nov - Dec 1999*		*Jan - Mar 2000*		*Total*	
Hours							
Director	265	80	68	216	158	561	491
Income							
PEF funding	200,000					200,000	200,000
Other	485					485	485
Total income	200,485					200,485	200,485
Expenses[1]							
Director - fees	22,968	6,934	5,894	18,721	13,694	48,622	42,555
Director - expenses	3,192	347	89	3,744	1,711	7,283	4,992
Meeting & misc.expenses	1,227			1,000		2,227	1,227
Total expenses	27,386	7,280	5,982	23,465	15,405	58,131	48,774
Ending Balance	173,099	165,819	167,117	142,354	151,712	142,354	151,712

actual (to March 19)

projected in Work Plan (to March 31)

[1] including GST

3 Activities

Activities of the Director are itemized in detail in the monthly activity reports (appended). The most important activities were:

- scope assessment (including survey of and interviews with potential members);
- identification and review of related programs;
- tour of historical lodgepole pine trials in the Alberta foothills;
- organization and facilitation of workshop with potential members (October 22, 1999);
- development of terms of reference and Memorandum of Agreement;
- development of work plan and budget for period November 1, 1999 to March 31, 2001;
- project planning and experimental design;
- Technical Committee coordination and meetings;
- reporting and information dissemination.

4 Achievements

Achievements are also reported in the monthly activity reports (appended). Although assessment of achievements is premature, the following five areas are arguably most significant.

4.1 Scope Assessment

The scope assessment, as reported at the October 22 workshop, assembled information and perspectives of potential member companies with respect to:

- goals and opportunities for co-operation in growth and yield assessment;
- current programs in silviculture, mensuration, and growth and yield research;
- crop treatments regimes of interest and prime importance;
- appropriate structure and function of a cooperative program.

It identified the needs, concerns and priorities of the member companies, and most importantly, areas of agreement, similarity, and common interest, providing the basis for joint action (see Table 2).

4.2 Memorandum of Agreement

The Memorandum of Agreement among members of the Association was signed by nine forest companies, the Foothills Model Forest, and the Alberta Land and Forest Service (LFS) as of December 15, 1999. The Agreement establishes (effective April 1, 2000) the Association for the forecasting and validation of managed stand growth and yield, particularly of lodgepole pine, with nine voting members, the Foothills Model Forest as the coordinating agency, and the LFS as a non-voting advisory member.

The Agreement defines the roles and responsibilities of voting members, steering and technical committees, the coordinating agency, the LFS, and the director. It specifies requirements and protocols for the scope and development of cooperative projects, and contains provisions for the protection of members' rights and privileges, and for termination and amendment.

Table 2. Scope Assessment - Perspectives of Interviewed Companies

Item	*Agreement and similarities among members*	
	General agreement / similarity	Disagreement / differences
Wood supply	Decreasing land base availability	% secure wood supply (50-95)
Forest profile	15-20% of area harvested and regenerating; significant areas of late-stage fire origin stands (50% +)	Age class distributions of natural stands: areas of young and mid-range fire origin stands vary in significance
		% pine 40 - >90
Expected AAC response to EFM	Sensitive to regenerated stand yields, dependent on long-term interim supply of late-stage fire-origin stands	Sensitivity to treatments of fire-origin stands
Cost or price sensitivity to tree size / quality	High sensitivity	Relevance and economics of stand management interventions
Goals of cooperation	Quantification of yields associated with pine management practices	Exclusive focus on pine
Indicators of successful cooperation	Approved forecasts of stand yields, incorporating growth responses to planned treatments	
Growth and yield research installations	Most companies have useful installations	Levels of investment to date
Regimes of interest	Lodgepole pine in upper and lower foothills.	Interest in white and black spruce. Subalpine and mixedwood sub-regions.
	Even-aged stands of harvest origin	Fire-origin stands
	Density management: spacing, tending, PCT	Commercial thinning
	Not drainage, pruning	Fertilization, site prep., stock type
Roles of coordinating agency	Experimental design and standards	
	Data compilation	
	Quality control of trial installation and measurement	
	Model development and validation	
	Continuing education of members	
	Not direct participation in policy negotiation	
Funding	Members responsibility	Roles of FRIP and external sources
Coordinating agency	FMF, at least initially	
Structure	Steering committee; appointed director; technical representatives	
Full membership	FMA, Quota holders	Uncertainty over role of LFS
Vote	Equal	
Associate membership / other participants	Need to integrate work and knowledge from CFS, WESBOGY, B.C., other	
Fees	Fixed base rate	
Mandatory contribution	Required level of trial installation, possibly linked to land base / AAC	
Confidentiality	Access by members to core data and derived results	
	Distribution of results to non-members by approval of steering committee	
Concerns	Work must be user-driven, cost-effective, results-focussed, and directly beneficial to development and support of management planning commitments	
	Fragmented , discontinuous or theoretical research	
	Role of government	
	Need for early tangible action and benefits	
	Membership commitment; equitable participation; free-loading	

4.3 Work Plan and Budget

A work plan and budget for the remainder of the 1999 / 2000 fiscal year, and the 2000 / 2001 fiscal year (April1, 2000 – March 31, 2001), was submitted to the Foothills Model Forest and circulated to members on December 15, 1999.

Some changes to the allocation of budget for software development will be recommended as a result of deliberations of the Technical Committee. The overall program and budget will be maintained as planned, subject to the advice and approval of the Steering Committee.

