

Foothills Growth and Yield Association BUSINESS AND WORK PLAN

**Business Plan Updated Effective April 1, 2008
With Annual Work Plan for April 2008 – March 2009**

Prepared by:

R.W. Udell, R.P.F.
and
Sharon Meredith, R.P.F.

Revised
July 10, 2008



P.O. Box 6330
Hinton, Alberta
T7V 1X6

TABLE OF CONTENTS

1. BACKGROUND.....	4
2. MISSION.....	4
3. STRATEGIES.....	5
3.1. PROJECT DEVELOPMENT.....	5
3.2. PROJECT PRIORITIES	6
3.3. ROLES, RESPONSIBILITIES AND ASSIGNED TASKS.....	7
3.3.1. <i>Voting Members</i>	7
3.3.2. <i>Alberta Sustainable Resource Development</i>	8
3.3.3. <i>Foothills Research Institute</i>	8
3.3.4. <i>Program Manager (Director of Operations and Field Coordinator)</i>	9
3.3.5. <i>Research and Development Associate (Technical Director)</i>	9
3.3.6. <i>Field Services Contractors</i>	10
3.4. ALLOCATION OF EFFORT AND COSTS	10
3.5. COLLABORATION WITH EXTERNAL INSTITUTIONS	11
3.6. DATA SHARING.....	12
3.7. JUSTIFICATIONS FOR EXTERNAL FUNDING.....	13
3.7.1. <i>Application of Results</i>	13
3.7.2. <i>Relationship to Existing Responsibilities</i>	14
3.7.3. <i>Standards</i>	14
3.7.4. <i>Fair Market Value</i>	14
4. PROJECTS AND DELIVERABLES.....	15
4.1. DEVELOPMENT AND MANAGEMENT OF THE ASSOCIATION	15
4.1.1. <i>Justification and Purpose</i>	15
4.1.2. <i>Methodology</i>	15
4.1.3. <i>Deliverables</i>	15
4.2. LODGEPOLE PINE REGENERATION	16
4.2.1. <i>Justification and Purpose</i>	16
4.2.2. <i>Methodology</i>	16
4.2.3. <i>Deliverables</i>	16
4.3. COMPARISON OF PRE-HARVEST AND POST-HARVEST STAND DEVELOPMENT	19
4.3.1. <i>Justification and Purpose</i>	19
4.3.2. <i>Methodology</i>	20
4.3.3. <i>Deliverables</i>	20
4.4. COOPERATIVE MANAGEMENT OF HISTORIC RESEARCH TRIALS	20
4.4.1. <i>Justification and Purpose</i>	20
4.4.2. <i>Methodology</i>	21
4.4.3. <i>Deliverables</i>	22
4.5. REGIONAL YIELD ESTIMATORS	23
4.5.1 <i>Justification and Purpose</i>	23
4.5.2 <i>Methodology</i>	23
4.5.3 <i>Deliverables</i>	23
4.6. ENHANCED MANAGEMENT OF LODGEPOLE PINE.....	24
4.6.1. <i>Justification and Purpose</i>	24
4.6.2. <i>Methodology for Sub-project 1: Lodgepole Pine Nutrition</i>	24
4.6.3. <i>Methodology for Sub-project 2: Pine-aspen Density Management</i>	25
4.6.4. <i>Deliverables</i>	25
4.7. REGENERATION MANAGEMENT IN A MOUNTAIN PINE BEETLE ENVIRONMENT	26
4.7.1. <i>Justification and Purpose</i>	26
4.7.2. <i>Methodology</i>	27

4.7.3.	<i>Deliverables</i>	27
5.	FINANCE	28
5.1.	DEVELOPMENT AND MANAGEMENT OF THE ASSOCIATION	28
5.2.	LODGEPOLE PINE REGENERATION	28
5.3.	COMPARISON OF PRE-HARVEST AND POST-HARVEST STAND DEVELOPMENT	30
5.4.	COOPERATIVE MANAGEMENT OF HISTORIC RESEARCH TRIALS	30
5.5.	REGIONAL YIELD ESTIMATORS	31
5.6.	ENHANCED MANAGEMENT OF LODGEPOLE PINE	31
5.7.	REGENERATION MANAGEMENT IN AN MPB ENVIRONMENT	31
6.	ANNUAL WORK PLAN (APRIL 1, 2008 – MARCH 31, 2009)	33
6.1.	OBJECTIVES AND DELIVERABLES	33
6.1.1.	<i>Project 1 - Development and Management of the Association</i>	33
6.1.2.	<i>Project 2 - Lodgepole Pine Regeneration</i>	33
6.1.3.	<i>Project 3 - Comparison of Pre-harvest and Post-harvest Stand Development</i>	33
6.1.4.	<i>Project 4 - Cooperative Management of Historic Research Trials</i>	34
6.1.5.	<i>Project 5 - Regional Yield Estimators</i>	34
6.1.6.	<i>Project 6 - Enhanced Management of Lodgepole Pine</i>	34
6.1.7.	<i>Project 7 – Regeneration Management in a Mountain Pine Beetle Environment</i>	35
6.2.	EXTENSION AND COMMUNICATION	35
6.3.	INTER-PROGRAM LINKS	36
6.4.	FUNDING SOURCES	36
6.5.	PROGRAM KEY MEMBERS AND RESPONSIBILITIES	37
6.6.	ENVIRONMENTAL AND OCCUPATIONAL HEALTH AND SAFETY PERMITS	38
APPENDIX 1. FINANCIAL ALLOCATIONS AND AUTHORIZATIONS FOR THE PERIOD APRIL 1, 2007 – MARCH 31, 2009		40
APPENDIX 1.1. PROJECT FOOMOD-01-03 – FOOTHILLS GROWTH AND YIELD ASSOCIATION MEMBERSHIP FEES		40
APPENDIX 1.2. PROJECT FOOMOD-01-02 – MEASUREMENT AND MAINTENANCE OF HISTORIC RESEARCH TRIALS		41

List of Tables

Table 1.	Work Allocation Based on Pine-leading Area	11
Table 2.	Delivery Schedule for <i>Lodgepole Pine Regeneration</i> Project	17
Table 3.	<i>Lodgepole Pine Regeneration</i> Project – Elapsed Growing Seasons and Scheduled Measurement Type by Year and FMA	19
Table 4.	Re-measurement Schedule for Historic Research Trials	21
Table 5.	Delivery Schedule for <i>Cooperative Management of Historic Research Trials</i>	23
Table 6.	Delivery Schedule for <i>Enhanced Management of Lodgepole Pine</i> Project	26
Table 7.	Financial Projections for Project 1 - Development and Management of the Association	29
Table 8.	Estimate of Remaining Costs to be Incurred by Members for the <i>Lodgepole Pine Regeneration</i> Project	29
Table 9.	Cost Schedule for FGYA Contribution to <i>Cooperative Management of Historic Research Trials</i> Project	30
Table 10.	Cost Schedule for <i>Enhanced Management of Lodgepole Pine</i> Project	31
Table 11.	Budget (\$) by phase, year, activity and funding source	32
Table 12.	Scheduled income for 2008	37
Table 13.	Foothills Growth and Yield Association Representatives and Contacts (2008)	39

1. Background

The Foothills Model Forest (FtMF)¹, responding to interest by industry and government, in 1999 facilitated collaboration among 9 companies holding Forest Management Agreements on the Eastern Slopes to create the Foothills Growth and Yield Association (FGYA) for co-operative forecasting and monitoring of managed stand growth and yield.

The FtMF appointed a part-time Director in June 1999, with the mandate to develop a growth and yield co-operative. A memorandum of agreement was developed and endorsed by 9 companies, the Land and Forest Service, and the FtMF. Nine companies presently participate in the FGYA as voting members. The Alberta Department of Sustainable Resource Development (ASRD) and the FtMF participate as non-voting members, with the FtMF acting as the coordinating agency.

The FtMF, 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 contract had an initial term of 2 years, and was amended in September 2001, extending the term to 5 years (April 1, 2000 to March 31, 2005). In 2005 a second 5-year term was approved (April 1, 2005 to March 31, 2010) under FRIAA Project # FOOMOD-01-03.

During the 2001-02 fiscal year, the FGYA established a major project to forecast and monitor development of lodgepole pine regenerated after harvesting, and assessed opportunities and requirements for other cooperative projects. At the FGYA's March 2002 Annual Steering Committee Meeting the Committee reviewed and accepted a business plan that rationalized the Association's mission, strategies, projects and financial requirements for the next 5 years. The plan identified a total of 6 projects, all of which have been implemented and are now in various stages of completion. In 2007, a new project dealing with mountain pine beetle impacts was added. The plan has been updated each year since 2004.

This version of the plan covers the period commencing April 1, 2008, with projections 2-5 years ahead depending on project plans and expected durations. Costs, revenues, activities and deliverables are scheduled by year. Work is scheduled in detail for the coming year (April 1, 2008 – March 31, 2009).

2. Mission

The interests of the parties constituting the FGYA 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;

¹ Effective spring 2008, the Foothills Model Forest changed its name to the Foothills Research Institute, in keeping with its new 5-year business strategy and to better represent the nature of the organization's mission.

- 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 Research Institute (FRI) wishes to promote cooperation and shared responsibility in the improvement of sustainable forest management practices.

The mission and mandate of the FGYA are to continually improve the assessment of lodgepole pine growth and yield in managed stands by:

- Forecasting and monitoring responses to silvicultural treatments;
- Facilitating the scientific development and validation of yield forecasts used by members in managing their tenures;
- Promoting knowledge, shared responsibility and cost-effective cooperation.

The following indicators will measure success in performing the mandate, and may be used as criteria for evaluating and prioritizing project proposals and other FGYA 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-focused, and directly applicable to management and crop planning.

3. Strategies

3.1. Project Development

The goals of the FGYA 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 FGYA will be designed to forecast and validate yields for treatment regimes and site conditions of interest to all members, in order to provide a credible and reliable basis for supporting and defending timber supply analyses and assumptions. *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.

Quantitatively, the benefit of a project to each member will vary, and will be determinable only by the individual member. It is expected that each member will bring to the table during project definition those questions, issues and priorities that relate to their particular interests, and will

participate actively in design, approval, implementation, and evaluation of the project. By these means, the qualitative value of projects will be assured.

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 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 that responses to planting, vegetation management and density regulation treatments in harvest-origin stands was the highest priority for investigation, followed by density and nutrition management in fire-origin stands. All members agreed to proceed with investigations of spacing, tending and pre-commercial thinning in harvest-origin stands, but there were variable opinions on the importance of commercial thinning and fertilization. The primary focus has remained on forecasting the development of post-harvest managed stands, and has been emphasized and re-affirmed by current interests and urgency for the development of regeneration standards linked to growth and yield. Although post-harvest stand development is the first priority for growth and yield assessment, the Association recognizes that (a) much can be learned from experimentation and assessment in fire-origin stands that is relevant and necessary for yield forecasting and sound silvicultural decision-making in post-harvest stands, and (b) strategic management of existing fire-origin stands requires an ability to predict responses to potential interventions such as thinning and fertilization.

Following strategic discussions in January 2007, further direction from the Steering Committee in February and the field tour in July, a proposal entitled "Monitoring and Decision Support for Forest Management in a Mountain Pine Beetle Environment" was developed and accepted for FRIAA funding. This funding, and other funding committed by the FRI provides support for a new project described in Section 4.

The above priorities are reflected in the identification and development of projects as described in Section 4. A review and discussion of these priorities will be held at the technical committee meeting in June of 2008.

As a basis for determining what stand variables 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 (related to 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, Responsibilities and Assigned Tasks

The FGYA is a cooperative initiative involving voting members (industrial sponsors), ASRD and the Foothills Research Institute (as Coordinating Agency).

3.3.1. Voting Members

Voting members must be corporations or corporate divisions holding forest management tenures in Alberta. Responsibilities of the voting members will include:

- Installation and measurement of growth and yield trials (either directly or by financial and other support of work undertaken by contractors administered through the FRI) as specified in work and project plans approved by the Steering Committee;
- Provision of error-free data, in a format defined by the Coordinating Agency and the Technical Committee, from those measured under direct supervision of the member;
- Appointment of a representative to the Steering Committee with authority to vote and represent the Member's strategic and financial interests;
- Assignment of a representative to the Technical Committee with authority to represent the Member's technical views and interests;
- Payment of an annual 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 FGYA 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 Program Manager;
- Approve assignment to the FGYA of personnel hired or contracted by the Coordinating Agency;

- Approve the publication and dissemination of information resulting from FGYA projects.

Effective April 1, 2006, the term for the elected chairperson will be 2 years i.e. the current Chairman's position will expire March 31, 2010.

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

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

3.3.2. *Alberta Sustainable Resource Development*

The Forests Division (FD) of ASRD has undertaken to:

- Assign the Executive Director of Forest Management, or other authorized senior official, 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 Research Institute (FRI)*

The Foothills Research Institute, as Coordinating Agency for the FGYA, will be responsible for:

- Administration of the Association;
- Appointment of a representative of the Foothills Research Institute Board of Directors to the Steering Committee in a non-voting capacity;
- Dissemination of information to, and continuing education of, FGYA members in matters relevant to the Association;
- Preparation and submission of the reports.

The Foothills Research Institute will also:

- Retain the services of a Program Manager to manage the Association and to coordinate and ensure quality control of field services undertaken by contractors;
- Retain or assign other required staff and contract services;
- 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 FGYA data.

3.3.4. *Program Manager (Director of Operations and Field Coordinator)*

The Program Manager will be a firm or one or more individuals retained to undertake the following duties:

- Preparation of annual work plans and budgets, and annual updating of a 5-year business plan;
- Chairing of a Technical Committee consisting of representatives from 11 member organizations, and consultation with the members regarding the development and management of projects;
- Ensuring that project proposals, plans, experimental designs, and data standards are developed in a timely manner;
- Control of data quality consistent with plans and standards approved by the Steering Committee;
- Oversee loading (including quality control), compilation and maintenance of FGYA project databases;
- Ensuring that projects are implemented in a timely manner consistent with approved program and project plans and quality standards;
- Planning, supervision and quality control of field research and measurements, including the overseeing and auditing of contracts and the coordination of inputs by technical representatives;
- Dissemination to FGYA members of relevant information, including a minimum of one educational meeting or field trip per year;
- Preparation of progress reports every six months or as otherwise requested by the Steering Committee, and of annual program and project reports;
- Collaboration and cooperation with other agencies as appropriate and necessary to further the interests of the Association.

The Program Manager will:

- Enter into a one-year renewable employment agreement or services contract with the Foothills Research Institute to undertake the above duties;
- Retain or sub-contract any additional personnel required to fulfill the list of duties specified above;
- Report to the FGYA Steering Committee and the General Manager of the Foothills Research Institute;
- Work closely with the FGYA Research and Development Associate;
- Be provided data management and financial accounting support by the Foothills Research Institute.

The required level of input is expected to be between 0.5 and 1.0 person years per year, and to be split fairly evenly between professional program direction and technical field coordination by one or more registered forestry professional(s). Funding, implementation and extent of the services are subject to initial and annual approval by the Steering Committee.

3.3.5. *Research and Development Associate (Technical Director)*

A Research and Development Associate will be retained on a part-time basis under a rolling 2-year contract by the Foothills Research Institute to provide analytical and technical direction services to the members and the Program Manager. He / she will be a registered professional forester holding an advanced forestry degree with extensive research and operational experience in growth and yield, and will undertake the following duties:

- Selection and development of analytical and modeling techniques for predicting the establishment, performance, growth and yield of lodgepole pine in managed stands;

- 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;
- Analysis of data from FGYA field trials;
- Reporting of technical results of projects to FGYA members;
- Evaluating and, if appropriate, recommending continued support for research projects and trials a minimum of two years prior to any planned termination of support or maintenance;
- Development and testing of decision-support tools for application by Association members;
- Preparation of technical reports and papers for dissemination or publication;
- Liaison and communication with Association timber supply planners and silvicultural practitioners, and with researchers in collaborating agencies, as required for effective exchange of knowledge and ideas.

The required level of input is expected to be approximately 80 days per year. The Associate will report to the Program Manager on program responsibilities and administration and directly to the Steering and Technical Committees on technical results and products.

3.3.6. *Field Services Contractors*

A roster of suitably qualified field contractors will be maintained to assist the Program Manager in project implementation and quality assurance. These services are required for the installation and measurement of research trials: Planned project implementation will require the services of qualified contractors with proven experience in forestry field measurements, sample plot layout, and / or experimental silviculture.

Only contractors recommended or endorsed by FGYA member companies will be listed and engaged. Selection for projects will be competitively bid, or may be sole-sourced in situations where only one contractor is available with the required skills and experience. In the latter case, financial proposals will be evaluated by at least 2 technical representatives in addition to the Program Manager.

If the Field Coordinator is a member of a consulting firm providing technical services to the FGYA, he must separate himself from direct involvement in service provision through direct measurements or supervision of field crews doing the work.

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 7, but will be subject to Steering Committee review and approval each year.

Unless otherwise provided for under special agreements with external sponsors and cooperators, 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 calculated in 2002. The allocation will be updated when significant changes occur to any member's net area. The re-allocation will take effect in the fiscal year following the change being reported, and will not be applied retroactively.

Situations have arisen where members have already collected growth data from permanent sample plots (PSPs), potentially contributing to an FGYA project with considerable timesaving. Such contributions may be recognized and encouraged by crediting and offsetting the value of the data against the contribution that the member would otherwise make to the project under the allocation formula. The Technical Committee will assess the value of such contributions relative to the cost of new data collection, and make recommendations to the Steering Committee regarding what value should be credited to the member contributing data. The Steering Committee will make the final determination of the value to be credited. The FGYA 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.

Table 1. Work Allocation Based on Pine-leading Area

Member	Net area (ha)	% of total
Alberta Newsprint Company	106,870	5.2
Blue Ridge Lumber	180,323	8.8
Canadian Forest Products	106,271	5.2
Millar Western Forest Products	112,406	5.5
Spray Lake Sawmills	114,988	5.6
Sundance Forest Products	121,848	6.0
Sundre Forest Products	293,655	14.4
Hinton Wood Products	451,713	22.1
Weyerhaeuser Canada	557,433	27.3
Total	2,045,507	100.0

3.5. Collaboration with External Institutions

Cooperation with external agencies (i.e. non-FGYA members) is desirable and necessary for meeting the mandate and mission of the FGYA. However, a clear collaboration strategy is necessary to ensure that such cooperation is beneficial to the Association and its members, equitable, and an efficient expenditure of the Association's time and resources.