4.4 Technical Committee

A functional Technical Committee is now in place, with representation from each member. Participation and input has been high quality, enthusiastic and timely, in spite of all representatives having demanding schedules. In addition to the inputs of designated representatives, contributions of others, particularly Drs. Victor Lieffers, Peter Blenis, and Steve Titus of the University of Alberta, and Shongming Huang of the LFS, are gratefully acknowledged.

4.5 Project Plan and Experimental Design

Work with the Technical Committee has resulted in a project plan for assessing the effects of site, competition, and initial density management on early crop performance and subsequent stand growth and yield. The plan includes:

- specification of questions to be answered and effects to be estimated;
- experimental design alternatives for long-term monitoring of the effects (final selection of preferred design pending);
- identification of existing data sources and models for providing interim answers to the questions and estimation of the effects;
- estimated level of effort and costs, plus proposals for their allocation among members.

Detailed technical planning is incomplete and ongoing.

5 Shortfalls

1. The Project Plan is incomplete. The experimental design will be finalized following this meeting and further technical review within the next week. Technical specifications will be completed to the level of detail necessary for requesting proposals by April 15, 2000. A field manual will be drafted by May 15, 2000.

2. No proposals for compilation software have been requested. The software is not required for initial work on the regenerated lodgepole pine project, and may not be required for other presently identified supplementary data sources. Opportunities will be explored for utilization or enhancement of existing and anticipated programs. The Steering Committee might consider utilization of some or all of this budget to support installation of the regenerated lodgepole pine project, or for acquisition of supplementary data.

Development of Lodgepole Pine Growth and Yield Co-operative

Monthly Activity Report – Dick Dempster Consulting Ltd.

Reporting Period	June 21 – July 31 1999
Total reimbursable hours	79 (details submitted with invoice)
Major expenses incurred	None (telephone charges only)

Activities

- Review background materials (history file and misc. literature)
- Meetings Udell and Blackwood
- Work and contact scheduling
- Develop scope assessment framework
- Contact potential industrial members (introductory memos sent to 28 persons in 9 companies)

Achievements

- Establishment work schedule and scope assessment framework completed
- Contact database created
- Telephone contact established and initial discussions held with 9 companies
- Scope assessment meetings scheduled with 7 companies; remaining 2 pending staff returns from vacation

Shortfalls

- Review of related research programs incomplete

Tasks for next month

- Scope assessment consultations with 9 companies
- Tour of research installations and consultations with senior LFS and EFM task force staff
- Develop discussion paper based on scope assessment
- Review related research programs
- Cost estimate for establishment phase

Development of Lodgepole Pine Growth and Yield Co-operative

Monthly Activity Report – Dick Dempster Consulting Ltd.

Reporting Period	August 1 – August 31, 1999
Total reimbursable hours	88 (details submitted with invoice)
Major expenses incurred	$2332 Extensive travel (details submitted with invoice)

Activities

- Scope assessment consultations with partners
- Tour of research installations
- Analysis of scope assessment information

Achievements

- Scope assessment consultations completed
- Results and proposals for Co-op formulation circulated for discussion
- Relevant CFS, LFS, and industry research programs and installations reviewed
- 9 companies and LFS supportive of Co-op formulation
- Establishment workshop scheduled for October 22

Shortfalls

- Budget estimates for Co-op and FMF contribution incomplete

Tasks for next month

- Draft terms of reference, budget and work program for Co-op
- Arrangements for workshop October 22

Development of Lodgepole Pine Growth and Yield Co-operative

Monthly Activity Report – Dick Dempster Consulting Ltd.

Reporting Period	September 1 – September 30, 1999
Total reimbursable hours	41 (details submitted with invoice)
Major expenses incurred	$256.60 Travel and telephone (details submitted with invoice)
Activities Workshop preparation and agenda development Meetings G. Hurley and R. Blackwood, Hinton (re: workshop and budget arrangements) Budget and work program development	
Achievements Preliminary 5-year work plan and budget prepared Workshop agenda and invitations sent to 9 companies and LFS (24 recipients)	
Shortfalls None	
Tasks for next month Report to Foothills Model Forest Board Workshop Establishment Workshop	

Development of Lodgepole Pine Growth and Yield Co-operative

Monthly Activity Report – Dick Dempster Consulting Ltd.

Reporting Period	October 1 – October 31, 1999	
Total reimbursable hours	57	(details submitted with invoice)
Major expenses incurred	$602.69	Primarily travel and accommodation expenses associated with Hinton workshop (details submitted with invoice)

Activities

Prepare and present report to Board (see enclosed)
Workshop
Drafting and revision of Memorandum of Agreement

Achievements

Board acceptance and endorsement of report
Workshop attended by 17 participants, including representatives from all 9 candidate companies, plus LFS and CFS

Shortfalls

None

Tasks for next month

Finalization and signing of MOA
Initiate contact and work schedule with Technical Representatives

Development of Lodgepole Pine Growth and Yield Association

Monthly Activity Report – Dick Dempster Consulting Ltd.

Reporting Period	November 1 – December 31, 1999
Total reimbursable hours	68 (details submitted with invoices #15 and #16)
Major expenses incurred	None (minor expenses itemized on invoices)

Activities

- Finalization of Memorandum of Understanding
- Correspondence with Members
- Work plan and budget
- Technical Committee organization

Achievements

- 9 companies plus LFS confirmed signature of MOA
- Project executive summary, detailed proposal (including annual work plan and budget) submitted to Board
- Technical Committee activities scheduled for January

Shortfalls

- None

Tasks for next month

- Initiate detailed project design work with Technical Committee

Development of Lodgepole Pine Growth and Yield Association

Monthly Activity Report – Dick Dempster Consulting Ltd.

Reporting Period	January 1 – February 29, 2000	
Total reimbursable hours	89	(details submitted with invoice #22)
Major expenses incurred	$1711	(primarily travel to meetings with technical representatives; details itemized on invoice #22)

Activities

- Meetings with Technical Representatives (Hinton, Whitecourt, Grande Prairie)
- Consultations LFS and U of A
- Project research and design
- Technical and Steering Committee Meeting arrangements

Achievements

- Received input from all members on project design and planning for 2000
- Project experimental design (Regenerated Lodgepole Pine) proposal prepared for Technical Committee review
- Full Technical Committee Meeting and Steering Committee Meeting arranged for March

Shortfalls

- None

Tasks for next month

- Technical and Steering Committee Meetings
- Obtain Steering Committee approval for 2000 / 2001 project plan, work plan, and budget
- Continued development of Project Plan (Regenerated Lodgepole Pine)

Memorandum of Agreement

MEMORANDUM OF AGREEMENT AMONG MEMBERS OF THE FOOTHILLS GROWTH AND YIELD ASSOCIATION

WHEREAS:

The companies that are signatories of this Agreement wish to participate in a cooperative program, known as the *Foothills Growth and Yield Association*, for the forecasting and validation of managed stand growth and yield, particularly of lodgepole pine;

The Foothills Model Forest wishes to promote cooperation and shared responsibility in the improvement of sustainable forest management practices, and has agreed to be the Coordinating Agency for the Association;

The Alberta Land and Forest Service wishes to promote the scientific development and validation of yield forecasts used by tenure holders in the development of forest management plans, and is willing to provide advice and information to the Association;

IT IS AGREED:

DEFINITIONS

"Association" means the Foothills Growth and Yield Association.

"Voting Members" means industrial forest tenure holders that are signatories to this Agreement, and that pay an annual membership fee and otherwise contribute to the Association at a level specified by the Steering Committee.

"Members" includes Voting Members, the Foothills Model Forest, and the Alberta Land and Forest Service.

"Foothills Model Forest" is a non-profit company established under part 9 of the Companies Act R.S.A. 1980, Ch. C-20.

"Land and Forest Service" refers to the Land and Forest Service of the Alberta Department of Environment.

"Steering Committee" means the governing body of the Association as represented by one person from each of the Voting Members.

"Technical Committee" means the body, consisting of technical representatives from each member and chaired by the Director, which develops project plans, experimental designs and standards for approval by the Steering Committee, and coordinates installation and measurement of field trials.

"Coordinating Agency" is the Foothills Model Forest or other agency assigned by the Steering Committee to administer the Association.

"Director" is the person recruited by the Coordinating Agency and approved by the Steering Committee to manage the Association.

1. VOTING MEMBERS

Voting Members are responsible for:

1. Installation and measurement of growth and yield trials on their tenured lands;

2. Provision of error-free data, in a format defined by the Coordinating Agency and the Technical Committee, from these trials to the Coordinating Agency;
3. Participation in the affairs of the Association at their own cost;
4. Application, as the Members deem appropriate, of results from Association projects to their own tenures, including local calibration of models; incorporation of results in financial models, timber supply analyses, and other corporate decision-support systems; and seeking approval of yield forecasts used in forest management plans.

Each Voting Member shall:

5. Appoint a representative to the Steering Committee with authority to represent the Member's strategic and financial interests;
6. Assign a representative to the Technical Committee with authority to represent the Member's technical views and interests;
7. Install and periodically measure growth and yield trials as specified in the work plan approved by the Steering Committee;
8. On or before April 1 each year, and commencing on or before April 1, 2000, pay a membership fee approved by the Steering Committee to support the direct costs incurred by the Coordinating Agency in the management of the Association.

2. STEERING COMMITTEE

The Steering Committee shall:

1. Meet at least once each year;
2. Elect from among the Voting Members' representatives a chairperson who shall call and chair meetings;
3. Define, periodically review, and revise as necessary, a minimum program contribution level for Voting Members;
4. Set, annually review, and revise as necessary, annual membership fees;
5. Review and approve project plans, data standards, annual work plans, annual operating budgets, reports, and priorities for supporting research;
6. Approve the purchase and disposition of assets (such as vehicles, computers, and software);
7. Review and approve contracts for outside services, data sharing agreements, and other business arrangements proposed by the Director;
8. Approve assignment to the Association of personnel hired or contracted by the Coordinating Agency;
9. Approve the publication and dissemination of information resulting from Association projects;
10. Set and annually review policies and strategic directions for the Association;
11. Resolve any disputes arising among members regarding the design and implementation of the Association's program.

At any meeting of the Steering Committee:

12. Each Voting Member may be represented by the Member's appointed representative, or an alternate designated by the Member;
13. A Voting Member representative shall have one vote;
14. A quorum shall be at least 75% of the Voting Members.

3. TECHNICAL COMMITTEE

The Technical Committee shall:

1. Develop project plans, experimental designs and standards for approval by the Steering Committee;
2. Assist the Director in the development of work plans and budgets;

3. Coordinate the installation and measurement of field trials;
4. Monitor program implementation, quality control, and data delivery;
5. Evaluate project results.

4. COORDINATING AGENCY

The Coordinating Agency is responsible for:

1. Administration of the Association;
2. Ensuring that project plans, experimental designs, and data standards are developed in a timely manner;
3. Data compilation;
4. Control of data quality consistent with plans and standards approved by the Steering Committee;
5. 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;
6. Dissemination of information to, and continuing education of, Members in matters relevant to the Association.