The FGYA may collaborate with other agencies in order to:

- Obtain expert advice on the design, analysis and interpretation of projects;
- Obtain assistance in the analysis of data and publication of results;
- Encourage independently funded supplementary research supporting and building on FGYA projects;
- Access relevant information sources, including through sharing and exchange of data where clearly in the FGYA's interest and approved by the Steering Committee;
- Improve communication between researchers and practitioners where such communication will benefit members and enhance the assessment of lodgepole pine growth and yield in managed stands.

Where collaboration involves data sharing, significant costs, publication of FGYA information, and / or formal commitment to deliverables, the Program Manager will obtain the approval of the Steering Committee before proceeding. If deemed necessary and appropriate by the Steering Committee, the FGYA will enter into a formal memorandum of cooperation and / or collaborative research signed by the FGYA's chairperson. Such an agreement between the FGYA and cooperator will specify:

- Purpose and scope of the cooperation;
- Administrative roles and responsibilities;
- Contributions (financial and / or in-kind);
- Data ownership and access;
- Appropriate provisions and clarifications regarding liability, indemnification, amendment, notice, and dispute settlement;
- Term of agreement and time schedule for work commencement and completion;
- Schedule of committed deliverables.

No provisions in any such agreement may conflict with, encumber or supersede provisions contained in the Memorandum of Agreement between FGYA members or this Business Plan.

Collaborative arrangements in existence or planned include:

- *Canadian Forest Service*: The FGYA, the Northern Forestry Centre of the CFS, and the Land and Forest Division (LFD) of Alberta Sustainable Resource Development entered into an agreement in July 2002 for the cooperative management of historic lodgepole pine research trials. Negotiations to renew this Agreement are proceeding. Informal dialogue is also taking place with the CFS on assessment of climatic factors and climate change on growth and yield.
- *University of Alberta*: In 2005 the University and FGYA entered into a collaborative agreement to participate in implementation of the *Enhanced Management of Lodgepole Pine Project*.
- *British Columbia*: Informal dialogue with the B.C. Ministry of Forests Research Branch has proven extremely helpful without requiring specific or formal commitments on the part of the FGYA. This dialogue will be continued and extended to regional Ministry staff such as those knowledgeable and involved in the management of regeneration following mountain pine beetle infestations.
- *Loblolly Pine Growth and Yield Research Cooperative*: The FGYA visited the Virginia-based Cooperative in 2006 to learn about its research, operation and structure. Members concluded that maintaining and building on the link established was desirable. The application of loblolly pine models and thinning practices to lodgepole pine, based on "scaling" and "similarity analysis" approaches discussed and demonstrated during the tour, is of particular interest. The FGYA will consult with the Cooperative to investigate the application of these approaches.
- *Mixedwood Management Association (MWMA)*: The FGYA will continue to support the efforts of the MWMA to promote collaboration among Alberta forestry co-operatives. (In 2006 we provided information on our objectives and structure, and participated in formal consultations with representatives from the MWMA and other agencies.)

3.6. Data Sharing

New data collected and / or funded by a member specifically as part of an approved cooperative project will be provided to the FGYA and made available to all Association members. 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). 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 outside the FGYA without the agreement of the contributing member or members. Section 8 of the Memorandum of Agreement among members imposes restrictions on the use of cooperative project data by individual members, including that no member shall disseminate data collected by other members, or information derived from such data, to non-members without the approval of the Steering Committee. Dissemination of information within a member's organization, including other divisions and the parent corporation, is permitted.

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 External Funding

Members may elect to sponsor their contributions to the FGYA from FRIP (Forest Resource Improvement Program). The FGYA's program fulfils the proposal evaluation criteria of FRIAA, and is not a regulatory responsibility of the industrial members. Funding or collaboration will also be sought from other sources, given the program's:

- Alignment with provincial forest management and research priorities;
- Alignment with federal and provincial 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 other sources are summarized as follows.

3.7.1. *Application of Results*

The FGYA's activities are enhancing the management of forest resources by providing a continually improved, scientific, quantitative, and credible basis for:

- Linking regeneration standards and practices to timber yield objectives;
- 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;
- Providing decision-support tools for the management of stands attacked by mountain pine beetle.

Results 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 FGYA. Information gathered is being 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 ecosystem basis, rather than just by tenure, the results will be generally applicable to the natural range of lodgepole pine in Alberta.

The FGYA is enhancing 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;
- Development of decision support tools to mitigate the impacts of mountain pine beetle on sustainable timber supplies;
- Bridging basic research to market-driven applications such as prototype forestry practices and decision-support tools, demonstration, and feasibility investigation

3.7.2. Relationship to Existing Responsibilities

The work undertaken by the FGYA 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, or other recognized centres of excellence. Measurement standards will follow or exceed those used by the Canadian Forest Service (CFS) and ASRD for assessing 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 FGYA'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 Research Institute and sponsors. General benchmarks, used to ensure that fair market value is obtained for planned expenditures, will include:

- Technical and operations directors: 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 co-ordination and quality control: Prevailing contract rates for a registered professional forester or technologist with a minimum of five years experience in forest field measurements.
- Other contractors and field personnel: Prevailing contract or wage rates based on the respective categories of work. Work will normally be competitively bid. Where competitive bidding is not practical (e.g. because of specialized requirements for uniquely held skills), assignments may be sole sourced. Proposals for services to be sole sourced will be scrutinized by at least 2 FGYA member organizations, in addition to the Director, for fair value.

4. Projects and Deliverables

The activities of the FGYA during the term of this Plan will focus on 6 of the following 7 projects:

1. Development and management of the Association;
2. Lodgepole pine regeneration;
3. Comparison of pre-harvest and post-harvest stand development;
4. Cooperative management of historic research trials;
5. (Regional yield estimators; No further activity is planned for Project 5)
6. Enhanced management of lodgepole pine;
7. Regeneration management in a MPB environment.

Justification, purpose, methods and deliverables are 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 FGYA requires a Coordinating Agency to administer the Association and a Director (program manager) 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

Section 3.3 describes the methodology adopted for developing and managing the Association, including the assigned roles, responsibilities and tasks.

4.1.3. Deliverables

- Annually updated 5-year business plan and annual work plan, with budgets by year for each project;
- Project proposals, plans, designs, reports and publications;
- Information exchange meetings, field tours and technical sessions (minimum of 1 meeting per year), cooperative arrangements with collaborating agencies;
- Active publicly-accessible web site;
- Mid-year and annual progress reports;
- Financial statements (annually and / or as required);

- Documented recommendations of the technical committee;
- 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.

Since the Project's inception, the linking of early crop condition and treatment to subsequent growth and yield has assumed a high priority among FGYA members who are seeking to develop stratum-specific reforestation standards based on the yield objectives contained in their forest management plans. This requires linking crop performance (e.g. as measured in performance surveys 8-14 year performance surveys) to growth and yield predictions, and forecasting crop performance from site and treatment variables and from early crop attributes (e.g. as measured by 4-8 year establishment surveys). The project over the next 5 years will contribute substantially to meeting these requirements through the development of regeneration models. These decision support tools will allow managers to predict establishment and performance results based on site, stand, site preparation, planting, and vegetation management factors.

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 (weeding, thinning, weeding and thinning, no weeding or 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, installations and procedures are provided in an *Establishment Report* (April 2003) and a periodically updated field manual. FRIP funding for the Project was approved by FRIAA for the period April 1, 2000 to March 31, 2005 (FRIAA Project FOOMOD-01-01). Continued funding to March 31, 2010 is provided for under FRIAA Project FOOMOD-01-03).

4.2.3. Deliverables

Deliverables of the Project for the period April 1, 2007 to March 31, 2010 are shown in Table 2.

Note that installation status and measurements are the responsibilities of individual members, whereas other deliverables are the responsibility of the FGYA. Consistent with the Memorandum of Agreement, the project database was managed by the FtMF until 2007, when a member company assumed responsibility for database design, improvement and management on a temporary basis for 2007 and 2008.

Annual status (mortality) checks and bi-annual full measurements will be continued as previously scheduled for the first 10 growing seasons. Table 3 shows a breakdown of scheduled measurements for the 102 installations by year, number of growing seasons elapsed since planting, and forest management area (FMA). A more detailed schedule will be developed each year before commencement of fieldwork, and reviewed with technical representatives and

contractors at a pre-season meeting. Consideration will be given to rescheduling of 2008, 2009 measurements so as to provide full measurements for all installations in 2009, for inclusion in the regeneration performance model and final report for the 5-year project term.

No further fill-planting will be undertaken unless installations fail completely. Continued tending is expected to be necessary only where treatments prior to 2007 were missed or failed.