The Coordinating Agency, with the direction and approval of the Steering Committee, shall:

7. Retain the services of a Director to manage the Association and fulfill duties as specified in Section 6 of this Agreement;
8. Retain or assign other staff and contract services as required and approved in the annual work plan;
9. Administer the annual operating budget of that portion of the Association's program for which it is responsible;
10. Control expenditures in accordance with the approved annual work plan and operating budget, and generally accepted Canadian accounting practices;
11. Maintain books of account of all funds contributed and dispersed on behalf of the Association's program, in accordance with generally accepted Canadian accounting practices, and subject to annual independent audit;
12. Provide financial reports to the Director and Steering Committee on request;
13. Procure, own, maintain and dispose of equipment;
14. Maintain a secure repository of all Association data;
15. Encourage, and seek resources to undertake, research supporting and related to the Association's program.

The Foothills Model Forest, as Coordinating Agency, shall additionally contribute the following to the establishment and operation of the Association, at no cost to the Voting Members:

16. $200,000 towards initial establishment of the Association, contracting of a Director, and associated fringe, overhead, and meeting costs, incurred between June 21, 1999 and June 21, 2001;
17. Salary and fringe costs of a field coordinator, on a half-time equivalent basis, from April 1, 2000 to March 31, 2002;
18. Administrative overhead services, at a level of effort equivalent to approximately 5% of the non-capital operating budget managed on behalf of the Association;
19. A member of the Foothills Model Forest Board of Directors to participate on the Steering Committee in a non-voting advisory capacity.

5. LAND AND FOREST SERVICE

The Land and Forest Service shall:

1. Assign the Director of the Land and Forest Service Forest Management Division, or an equivalent senior official, to participate on the Steering Committee in a non-voting advisory capacity;

2. 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.

6. DIRECTOR

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

1. Prepare an annual work plan and budget;
2. Act as chairperson to the Technical Committee;
3. Ensure that project plans, experimental designs, and data standards are developed in a timely manner;
4. Supervise a field coordinator or other staff approved by the Steering Committee;
5. Consult with the Technical Committee regarding the selection, establishment and measurement of field trials;
6. Ensure the timely compilation of Association data consistent with approved project plans and quality standards;
7. Undertake, or direct the undertaking of, analysis of data and the selection, development, testing, or validation of appropriate stand-level models;
8. Report the results of Association projects to Members;
9. Arrange dissemination to Members of information on matters relevant to the Association, including a minimum of one educational meeting or field trip per year;
10. Provide quarterly and annual progress reports to the Steering Committee and the Coordinating Agency;
11. Act as Secretary to the Steering Committee if requested to do so by the chairperson;
12. Collaborate, cooperate and confer with other agencies as appropriate and necessary to further the interests of the Association;
13. Arrange the dissemination or publication of data and results when so directed by the Steering Committee.

7. PROJECTS

1. All Association projects shall have as deliverables *yield forecasts* and a *validation program.*
2. Following project design by the Technical Committee, and approval of a project plan by the Steering Committee, all members shall support project implementation.
3. *Yield forecasts* shall be 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. They may be based on new models developed by the Association, models calibrated by the Association, or existing models validated by the Association.
4. Project plans shall specify input and output variables to be included in each yield forecast.
5. Input variables shall include (a) stand and site parameters prior to treatment, and treatment parameters, and / or (b) stand and site parameters at benchmark stand development stages (e.g. performance surveys). Input variables shall include, or be stratified by, a common ecological site classification system.
6. Output variables shall include timber yields from intermediate (if applicable) and final harvests, at utilization standards agreed by the members.
7. A *validation program* may involve existing trials or new trials. It shall include a valid replicated experimental design, an installation schedule (if applicable), and a measurement schedule. The project plan shall specify variables to be measured and models or assumptions to be tested in the validation program.
8. Project plans shall include estimates of implementation costs.

8. PROTECTION OF RIGHTS AND PRIVILEGES

1. No Member shall use for its own purpose or disclose information of or relating to any other Member, which it knows or ought to know is confidential or proprietary information of such other Member, except as may be expressly authorized by such Member in writing.
2. No Member shall disseminate to non-members information produced by the Association, without the approval of the Steering Committee, except to parties authorized and legally entitled to receive such information.
3. Each Member indemnifies and holds harmless all of the other Members from and against all claims, actions, damages and expenses arising out of, or resulting from, a negligent act or omission of the indemnifying Member with respect to the Association.
4. Nothing in this Agreement shall be interpreted to create a partnership between the Members, or to authorize one Member to act as an agent for any other Member.
5. The Steering Committee may set charges for data or other services provided by the Association to non-members.
6. At the discretion of the Steering Committee, and after April 1, 2000, new Voting Members may be admitted and charged an entrance fee.
7. Data and analyses produced from Association field trials shall be made equally available to all Members.
8. Notwithstanding 8(2) and 8(7) above, data contributed by a Member to an Association field trial are the property of that Member, and may be used and distributed to other parties as the Member sees fit.
9. Data which are not produced from Association field trials, but which are provided by an individual Member to support Association analyses, remain the confidential property of that Member.

9. ESTABLISHMENT, TERMINATION AND AMENDMENT

1. The Association shall be established effective April 1, 2000.
2. Any Member may terminate its participation upon delivery to the Foothills Model Forest of at least 12 month's notice in writing.
3. Voting Members whose participation lapses may, at the discretion of the Steering Committee, be charged a re-entrance fee computed as a proportionate share of the costs incurred by the Members in operating the Association during the lapsed period.
4. Voting Members who terminate their participation shall have no right to Association information developed after the effective date of termination except information afforded to non-members under Sections 2.9 and 8.5 of this Agreement.
5. This Memorandum of Agreement may be amended, or a Member barred from further participation, or the Association wound up, by approval of at least 75% of the Voting Members.
6. This Memorandum of Agreement shall remain in effect until amended or terminated by approval of at least 75% of the Voting Members.
7. The interests of a Member herein are transferable with the approval of at least 75% of the Voting Members.

IN WITNESS WHEREOF the undersigned party has executed this Agreement.

Member _____

Signature of authorized representative

Per: _____

Print name: _____

Date _____

Project Plan

Project Plan

Regenerated Lodgepole Pine

Effects of Site, Competition, and Initial Density Management on Early Crop Performance and Stand Growth and Yield of Lodgepole Pine

Statement of Objectives - General

Forecast and validate the growth and yield of regenerated lodgepole stands in relation to site, early crop performance and stocking, and density regulation.

Answer the following questions:

- What are the relationships between early stand conditions (stocking, height growth, density, competition) and subsequent growth and yield?
- How does stand growth and yield respond to different levels of initial spacing and pre-commercial thinning?
- How do these responses and relationships vary across sites of primary interest?

Statement of Objectives - Specific

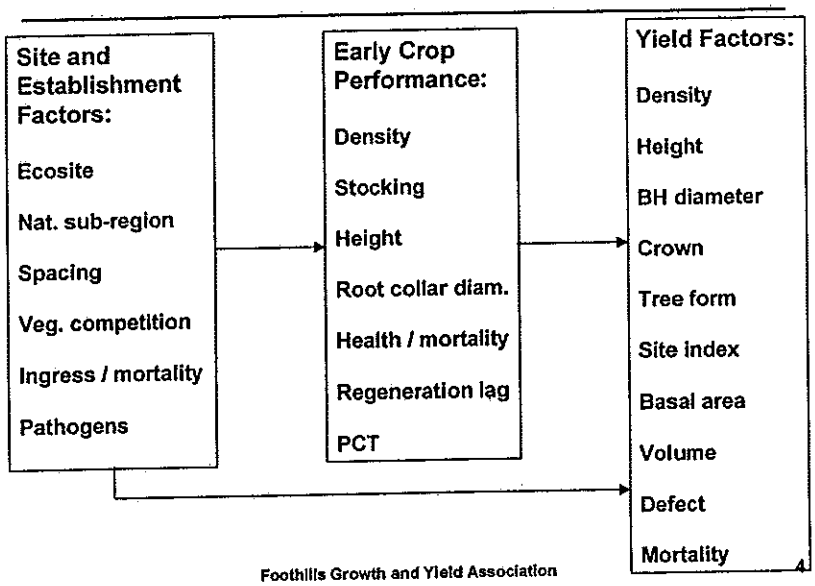
- Estimate the effects of site and establishment factors[1] on early crop performance[2] and subsequent stand growth and yield.[3]
- Estimate the effects of early crop performance[2] and density regulation on subsequent stand growth and yield.[3]

1 ecosite, natural sub-region, spacing, competing vegetation, ingress, pathogen occurrence, mortality

2 density, stocking, height, diameter, health, mortality, regeneration lag

3 density, height, diameter, crown development, tree form, basal area, volume, defect, mortality

Effects to Be Estimated



Sites

Ecosite (and Edatope)	*WC*	*SW*	*NSR*
1. Bearberry / lichen / h.w. 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

WC = west-central guide
SW = southwestern guide
NSR = natural sub-region

Treatments

Treatment	*N*	*Explanation*
Spacing	6	control (no planting); plant: 816, 1111, 1600, 2500, 4444 per ha
Vegetation management	4	none, weed, pre-commercially thin, weed and PCT

Spacing Treatments

Spacing (m)	*Density (stems / ha)*	*Trees / plot (0.025 / 0.1 ha)*
control	0	0
3.5	816	20 / 80
3.0	1111	28 / 112
2.5	1600	40 / 160
2.0	2500	63 / 252
1.5	4444	111 / 444

Vegetation Management Treatments

None	No treatment after planting
Weed (W)	Remove vegetation competing with planted or crop trees
Thin (T)	Pre-commercially thin to spacing density (except control)
Weed and Thin (WT)	Remove competing vegetation and thin to spacing density

Alternative 1

60 installations (5 ecosites x 4 vegetation management treatments x 3 replications); each installation split into 6 spacing treatments

Analysis of Variance	*Degrees of Freedom*
Ecosite	4
Vegetation management	3
Ecosite * vegetation	12
Error A	40
Spacing	5
Spacing * ecosite	20
Spacing * vegetation	15
Spacing * ecosite * veg.	60
Error B	200
Total	359