Table 2. Delivery Schedule for *Lodgepole Pine Regeneration Project*

Deliverable	Responsibility	Due
Status checks	Member	Annually (data submission by October 31)
Full measurements	Member	Bi-annually (data submission by October 31)
Summary status and verification reports	FGYA	Annually (January 31) and prior to final payments by FRIAA to sponsors
Digital database	FRI / FGYA	Annually updated (December 31)
Initial crop performance report (3-4 growing seasons)	FGYA	Delivered December 2005 for performance up to March 31, 2005
Crop performance report and regeneration establishment model (5 growing seasons)	FGYA	March 31, 2008
Pre-field work analysis of measurement and treatment requirements	FGYA	June 15, 2008
Compare mortality and ingress results with other studies; Assessment of Ives and Rentz data, FGYA pine-aspen results etc.	FGYA	September 30, 2008
Obtain expert entomological assistance in confirming biotic mortality factors and possible development of management support system	FGYA	Obtain assistance by June 15 for 2008 field season; including expert speaker for pre-season technical meeting
Extend regeneration performance model to 7 growing seasons (using 2007 and 2008 data)	FGYA	March 31, 2009
Crop performance report, regeneration performance model (8-9 growing seasons), final technical report	FGYA	March 31, 2010
Explore feasibility of linking growth and mortality to regional and local climate records	FGYA	Sept. 30, 2008.
If linkage feasible, assess predictability of drought, frost, and winter desiccation impacts using CFS and local gridded climate data sets	FGYA	First iteration: December 31, 2008 2 nd iteration: December 31, 2009

Deliverable	Responsibility	Due
Development and testing of mathematical models by external institutions	To be determined	FGYA will solicit interest from academic institutions by June 30, 2008
Extension of model development to other species and ecosystems ²	To be determined	FGYA will solicit interest from other G&Y researchers by June 30, 2008
Interpretation of results by knowledgeable practitioners	FGYA	Ongoing; formalize in dedicated field tour and technical meeting summer 2009; report by March 31, 2010
Revised trial measurement and treatment plan.	FGYA	February 28, 2009

The crop performance reports will include:

- Growth, ingress, competition and mortality statistics by treatment plot and growing season (or time since planting), with summaries by ecosite, treatment, FM area and growing season;
- Preliminary analyses to assess how much of the observed variation can be explained by controlled factors (ecosite, initial density, brushing);
- Preliminary exploratory analyses and strategy to develop regeneration models.

The regeneration establishment model will predict stocking, density, ingress, mortality and height and diameter growth over the first 5 years. It will be applicable to forecasting results of establishment surveys. The regeneration performance model will extend prediction of these variables to beyond 8 years, and will be linked to full-rotation growth and yield models. It will be applicable to forecasting the outcome of performance surveys, and placing stands on forecast long-term growth trajectories. The variables and factors evaluated for making predictions will include: ecosite, planting density, vegetation control, various competition indices, time since planting, elevation and natural sub-region, pre-harvest site index, physiographic site, planting season, site preparation and cone count. The preliminary model based on the first 5 growing seasons and developed in 2007-08 will be updated in 2008-09 to include measurements for the 7th growing season.

The RLP trials are currently scheduled for final measurements in 2009. In 2008/09 the R&D Associate will prepare a plan for continuing RLP trial measurement and treatments.

In view of combination of growing interest in the effects of climate change on regeneration survival and growth, and observed variation in crop performance likely to be linked to local climate, during 2007 a project was proposed to explore the feasibility of linking growth and mortality during the first 5 years of the trial to regional and locally-interpolated climate records. This is in progress, and a first iteration will be undertaken for December 31, 2008.

² Other incidentally occurring species naturally regenerating on the trial are being tracked and modeled; proposed strategy applies to development of similar approaches in other species associations and plantation regimes

Table 3. Lodgepole Pine Regeneration Project – Elapsed Growing Seasons and Scheduled Measurement Type by Year and FMA

FMA	# of installations	2008	2009
ANC Timber	6	7 (FM)	8 (SC)
Blue Ridge Lumber	6	7 (FM)	8 (SC)
Canfor	6	7 (FM)	8 (SC)
Hinton Wood Products	12	8 (SC)	9 (FM)
	10	7 (FM)	8 (SC)
Millar Western	6	7 (FM)	8 (SC)
Spray Lakes	6	7 (FM)	8 (SC)
Sundance	6	7 (FM)	8 (SC)
Sundre	14	8 (SC)	9 (FM)
Weyerhaeuser D.V.	6	7 (FM)	8 (SC)
Weyerhaeuser Edson	6	7 (FM)	8 (SC)
Weyerhaeuser G.P.	2	8 (SC)	9 (FM)
	16	7 (FM)	8 (SC)

FM = full measurement, SC = status check

4.3. Comparison of Pre-harvest and Post-harvest Stand Development

4.3.1. Justification and Purpose

The FGYA has completed a comparison of pre-harvest and post-harvest site indices. In 2004 results were presented at a major international forestry conference and published in the conference proceedings.³ The specific purpose of the comparison was to provide credible and reliable forecasts of post-harvest site index, for the main site types of interest to members, relative to pre-harvest values. The study demonstrated that regeneration practices following harvesting are capable of increasing site index and fibre production relative to that of fire-origin stands, most likely because of differences in initial stand densities relative to those of fire-origin stands. However, these shifts are not without associated risks and residual uncertainties. Priorities were identified for enhancing productivity, managing risks, and reducing uncertainties. Although the original objectives of the project have been met, the FGYA will undertake or encourage further work to:

1. Validate the initial results;
2. Confirm the role of stand density management in the observed differences;
3. Explore the implications to yield forecasting of post-harvest stands having different stocking-density relationships to fire-origin stands;
4. Integrate knowledge from the disciplines of genetics, silviculture and forest health into the prediction of yield following harvesting.

³ CIF/SAF Joint 2004 annual general meeting and convention., October 2-6, Edmonton, Alberta, Canada

4.3.2. *Methodology*

1. *Validation.* ASRD will collaborate with the FGYA in comparing site index changes observed in the FGYA study with trends observed in other datasets, and computed with later improved site index models.
2. *Effect of stand density.* Stand height development at different densities in CFS spacing trials will be compared with the observed shifts in site index between fire-origin and managed stands to assess whether the latter shifts can be explained in terms of managed densities.
3. *Stocking-density relationships and spatial effects.* Initial densities in post-harvest stands may not need to be as high as indicated by models based on fire-origin stands if regeneration is better distributed over the site as a result of reforestation treatments. The GYPSY program of ASRD is making excellent progress in modeling these effects. The FGYA will therefore not duplicate this effort, but will monitor closely and assist where possible.
4. *Integration of interdisciplinary knowledge.* The FGYA and FtMF, in conjunction with the Alberta Forest Genetic Resources Council (AFGRC) hosted a conference on post-harvest stand development in January 2006. The FGYA will continue to cooperate with the AFGRC and other participants in following through on recommendations developed by the conference.

4.3.3. *Deliverables*

1. A scientific paper covering item 1 above was begun under the direction of the ASRD Senior Biometrician, who invited the FGYA Research and Development Associate to participate as a co-author. This work is delayed pending the development of new Site Index Models.
2. Work covering item 2 will be scheduled and reported under Project 4 (see 4.4. below)
3. Results from items 1,2 and 3 will be incorporated into the models and yield forecasts developed under the *Lodgepole Pine Regeneration* and *Enhanced Management of Lodgepole Pine* projects.
4. Collaborative efforts continue through the 3 Dialogue initiatives arising from the 2006 Stand Density Management Conference.

4.4. Cooperative Management of Historic Research Trials

4.4.1. *Justification and Purpose*

In August 2001, representatives of the FGYA, 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. In 2002 the Director General of the Northern Forestry Centre, the Executive Director of the ASRD Forest Management Branch, and the Chairman of the FGYA, signed a Letter of Agreement facilitating the collaborative arrangements necessary to provide forest managers in Alberta with the full and continued benefit of relevant long-term field trials established to assess the responses of lodgepole pine to nutrition and density management. The initial term of the agreement was from July 1, 2002 – June 30, 2007. Renewal was proposed for a further five years in 2007, however responsibility had passed from the CFS to the Canadian Fibre Centre and its representatives requested changes to reflect their interests in the trials. An interim Agreement was signed that expired April 30, 2008. Negotiations on a new five-year Agreement have resulted in a draft Agreement that will be signed in 2008.

4.4.2. Methodology

The Project involves 3 main tasks:

1. Maintenance and protection of the field installations;
2. Analysis of historic data and synthesis of results;
3. Ongoing measurement.

This is a cooperative effort shared between the FGYA, CFS and ASRD. Details of proposed objectives, data sharing arrangements, activities, level of effort, and contributions are contained in the Letter of Agreement⁴. The FGYA's main role is re-measurement and maintenance of the trials on a prioritized schedule agreed by the 3 parties. Methods, schedules and sponsorship for this component of the project are specified in the approved FRIAA proposal: *Measurement and Maintenance of Historic Research Trials* (April 2003, FRIAA Project # FOOMOD-01-02). The original agreement approved by FRIAA specified FRIP payments for the first year (2003), but provided for multi-year extensions upon receipt and approval of amended work plans, budgets, reporting and payment schedules. The funding of measurements is subject to annual review of priorities by all 3 parties (FGYA, ASRD and the CFS), approval each year by the FGYA Steering Committee, and acceptance by FRIAA.