Alternative 2

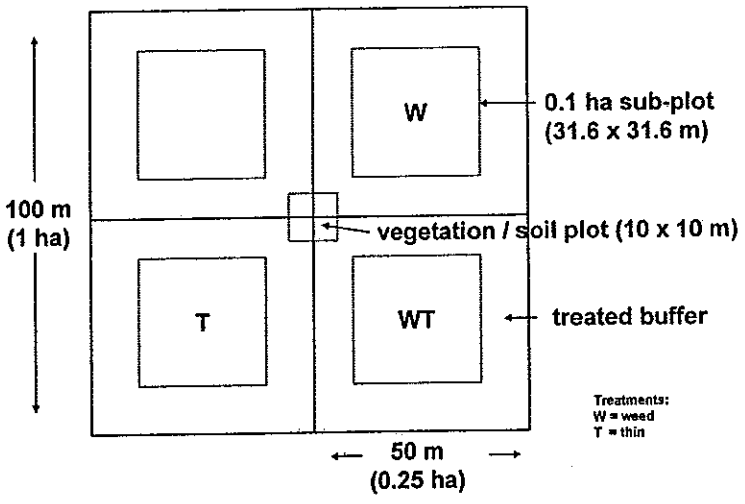
90 installations (5 ecosites x 6 spacings x 3 replications); each installation split into 4 vegetation management treatments

Analysis of Variance	*Degrees of Freedom*
Ecosite	4
Spacing	5
Ecosite * spacing	20
Error A	60
Vegetation management	3
Vegetation * ecosite	12
Vegetation * spacing	15
Veg. * ecosite * spacing	60
Error B	180
Total	359

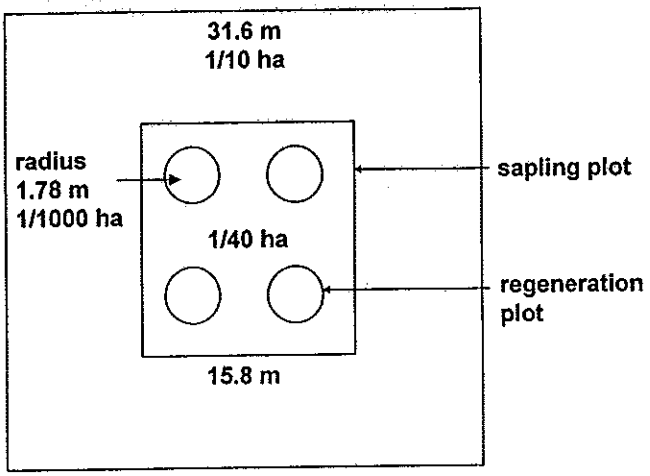
Design Considerations

- Alternative 1 is the better design if spacing (planting density) is the most important factor.
- Alternative 2 is the better (more balanced) design if spacing and vegetation management are equally important.
- Randomized selection of ecosites will be difficult, but is important.
- Increased replication is desirable, because interactions (e.g. between site and treatment) are likely. Alternatives include: reduce treatments levels and factors investigated; increase level of effort.

Installation Layout (Alternative 2)



Sub-plot Layout



Comparisons, Validation, and Interim Forecasts

- Models
  - GYPSY (LFS)
  - TASS / TIPSY (BC Min. For.)
  - member's FMP yield tables
  - SDMDs (BC Min. For.)
  - Prognosis (USDA / BC Min. For.)?
- Projects / Data
  - Gregg Burn PCT trial (CFS / Weldwood / Silfor)
  - Ecosite Dynamics & Managed Stand Productivity (CFS / Weldwood / ANC / BRL / MWFI)
  - NIVMA ?
  - Alberta Genetics Trials (G134, G127, G128, G154) ?
- Regeneration Standards and Crop Plans
  - Provincial regeneration standard
  - Variable regeneration standards and crop plans

Work Plan and Budget

FOOTHILLS GROWTH AND YIELD ASSOCIATION – WORK PLAN[1]

EXECUTIVE SUMMARY

1. Project Title

Development of a Lodgepole Pine Growth and Yield Cooperative Program

2. Project Location

Foothills Model Forest, with participants and research installations throughout the Eastern Slopes

3. Name of Organisation

Foothills Growth and Yield Association

4. Other Organisations Involved

• Foothills Model Forest	Coordinating Agency and Member
• Alberta Newsprint Company	Voting Member
• Blue Ridge Lumber	Voting Member
• Canadian Forest Products	Voting Member
• Millar Western Industries	Voting Member
• Spray Lakes Sawmills	Voting Member
• Sundance Forest Industries	Voting Member
• Sunpine Forest Products	Voting Member
• Weldwood of Canada	Voting Member
• Weyerhaeuser Canada	Voting Member
• Alberta Land and Forest Service	Member

Other agencies that have agreed to, or expressed an interest in, involvement include the Canadian Forest Service and the University of Alberta.

5. Cost of the Project Being Proposed

Costs for the period April 1, 2000, to March 31, 2001, are forecast to be $211,753. This does not include the costs incurred by members in the installation and measurement of research plots.

6. Consent of Other Organisations Involved

The Members listed in 4 above have confirmed consent to the program, subject to approval of a Project Plan to be presented to the Association Steering Committee in March 2000.

7. Contact Persons for this Proposal

Dick Dempster, Dick Dempster Consulting Ltd. (telephone 604 886 0461)
Glen Hurley, Foothills Model Forest (telephone 780 865 8332)

[1] As submitted to the Foothills Model Forest, December 14, 1999.

DETAILED PROPOSAL

1. Proposal Prepared By

W.R. (Dick) Dempster, Ph.D., R.P.F.
Dick Dempster Consulting Ltd.
RR8, 304 Georgia Drive
Gibsons, British Columbia
Tel: 604 886 0461
Fax: 604 886 0462
Cell: 604 454 7090
E-mail: dick_dempster@dccnet.com

2. Introduction

In response to interest by industry and government, the Foothills Model Forest has facilitated collaboration among a number of softwood producers to create a Foothills Growth and Yield Association for co-operative forecasting and monitoring of managed stand growth and yield, particularly of lodgepole pine. Nine companies will participate in the Association as voting members. The Alberta Land and Forest Service and the Foothills Model Forest will participate as non-voting members, with the Model Forest acting as the coordinating agency.