Table 4 shows a measurement schedule for the 5-year period 2008 – 2012. The trials indicated for measurement from 2008 onwards have been scheduled based on a priority assessment of plots, and discussion surrounding the renewal of the Letter of Agreement (FGYA, CFS, SRD). Table 4a shows FGYA measurements on the plots during the period 2003-2007.

Table 4. Re-measurement Schedule for Historic Research Trials

Trial	2008	2009	2010	2011	2012
MacKay thinning 1954	x				
Swan Lake thinning 1977	x				
Teepee Pole Creek spacing (flat, north) sites 1967	defer				
Gregg spacing 1963				x	
McCardle fertilization& thinning 1984		x		x	
Kananaskis heavy thinning (K-57) 1941				x (low)	
Gregg spacing 1984 medium site		x			
Gregg Spacing 1984 low/high sites		x (low)			
Clearwater fertilization & thinning 1968			x		
Ricinus fertilization after thinning 1975			none		
Strachan thinning			x (low)		
Teepee Pole Creek strip thinning	defer				
Kananaskis European thinning (K-3) 1938					x
Kananaskis economic thinning (K-58) 1950					x
Edson fertilization and thinning (Takyi)					
AB SRD Trial		x ⁵			

⁴ The LoA was renewed on a one-year basis in 2007 and a new LoA is proposed for 2008-12 but not yet signed (April 2008).

⁵ The Takyi Trial remeasurements are SRD responsibility

Table 4a. Re-measurements during first Letter of Agreement 2003-07

Trial	2002	2003	2004	2005	2006	2007
MacKay thinning 1954		x				
Swan Lake thinning 1977		x				
Teepee Pole Creek spacing 1967		x				
Gregg spacing 1963					x	
McCardle fertilization&thinning 1984			x			
Kananaskis heavy thinning (K-57) 1941					x	
Gregg spacing 1984			x			
Clearwater fertilization & thinning				x		
Ricinus fertilization after thinning				x		
Strachan thinning				x		
Teepee Pole Creek strip thinning	defer					
Kananaskis European thinning (K-3) 1938						x
Kananaskis economic thinning (K-58) 1950						x

4.4.3. Deliverables

Deliverables originally scheduled for the period April 1, 2002 – March 31, 2008 are listed in Table 5.

Analysis of measurements completed in 2006 for the Gregg spacing trials has been conducted to compare effects of controlled density on stand development with differences previously reported between post-harvest and fire-origin stands. The intent is to obtain and report an improved understanding of the cause and implications of developmental differences between stands of harvest versus fire origin. Results will be reported to the membership, and a paper will be prepared by the Research and Development Associate and the Field Coordinator in cooperation with the CFS if results merit publication.

A project originally begun by the CFS will be completed by the FGYA in 2008/09. In 2007, Gregg River and MacKay trials were reviewed against to growth & yield models used in Alberta (MGM and GYPSY) in two reports submitted by contract analyst Andria Dawson. Further work is needed to evaluate the Gregg River and MacKay data against TASS and the new version of GYPSY originally expected in March 2008 but now delayed.

Table 5. Delivery Schedule for Cooperative Management of Historic Research Trials

Activity	Deliverable	Dates
Maintenance and protection of trials (shared responsibility)	All trials marked and signed; Registration updated; Descriptions posted on internet; regional managers briefed; Prompt response to inquiries and trespass	Ongoing
Analysis and publication of results (CFS)	4 publishable synthesis papers including management interpretations	Originally scheduled 2007/08, completion date uncertain
	Compendium information report describing all trials and results	Published 2006
Analysis and Publication of Results (FGYA)	Analysis and reporting of Gregg and MacKay trials against MGM and GYPSY	March 31, 2008
	Analysis and reporting of Gregg and MacKay trials against latest available versions of GYPSY and TASS	December 31, 2008
Ongoing measurements (FGYA)	Compiled data from scheduled measurements	See table 4.

4.5. Regional Yield Estimators

4.5.1 Justification and Purpose

ASRD wished to produce generalized stock, stand volume, and yield tables for each natural region, differentiated by broad AVI (Alberta Vegetation Inventory) cover groupings, enabling the Department to report credibly on both the current state of provincial timber resources, and their rate of growth. The Executive Director of Timber Management requested the FGYA's support.⁶ The FGYA was interested in an improved basis for crop planning, evaluation of regeneration standards, sensitivity analysis, timber supply analysis and monitoring.

4.5.2 Methodology

The approach taken was to develop prototype compatible yield and growth estimation techniques for lodgepole pine cover types in a pilot study involving:

1. Assignment of ASRD analytical staff to the Project, with ASRD's Senior Biometrician, Shongming Huang, taking the lead role in conducting the analyses;
2. FGYA (Director and technical sub-committee) participation in project design, identification of suitable data sources, progress review, assessment of results and prototypes;
3. Provision of data through direct bilateral arrangements between FGYA member companies and LFD;
4. Analyses quantifying the relationships between mapped AVI (Alberta Vegetation Inventory) attributes, input variables for ASRD's GYPSY growth and yield projection system, and direct estimates of stand yield;
5. Development by ASRD of prototype applications for testing by FGYA members.

4.5.3 Deliverables

⁶ D. Sklar, Executive Director, Forest Management Branch, personal communication to H. Loughheed, January 23, 2002

The project is intended to provide, and has provided:

- Prototype stratum-based stock and stand table estimators for lodgepole pine ecosystems, compatible with stratification, and with forward and retrospective projection capability.
- Associated estimates of the precision of forecasts and the variability within strata.
- A report describing the estimation system and including technical recommendations for application of the system.

An *Interim Report on the Development of Yield Estimators for Pure Lodgepole Pine Stands in Alberta* was prepared by Yuqing Yang and Shongming Huang of the Forest Management Branch, ASRD, and edited and amended with input from the FGYA Director. It was circulated to members and included suggestions for further analysis and testing. The document will be published as is on the FGYA website as a technical information report. No further work is envisioned under the auspices of the FGYA (SRD will solicit support directly from FMA holders in the event it undertakes further work and requires further inputs).

4.6. Enhanced Management of Lodgepole Pine

4.6.1. Justification and Purpose

The project “*Enhanced Management of Lodgepole Pine*” ((FRIAA # OF-02-16) commenced in 2004 and runs until March 31, 2009. It is focused on filling information gaps in nutrition and density management of both fire-origin and post-harvest stands. It is complementary to the 5 projects already initiated by the FGYA to improve the assessment of lodgepole pine growth and yield in managed stands, and other work being conducted in Alberta and B.C.

The project objectives are to:

1. Develop techniques and yield tables to predict the growth response of stands to density and nutrition management practices with potential for enhancing timber volume, economic value, and / or forest health.
2. Produce stand assessment guidelines and interpretative criteria for selecting nutrition and density management treatments.
3. Establish a network of sample plots for demonstrating and monitoring actual versus predicted growth responses.
4. Assess impacts of enhanced forest management practices on stand composition, structure, biodiversity, susceptibility to fire and insect damage, and wood quality.

The Project is divided into 2 sub-projects aimed at addressing the main information gaps limiting achievement of the objectives. The 2 sub-projects are: (1) lodgepole pine nutrition and (2) pine-aspen density management. Separate experimental designs have been developed for each sub-project, and are described in detail elsewhere.⁷

4.6.2. Methodology for Sub-project 1: Lodgepole Pine Nutrition

This study will focus on providing members the ability to determine:

1. Which stands on their forest management areas are most likely to respond best to fertilization;
2. What yield increases can be expected from the stands most likely to respond.

⁷ Project OF-02-16 Annual Report (2004), Work Plan (2005-2008), and Detailed Project Design

The sub-project involves sub-sampling and selective treatment of 30 stands reconnoitered in 2004, of which 15 are young (10 – 30 years of age) post-harvest, and 15 mid-late (30-80 years) fire-origin. Baseline assessments were completed in May 2005.

Fixed-area treatment plots were established in the Fall and winter of 2005 in 15 stands across a selected range of stand conditions (16 stands were budgeted but one delayed). Treatments include thinning to 2500 stems per ha (in 8 post-harvest stands only) and fertilization (300 kg per ha N plus blend) plus controls (scheduled for May 2006). Tree, stand and foliar variables were measured prior and after treatment, and will be measured at 3, 6, and 9 years following treatment. (Only measurements up to year 3 were included in the funding request.) In February 2006 the Steering Committee approved additional funding to extend the above experimental treatments to a total of 30 sites. The additional sites were established, and all fertilization treatments applied, by the end of May 2006. First-year post-fertilization foliar analyses were conducted in the winter of 2006-7.

4.6.3. *Methodology for Sub-project 2: Pine-aspen Density Management*

The study will assess, on pine sites subject to hardwood competition, what density management alternatives are expected to provide the best total and coniferous timber productivity.

The sub-project involves selection of 18 post-harvest pine-aspen stands between 10 and 40 years of age, partitioning the stands into areas of high, medium and low aspen density, and measuring 6 plots in each stand. Plots will be tree-mapped and measured in detail. A sub-sample of 3 plots in each of 9 of the stands will be destructively sampled to obtain retroactive data on height and diameter increment for both pine and aspen. The remaining plots will be maintained for re-measurement. The analysis will involve assessment of competition indices and responses useful for developing or validating whole-stand, individual-tree, and/or distance-dependent growth models. The resulting models will be used to provide the required forecasts within the project term, while the maintained plots will allow for longer-term monitoring of actual versus forecast growth and yield.

4.6.4. *Deliverables*

Table 6 shows the schedule of activities and deliverables by fiscal year (April 1 – March 31) from 2006 onwards. Activities are shown as “done” if completed, or as “x” if scheduled for 2008.

Results of the Project will be reported as follows:

- Detailed technical reports will be submitted to FRIAA and the FGYA membership at the end of the second and fifth years, including details of trial establishment (done), techniques applied, responses measured, responses forecast, predictive models developed, and conclusions regarding factors influencing responses.
- At least one scientific paper will be prepared for peer review and publication in a recognized scientific journal.
- At least 2 information reports, one including managed stand yield tables, and one including stand assessment guidelines and interpretative criteria for thinning and fertilization, will be prepared and published.

Table 6. Delivery Schedule for *Enhanced Management of Lodgepole Pine Project*

Activity	2006	2007	2008
<i>Sub-project 1: lodgepole pine nutrition</i>			
Installation and pre-treatment measurement	done		
Thinning, fertilization and post-treatment measurements	done		
1-year post-fertilization foliage analysis	done		
3-year growth response measurements			x
3-year post-fertilization foliage analysis			x
Analysis		x	x
<i>Sub-project 2: pine-aspen density management</i>			
Stand selection	done		
Field sampling		done	
Analysis			x
<i>Analysis, synthesis of results and reporting</i>			
Scientific paper (pine-aspen results)			x
Information reports (2) (EMLP1 and 2 Est. Reports)		done	
Information report (EMLP1 3rd Year Foliar Response)			x

4.7. Regeneration Management in a Mountain Pine Beetle Environment

4.7.1. Justification and Purpose

The project *Regeneration Management in a Mountain Pine Beetle Environment* (FRIAA Open Funds Project # OF-07-P019) began in late 2007. The objective of this project is to provide tools for assessing treatment options (e.g. salvage, partial-cutting, site preparation, re-planting, fertilization, density management) and their growth and yield implications, for pure and mixed-species lodgepole pine stands attacked by mountain pine beetle.

The development of the project is predicated on the expectations that:

- High levels of infestation and mortality in member's forest management areas are probable and imminent;
- Knowledge of regenerated stand dynamics and growth performance will be critical to mitigation / amelioration;
- Regeneration and stand development pathways and options will be more complex than those so far studied by the FGYA;
- Maintenance of forest values and a viable forest enterprise may be enhanced by appropriately selected, and in some cases intensified, silvicultural practices;
- Urgency and the required scope of data capture and analysis in threatened stands and research installations are increased;
- Members will urgently need expert system / decision-support tools incorporating disparate information and knowledge;
- The FGYA is positioned to significantly contribute.

4.7.2. *Methodology*

Stage 1:

- Assess experience, research and data from B.C. and the U.S.A, and from stands in southern Alberta regenerated after earlier MPB infestations;
- Identify and profile susceptible stand types most important to member's timber supplies.

Stage 2:

- Assemble and develop relevant data and growth and yield models (e.g. for mixed species, short rotation, variable density, nutrition options) for projecting post-attack development of the most important stand types;
- Consolidate these into an expert system / decision-support tools, linked to landscape, timber-supply, regeneration and cost factors, that can be used to forecast the results and effectiveness of treatment options.

If / when and where major attacks occur, the project may involve a third phase to:

- Assess susceptibility factors and post-attack stand conditions;
- Monitor actual versus forecast outcomes.

4.7.3. *Deliverables*

Deliverables identified in the 2007 Business Plan and completed during 2007 include:

- A report of the BC and US experience and research (based in part on tour of areas subjected to attack in BC)⁸;
- A research proposal describing detailed project design⁹;
- Procurement of project funding (FRI and FRIAA Open Funds)

Funding is confirmed for this Project from the FRI, FGYA and FRIAA Open Funds (Project # OF-07-P019 Approved January 2008). Deliverables in 2008 are:

1. Elements with Model Forest funding:
 - Baseline assessment – compilation of existing and supplementary data; dendrochronological sampling (Reports March 31, 2008 and 2009);
 - Projections: Simulations with Alberta and BC models, other vegetation analysis.
2. Elements with FRIAA funding:
 - Baseline Assessment – supplementary field measurements;
 - Monitoring – plot status checks (Status Reports March 31, 2008 and 2009);
 - Synthesis – preliminary report providing an initial synthesis of information to be used in the Decision Support Tool development (March 31, 2009).

FGYA Funding supports technical input by the Research and Development Associate as well as management activities by the Director, under Project 1 of the Work Plan. FRI funding includes the time of the MPBEP Program head in managing the business and logistical aspects of the project.

⁸ Dempster, W.R. 2007. Tour of Mountain Pine Beetle Affected Areas in the Prince George Forest District, July 11 and 12, 2007: Draft Report and Recommendations. 20pp + Appendix.

⁹ Udell, R.W. and W.R. Dempster. 2007. Monitoring and Decision Support for Forest Management in a Mountain Pine Beetle Environment: Proposal. October 9, 2007. FRIAA-07-08 Provincial Projects Initiative. 24pp.

5. Finance

5.1. Development and Management of the Association

The development and management of the Association, including direction, field coordination and research and development tasks will be funded centrally and supported through a membership fee approved each year by the Steering Committee. FRIP funding for membership fees was approved by FRIAA for the periods April 1, 2000 to March 31, 2005 (FRIAA Project FOOMOD-01-01) and April 1, 2005 to March 31, 2010 (Project FOOMOD-01-03).

Table 7 shows financial projections for 5 years from April 1, 2008. In the projection the annual membership fee (approved at \$15,000 per member for 2007 and 2008) has been incremented in 2009 and 2010 in order to maintain a positive balance forward.

Table 7 does not include the following contributions by members and collaborating agencies:

- FRI administrative and financial services;
- Participation on technical, steering and project committees;
- Attendance of meetings;
- Review of minutes, reports, proposals, experimental designs and scientific papers;
- Identification of candidate sampling and experimental sites;
- Contribution of existing information and data;
- Provision and support of existing models;
- Protection of research installations;
- Analysis and interpretation of data.

5.2. Lodgepole Pine Regeneration

Costs of fieldwork will be incurred directly by each member for those installations (clusters of experimental plots) located on their forest management area. Work is administered directly by the member, with the FGYA playing a coordination and quality control role. FRIP funding for continuation of the Project was approved by FRIAA for the period April 1, 2005 to March 31, 2010 (FRIAA Project FOOMOD-01-03).

Members wishing to use FRIP funds to cover their inputs will submit to FRIAA:

- A supplementary proposal summary application referencing the umbrella proposal;
- A proposed payment schedule;
- Annual financial and work verification reports.

Estimated measurement costs shown in Table 8 for Project 2 are approximate expectations based on the work schedule shown in Table 3, and should be regarded as only indicative orders-of-magnitude of the actual costs to be incurred by members. Assumed measurement costs per installation (cluster of 4 plots) are assumed at \$3000 and \$600 for full measurements and status checks respectively. Costs for continued tending are not specifically included, but may be covered by the assumed contingency allowance.

Table 7. Financial Projections for Project 1 - Development and Management of the Association

Income / Expenditure	2007-8 (forecast)	2007-8 (Yr End)	2008-9	2009-10	2010-11	2011-12
Membership fee (per voting member)	15,000	15,000	15,000 ¹⁰	18,500	21,000	21,000
Income						
Prior year balance forward	156,392	156,392	114,450	46,650	17,850	11,550
Membership fees - FRIP (FRIAA contract)	120,000	120,000	97,500	129,500	147,000	147,000
Membership fees - non-FRIP	15,000	15,000	30,000	37,000	42,000	42,000
Total income	291,392	291,392	241,950	213,150	206,850	200,550
Expenditures						
Director and Field Coordinator	66,500	79,134	66,500	66,500	66,500	66,500
Field Coordinator	24,697	incl	20,000	20,000	20,000	20,000
Research and Development Associate	85,560	86,278	75,000	75,000	75,000	75,000
GIS and misc. services	0	563	15,000	15,000	15,000	15,000
Office and field supplies	1,197	2,179	2,500	2,500	2,500	2,500
Meetings and tours	7,665	8,788	7,000	7,000	7,000	7,000
Contingency (5%)	0		9,300	9,300	9,300	9,300
Total expenses	185,619	179,943	195,300	195,300	195,300	195,300
Ending Balance	105,773	114,449	46,650	17,850	11,550	5,250

Table 8. Estimate of Remaining Costs to be Incurred by Members for the *Lodgepole Pine Regeneration Project*

Cost item	2008	2009	Total
Status checks	16,800	44,400	61,200
Full measurements	222,000	84,000	306,000
Total measurements	238,800	128,400	367,200
Contingency	17,250	17,250	34,500
Total	256,050	145,650	401,700

¹⁰ Sundre Forest Products' membership fee will be \$7500 for 2008-9 in recognition of Bob Held's contribution in maintaining and updating the Regenerated Lodgepole Pine Trial database.