3. Background Information

The potential value of a co-operative lodgepole pine growth and yield research program was recognized in 1997 by a number of companies holding Forest Management Agreements and Timber Quotas on the Eastern Slopes.

The Foothills Model Forest appointed a part-time Director on June 21, 1999, with the mandate to develop a Growth and Yield Co-operative. The Director reviewed background work and consulted with nine companies holding timber tenures in the region, as well as the Alberta Land and Forest Service, and the Canadian Forest Service. During the summer of 1999 a number of research installations throughout the Eastern Slopes were visited, and a scope assessment was undertaken to assess the needs of potential program participants. This was followed by recommendations being made to the Board of Directors on October 7, 1999, for development of the co-operative program, and a workshop among the potential co-operators on October 22, 1999.

As a result of the workshop, a memorandum of agreement and preliminary work schedule was developed and endorsed by nine companies, the Land and Forest Service, and the Foothills Model Forest.

4. Objective

The goal of the program is the quantification of yields associated with forest management practices, especially of lodgepole pine.

5. Potential Application of Results

The results will be directly applicable to the development of forest management plans and enhanced forest management programs in the Foothills Model Forest area and throughout the geographic range of lodgepole pine in Alberta. They will influence the estimation and sustention of the allowable cut of lodgepole pine within the tenures of the participants, currently estimated at approximately 4.5 million cubic metres per year.

6. Deliverables

Projects of the Association will be designed to deliver yield forecasts and a validation program.

Yield forecasts will be 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. They may be based on new models developed by the Association, models calibrated by the Association, or existing models validated by the Association.

Validation programs may involve existing trials or new trials. They will include a valid replicated experimental design, an installation schedule (if applicable), and a measurement schedule.

The nature of tree growth and the project deliverables requires the program to be long term and ongoing. Although forecasts and improved confidence in estimation of growth and yield will accrue from initial measurements made in 2000, the full benefits of the program will be derived from growth re-measurements taken at intervals of up to ten years.

7. Methods

Methods will be specified in project plans (project proposals). The technical committee and Director will develop project plans for approval by a steering committee. Project plans will include replicated experimental designs, estimates of implementation costs, and will specify input and output variables to be included in each yield forecast.

Input variables will include (a) stand and site parameters prior to treatment, and treatment parameters, and / or (b) stand and site parameters at benchmark stand development stages (e.g. performance surveys). Input variables will include, or be stratified by, a common ecological site classification system. Output variables will include timber yields from intermediate (if applicable) and final harvests, at utilization standards agreed by the members.

Members of the Association on their tenured lands will carry out installation and measurement of growth and yield trials, and provide data, in a format defined by a technical committee and the Director. The Model Forest will engage a field coordinator responsible for the control and compilation of data consistent with approved project plans. Stand-level growth and yield models, best representing the experimental sites, practices and data, will be developed or validated.

8. Schedule

Activities and milestones scheduled to March 31, 2001, are shown in Table 1. Note that three projects are contemplated:

- Development of the Lodgepole Pine Growth and Yield Cooperative Program (current project as initiated in 1999).
- Forecasting and Monitoring of Growth and Yield in Regenerated Lodgepole Pine Stands (project scheduled to commence June 15, 2000, following completion and approval of a project plan in March, 2000).
- Determination of Potential for Increasing Yields of Semi-mature and Mature Lodgepole Pine (project proposal to be developed by March 2001, for possible implementation in the summer of 2001).

9. Site Information

The program will be based out of the Foothills Model Forest, Hinton. Research and monitoring sites will be distributed along the Eastern Slopes from Grande Prairie in the north to Cochrane in the south. Research trials will primarily be located in the Lower and Upper Foothills and the Subalpine Natural Sub-regions.

10. Financial Information

Income and expenses for Fiscal Year 2000 are forecast in Table 2.

11. References

- Memorandum of Agreement made 21st June 1999, between the Foothills Model Forest and Dick Dempster Consulting Ltd. pertaining to the development of a lodgepole pine growth and yield cooperative program.
- Memorandum of Agreement among Members of the Foothills Growth and Yield Association (December 1999).
- Workshop "*Establishment of a Foothills / Lodgepole Pine Growth and Yield Cooperative*" October 22, 1999 (presented materials including agenda, Director's report, and scope assessment).
- *"Development of a Growth and Yield Cooperative Program"*: report to the Board of the Foothills Model Forest, October 7, 1999.

12. Scientific Review

Recognized scientific experts in growth and yield, biometrics, and forest ecology will review project plans and results. Meetings will be held at least once a year, to which experts will be invited to attend and review projects. Formal peer review will be encouraged through the publication of project results.

13. Improvements to Management in Forest Ecosystems

The program will improve the management of forest ecosystems through:

- improved assessment of ecosystem productive capacity;
- improved assessment 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, and contributions to global ecological cycles.

14. Amount of Money and Services Requested

As a party to the Memorandum of Agreement among members of the Association, the Model Forest has committed to contributing:

- $200,000 towards initial establishment of the Association, contracting of a Director, and associated fringe, overhead, and meeting costs, incurred between June 21, 1999 and June 21, 2001.
- Salary and fringe costs of a field coordinator, on a half-time equivalent basis, from April 1, 2000 to March 31, 2002.
- Administrative overhead services.
- A member of the Foothills Model Forest Board of Directors to participate on the steering committee in a non-voting advisory capacity.