5.3. Comparison of Pre-harvest and Post-harvest Stand Development

Costs for this project are expected to be confined to the time inputs of the Research and Development Associate, and these are covered under Project 1.

5.4. Cooperative Management of Historic Research Trials

Table 9 shows estimated costs for the next 3 years, following the re-measurement schedule indicated in Table 4.

Costs incurred by the FGYA in implementing the project will continue to be allocated among voting members as per Section 3.4 and Table 1 of this plan. The original agreement approved by FRIAA: *Measurement and Maintenance of Historic Research Trials* (April 2003, FRIAA Project # FOOMOD-01-02) specified FRIP payments for the first year (2003), but provided for multi-year extensions upon receipt and approval of amended work plans, budgets, reporting and payment schedules. The funding of measurements is subject to annual review of priorities by all 3 parties (FGYA, ASRD and the CFS), approval each year by the FGYA Steering Committee, and acceptance by FRIAA.

The Association has signed a renewed Letter of Agreement between the Association, the Canadian Forest Service and Alberta Sustainable Resource Development for the period 2008-2013.

Table 9. Cost Schedule for FGYA Contribution to Cooperative Management of Historic Research Trials Project¹¹

Trial	Man-days	2007	2008	2009	2010	Total
Income						
Balance Forward		6,989	12,131	668		
Member Contribution		1,853	10,000	10,816	6,815	
FRIAA		19,158	20,537	22,516	14,185	
Total Income		28,000	42,668	34,000	21,000	125,668
Expense						
McCardle fertilization & thinning	36			18,000		18,000
MacKay thinning (A34)	56		20,000			20,000
Swan Lake thinning	8		5,000			5,000
Gregg spacing 1984 (NOR-4-02) (M)	11			6,000		6,000
Kananaskis European thinning (K-3)	18	9,000				9,000
Kananaskis economic thinning (K-58)	4	4,037				3,037
Clearwater fertilization & thinning 1968	22				11,000	11,000
Evaluation of G&Y Models against HRT measurements (New, Aug 2007)		2,832	3,500			7,000
Gregg Trial analysis (March 2008)			3,500			3,500
Contingency, signage and maintenance		15,869	10,000	10,000	10,000	40,000
Total Annual Expense		15,869	42,000	34,000	21,000	112,869
Ending Balance		12,131	668			
Annual Expenses plus Ending Balances		28,000	42,668	34,000	21,000	125,668

¹¹ Revised August, 2007

5.5. Regional Yield Estimators

Cost incurred in the provision of sample plot data (FGYA members) and analyses of data (ASRD) are not included in the FGYA budget. No direct revenues or expenditures are currently scheduled for this project.

5.6. Enhanced Management of Lodgepole Pine

The project (FRIAA # OF-02-16) will be supported with FRIP funding to a maximum of \$442,800, provided under FRIAA's *Open Funds* initiative. This amount was augmented by \$108,810 of supplementary funding in 2006, to increase the total budget to \$551,610. Table 10 shows costs by year. Note that this schedule applies to the whole project term, which is from April 1, 2004 to June 30, 2009. Actual amounts expended are shown for 2004, 2005, 2006 and 2007 and projected expenditures are shown for 2008.

FGYA costs for analysis from 2007 onwards (primarily time inputs by the Research and Development Associate) will be covered under Project 1. The Associate will work with scientists from the University of Alberta, whose costs will be absorbed by the University. The remaining funds for the 2008 program may be low, and will have to be reviewed after proposals are received. At this point the project may have to be curtailed or other funds found.

Table 10. Cost Schedule for *Enhanced Management of Lodgepole Pine Project*

Item	2004 (actual)	2005 (actual)	2006 (actual)	2007 (actual)	2008 (planned)	2009 (planned)	Total (funded)
Income							
Balance Forward		65,269	45,586	34,586	3,043		
FRIAA	126,200	126,900	202,110	6,300	39,024	5,010	505,544
Other funds			6,066				6,066
Transfer from project 1			40,000				40,000
Total Income	126,200	192,169	293,762	40,886	42,067	5,010	551,610
Expense							
Sub-project 1 (nutrition)	44,734	120,950	148,406	0	42,067	5,010	361,159
Sub-project 2 (pine-aspen)	0	21,354	108,497	37,843	0		167,694
Design and analysis	16,197	4,278	2,272	0	0		22,747
Total Expense	60,931	146,582	259,175	37,843	42,067	5,010	551,610¹²
Ending Balance	65,269	45,586	34,586	3,043	0	0	0

5.7. Regeneration Management in an MPB Environment

This project is supported by funding from the Foothills Research Institute's Mountain Pine Beetle Ecology Program, as well as FRIAA Open Funds (Project OF-07-PO19). An annual contribution by the FGYA to the project represents the time of the Research and Development Associate

¹² In the event 2008/09 remeasurements require the full budget, the projected cost overrun would be covered either by contingency funds or a request to FRIAA for additional funds.

providing scientific and technical direction to the project, as well as some time by the Director. These costs are already accounted for under Project 1 – Development and Management of the Association. Funding and deliverables are for the three – year initial phase of the project. Depending on the results of this research as well as the severity of the infestation, a further 2-year extension (phase 2) may be deemed important and further funding will be sought if such is the case. See tables below.

Table 11. Cost Schedule for *Regeneration Management in a Mountain Pine Beetle Environment* by phase, year, activity and funding source

(a) Phase 1						
Budget and Activity by Funding Source	Phase 1					
	2007	2007	2008	2009	2010	Total
Income	Planned	Actual	Planned	Planned	Planned	
Carry Forward	0		71,280	-,8520	-14,670	
FRIAA Open Funds	64,200	57,780	83,100	140,550	14,670	296,100
FGYA In-Kind	18,240	18,240	18,240	18,240		54,720
Foothills Research Institute MPBEP	25,500	25,500	108,800	35,000		169,300
Total Income	107,940	101,520	281,420	185,270	0	520,120
Expense						
Baseline assessment – FRI	13,500	0	73,300	10,000		83,300
Baseline assessment - FRIAA Open Funds	45,000	0	90,000	30,000		120,000
Projections – FRI	0	0	37,000	13,000		50,000
Monitoring - FRIAA Open Funds	19,200	0	38,400	106,700		145,100
Synthesis - FRIAA Open Funds	0	0	21,000	10,000		31,000
Technical input and management - FGYA	18,240	18,240	18,240	18,240		54,720
Administration – FRI	12,000	12,000	12,000	12,000		36,000
Sub-total - FRIAA Open Funds	64,200	0	149,400	146,700	0	296,100
Sub-total – FGYA (in-kind)	18,240	18,240	18,240	18,240		54,720
Sub-total – FRI	25,500	12,000	122,300	35,000		169,300
Grand Total All Sources	107,940	30,240	289,940	199,940	0	520,120
Difference +/-		71,280	-8,520	-14,670	0	0

(b) Phase 2			
Activity by Funding Source	Phase 2 (provisional)		
	2010	2011	Total
Projections – FRI	13,000	13,000	26,000
Monitoring - unidentified	69,200	66,700	135,900
Synthesis - unidentified	20,000	48,000	68,000
Technical input and management – FGYA (in-kind)	18,240	18,240	36,480
Administration - FMF	12,000	12,000	24,000
Sub-total – FGYA	18,240	18,240	36,480
Sub-total - Foothills Research Institute (FRI)	25,000	25,000	50,000
Sub-total - unidentified	89,200	114,700	203,900
Grand Total - all funding sources	114,200	139,700	253,900

6. Annual Work Plan (April 1, 2008 – March 31, 2009)

This work plan follows the general format specified for all FRI annual work plans by the FRI Board and Executive, but is cross-referenced to the main Business Plan to reduce duplication.

6.1. Objectives and Deliverables

The mission and mandate of the FGYA are described in Business Plan Section 2.

Objectives and deliverables for each FGYA project, all of which have multi-year terms, are detailed in Business Plan Section 4. The following is a list and description by project of deliverables for 2007.

6.1.1. Project 1 - Development and Management of the Association

Annually updated 5-year business plan and annual work plan, with budgets by year for each project (April 1 2008 for approved 2008 plan; February 2009 for draft 2009 plan);

Project proposals, plans, designs, reports and publications (see under individual technical projects);

Meetings, field tours and technical sessions:

Pre-season meeting of technical representatives and contractors (June 23);

Steering Committee and annual meeting (February 2009)

Active publicly-accessible web site (throughout year);

Mid-year (October) and annual (year-end) progress and financial reports;

Steering committee meeting minutes (March 31, 2009 latest).

(See also Business Plan Section 4.1.)

6.1.2. Project 2 - Lodgepole Pine Regeneration

In 2007/08 the Research and Development Associate completed the 5-year crop performance report and a preliminary regeneration establishment model. Further activities planned for 2008/09 include:

- Detailed fieldwork schedule (June 15 latest);
- Obtain expert advice on biotic mortality factors, possible management support system (June 30, 2008)
- Solicit development and testing of mathematical models by external institutions (June 30, 2008);
- Solicit interest in extension of model development to other species and ecosystems (June 30, 2008)
- Comparison of mortality and ingress with other studies (Sept 30, 2008);
- Scheduled status checks or full measurements (102 installations) – October 31, 2008;
- Updated digital database – December 31, 2008;
- Audit and work verification reports – January 31, 2009;
- Regeneration model improvements to include climate data – December 31, 2008.
- Extend regen performance model to 7 growing seasons (March 31, 2009)
- Revised trial measurement and treatment plan (February 28, 2009)

(See also Business Plan Section 4.2.)