Voting members will cover their own costs incurred in the installation and measurement of growth and yield trials. They will also contribute to the costs of the Association throughout the Fiscal Year 2000 through a membership fee of not less than $10,000. After March 31, 2001, the steering committee will determine and set the membership fees necessary to finance the ongoing operation of the Association.

15. Proposed Payment Schedule

Membership fees will become due April 1, 2000.
The Director's fees and expenses are payable monthly.
The income and expense forecast, and associated ending balances, shown in Table 2 assume a carry over of existing funding from the current financial year of $142,354.

16. Subcontracted Work

Dick Dempster Consulting Ltd. will provide the services of the Director on contract. None of the work may be subcontracted without the written consent of the Foothills Model Forest. Other contract services, which may be required during Fiscal Year 2000, will be solicited through competitive bidding, unless the Foothills Model Forest and the Association agree and instruct to the contrary. The main requirement for contract services during 2000 is the development of a software system for sample-plot data verification and compilation.

17. Project Management

Project management and management responsibilities are described in the Memorandum of Agreement among members of the Association.

18. Additional Organisations Requesting FRIP Monies

Funding of contributions to the Association, and the identification of sources for such funding, are the responsibilities of the individual members.

19. Publication of Results for General Consumption

The members view publication of results as being in their interest. The steering committee will direct and approve the publication and dissemination of information resulting from Association projects.

20. Other Relevant Information

See Section 11 *References*.

Table 1. Growth and Yield Association Program Work Plan - Activities and Milestones

Activity / Milestone	Apr - Oct 1999	Nov - Dec 1999	Jan - Mar 2000	Total 1999 / 00	Apr - Jun 2000	July - Sep 2000	Oct - Dec 2000	Jan - Mar 2001	Total 2000 / 01	Total 1999 / 01
Commence Project 1[1]	21-Jun									
Program direction[2]	33	10	27	70	20	30	25	25	100	170
Establishment workshop	22-Oct									
MOA signed[3]		17-Dec								
Complete Project 2[1] proposal			Feb-29							
Request software proposals			Feb-29							
Steering committee meeting			Mar					Mar		
Annual fees due					1-Apr					
Procure computer					30-Jun					
Commence Project 2[1]					15-Jun					
Complete field work						15-Sep				
Field co-ordination[2]					25	50	25	10	110	110
Procure compilation software					30-Jun					
Commence data analysis							1-Oct			
Project 2 establishment report							31-Dec			
Field tour & AGM						Sep				
Complete Project 3[1] proposal								28-Feb		

[1] Project 1 Development of a Lodgepole Pine Growth and Yield Cooperative Program
Project 2 Forecasting and Monitoring of Growth and Yield in Regenerated Lodgepole Pine Stands
Project 3 Determining Potential for Increasing Yields of Semi-mature and Mature Lodgepole Pine

[2] Person days

[3] 9 voting members plus Foothills Model Forest and Alberta Land and Forest Service

actual

planned

Table 2. Growth and Yield Association Program Work Plan - Income and Expenses

Income / Expense	Apr - Oct 1999	Nov - Dec 1999	Jan - Mar 2000	Total 1999 / 00	Apr - Jun 2000	July - Sep 2000	Oct - Dec 2000	Jan - Mar 2001	Total 2000 / 01	Total 1999 / 01
Income										
PEF funding	200,485.31			200,485						200,485
Membership fees[1]				-	90,000				90,000	90,000
Total income	200,485.31			200,485	90,000				90,000	290,485
Expenses[2]										
Director - fees	22,967.55	6,934	18,721	48,622	13,867	20,801	17,334	17,334	69,336	117,958
Director - expenses	3,191.83	347	3,744	7,283	2,773	4,160	3,467	3,467	13,867	21,150
Other contract services[3]				-	48,150	48,150			96,300	96,300
4WD vehicle (rental)				-	1,500	4,500			6,000	6,000
Travel expenses (field coord.)				-	1,750	3,500			5,250	5,250
Meeting & misc.expenses	1,226.78		1,000	2,227		3,000		1,000	4,000	6,227
Computer & misc. equipment				-	17,000				17,000	17,000
Total expenses	27,386.16	7,280	23,465	58,131	85,041	84,111	20,801	21,801	211,753	269,885
Ending Balance	173,099.15	165,819	142,354	142,354	147,313	63,202	42,402	20,601	20,601	20,601

actual

projected

[1] $10,000 per voting member

[2] including GST

[3] primarily development of data verification and compilation software

Regenerated Lodgepole Pine Project
Allocation of Work Based on Share of Land Base

Company	Net area[1] (ha)	% of total	# of[2] installations	Establishment cost ($)[3]	Annual cost ($)
ANC	106,870	5.2	5	15,000	1,250
BRL	180,323	8.8	8	24,000	2,000
Canfor	96,381	4.7	4	12,000	1,000
MWFP	112,406	5.5	5	15,000	1,250
Spray Lakes	127,764	6.2	6	18,000	1,500
Sundance	121,848	5.9	5	15,000	1,250
Sunpine	396,627	19.3	17	51,000	4,250
Weldwood	451,713	22.0	20	60,000	5,000
Weyerhaeuser	457,433	22.3	20	60,000	5,000
Total	2,051,365	100.0	90	270,000	22,500

[1] Provisional estimates of net pine landbase contributing to allow able cut, including quota

[2] Based on design alternative 2, w ith 4 sub-plots per installation and minimal replication

[3] To be distributed over a minimum of 2 years

No contingency for replacement due to error, failure, trespass etc.