6.1.3. Project 3 - Comparison of Pre-harvest and Post-harvest Stand Development

A scientific paper aimed at extending and validating the previous analysis was begun under the direction of the ASRD Senior Biometrician, with the FGYA Research and Development

Associate identified as a co-author (see Business Plan Section 4.3.3.1), but is delayed pending completion of new Site Index Models by ASRD. No other specific deliverables are confirmed for 2008. However, the FGYA will participate in the *Dialogues* initiative led by FRI Communications and Extension Program as an outcome of the *Post-harvest Stand Development Conference* held in 2006. Also, analysis is being done to further investigate pre- and post-harvest density effects under Project 4 (see below).

6.1.4. *Project 4 - Cooperative Management of Historic Research Trials*

A five-year Agreement with the CFS for the remeasurement and maintenance of these trials expired in 2007 and was renewed for one year pending discussion between the FGYA, Alberta Sustainable Resource Development and the Canadian Fibre Centre towards a new five-year Agreement. Pending completion of a new five-year Agreement the workplan will be implemented.

A system for evaluating priority remeasurement has been developed, and all trials rated accordingly. Fieldwork will continue on trials rated as “medium” priority, and some “low” priority trials may be remeasured if at risk from Mountain Pine Beetle mortality. Fieldwork will continue only if re-measurement of the trials is determined to be useful for the development of analytical products, and the inter-agency agreement is renewed (see Business Plan Section 4.4).

Subject to this renewal, re-measurements are tentatively scheduled for the following CFS trials:

- MacKay thinning 1954
- Swan Lake thinning 1977

A project originally begun by the CFS will be completed continued by the FGYA in 2008/09. In 2007, Gregg River and MacKay trials were reviewed against to growth & yield models used in Alberta (MGM and GYPSY) in two reports submitted by contract analyst Andria Dawson. Further work is needed to evaluate the Gregg River and MacKay data against TASS and the new version of GYPSY when it is completed, and extend the analysis to include the McCardle Creek, Takyi and TeePee Pole Creek Trials. (See Business Plan Section 4.4.1 and 4.4.3)

Analysis of measurements was completed in 2006/07 for the Gregg spacing trials to compare effects of controlled density on stand development with differences reported between post-harvest and fire-origin stands. (See Business Plan Sections 4.3.2.2 and 4.4.3.)

6.1.5. *Project 5 - Regional Yield Estimators*

No deliverables are currently scheduled for 2008.

6.1.6. *Project 6 - Enhanced Management of Lodgepole Pine*

Sub-project 1 remeasurements for 3rd-year growth and foliage analysis are planned for 2008 (post growing season). Finalization of the analysis and preparation of the scientific paper for Sub-project 2 will be done in 2008, along with preparation of technical and information reports. (See also Business Plan Section 4.6.4).

6.1.7. Project 7 – Regeneration Management in a Mountain Pine Beetle Environment

The intent of this project is to provide decision support tools that will assist FGYA members and others mitigate timber supply impacts of the mountain pine beetle in Alberta by using knowledge of growth and yield in the silvicultural treatment of threatened or attacked stands.

Funding is confirmed for this Project from the FRI, FGYA and FRIAA Open Funds (proposal submitted October, 2007). Subject to review and approval by the Technical and Steering Committees, activities and deliverables in 2008 are:

a. Elements with Model Forest funding:

- Pre-compilation of existing data and selection of candidate plots (by April 30, 2008);
- Assessment of supplementary data requirements (April, 2008);
- Dendrochronological measurements (May – October);
- Dendrochronological analyses and report (by March 31, 2009);
- Stand projections with existing models (November 2008 – January 2009).

b. Elements with FRIAA funding:

- Baseline supplementary field measurements (May - October, 2008);
- Field checks for plot infestation status (August - October 2008);
- Compilation of existing and new data - PSP database development (October, November 2008);
- Decision support tool development (ongoing);
- Status report on preliminary assessment of decision-support tools (by March 31, 2009);
- Update report on monitoring (by March 31, 2009);
- Technical report on compiled data and projections (by March 31, 2009).

FGYA Funding supports technical input by the Research and Development Associate as well as management activities by the Director. (See Business Plan Section 4.7.)

6.2. Extension and Communication

The FGYA Business Plan addresses the following aspects of extension and communication:

- Information exchange meetings, field tours and technical sessions;
- Maintenance of an active publicly-accessible web site;
- Technical reports, publications and bulletins;
- Collaboration with external institutions;
- Dissemination of information and sharing of data.

A Communications and Extension Strategy was prepared in August 2007 that includes the following activities for 2008:

- Technical Session providing an update of FGYA results to date (in conjunction with the 2008 AGM);
- Website updates;
- Technical information reports for Projects 6 and 7
- Two *Quicknotes* providing non-technical summaries of project results and / or program activities

6.3. Inter-program Links

The following activities or projects will be undertaken in collaboration with other FRI and external programs:

- **Database management:** The FRI Data, Information and Knowledge Management Program is responsible for safe storage of the Association's data.
- **Website management:** The FGYA, as a FRI program, has a dedicated section of the FRI website, and relies on the FRI Communications and Extension Program for management of the website.
- **Inter-agency dialogues on post-harvest stand development:** the FGYA Steering Committee Chairman represents the Association on this initiative.
- **Climate change:** The FGYA maintains an interest in the proposed FRI Climate Change sub-program and has expressed particular interest in the following areas:
 - Relationship of regeneration success to variation in local climate, and application of results to predicting impact of future climate change (see Section 5.2);
 - Separation of climatic and other factors that have led to local and hemispherical changes in tree and stand growth rates (see Section 5.4);
 - Improved linkage of MPB risks to local climatic trends.
- **Historic research trials:** this project will continue to be conducted cooperatively through an inter-agency agreement with the Canadian Forest Service and Alberta Sustainable Resource Development.
- **Enhanced management of lodgepole pine:** the University of Alberta has participated in the design, and will participate on the analysis, of this project under a research collaboration agreement with the FGYA.

(See also Business Plan Section 3.5.)

6.4. Funding Sources

The following organizations are sponsoring members of the FGYA:

- Alberta Newsprint Company
- Blue Ridge Lumber
- Canadian Forest Products
- Millar Western Forest Products
- Spray Lake Sawmills
- Sundance Forest Products
- Sundre Forest Products
- Hinton Wood Products
- Weyerhaeuser Canada

All are companies or corporate divisions holding Forest Management Area tenures in the Foothills Natural Sub-regions of Alberta.

Each member contributes:

- An annual member fee of \$15,000¹³ (for the 2008/09 operating year);
- In kind services, including measurement, treatment and maintenance of the *Regenerated Lodgepole Pine (RLP) Trial* (Project 2);
- Funding to other projects, pro-rated by pine-leading managed area according to a formula specified in the Business Plan Section 3.4.

¹³ Sundre FP fees reduced to \$7500 in 2008 to reflect their contribution to the RLP database upgrade and maintainance.

Project 6, *Enhanced Management of Lodgepole Pine*, and Project 7 *Regeneration Management in a Mountain Pine Beetle Environment* are supported with FRIAA Open Funds.

Table 12 summarizes funding sources for 2008. Appendix 1 contains details and allocations of cash contributions from sponsoring members.

Table 12. Scheduled income for 2008

Project (Accounting Code)	Contributing Organization	Carry Forward	Cash Committed	Total Funding¹⁴	In-kind Support	Comments
Project 1 FGYA (235)	Members	114,450	127,500	241,950		Member fees
Project 2 - RLP	Members				256,050	Fieldwork
Project 4 - HRT (235.1)	Members	12,131	30,537	42,668		Historic research trials
Project 6 - EMLP (235.2)	FRIAA Open Funds OF-02- 16		51,572	51,572		Enhanced management of lodgepole pine
Project 7 – MPB	FRI and FRIAA Open Funds	77,700	212,240	289,940	18,240	
Total FGYA		204,281	421,849	626,130	274,290	

Details on the annual and projected income and expenditures for each of these projects may be found as follows:

Project 1 – Management of the Association -	Table 7
Project 2 – Regenerated Lodgepole Pine -	Table 8
Project 3 – Comparison of Pre- and Postharvest Stand Development -	No direct costs
Project 4 – Historic Research Trials -	Table 9
Project 5 – Regional Yield Estimators -	No Activity
Project 6 - Enhanced Management of Lodgepole Pine -	Table 10
Project 7 – Mountain Pine Beetle	Table 11

FGYA technical and analytical input by the Research and Development Associate to the various projects are covered under Project 1.

6.5. Program Key Members and Responsibilities

Roles and responsibilities for the FGYA program are described in Business Plan Section 3.3. Note that effective 2007 responsibilities for project management, field coordination, and analytical research and development have been re-allocated (see Sections 3.3.4 and 3.3.5).

Management staff and corporate representatives are identified with their contact information in Table 13.

¹⁴ Updated from 2007/08 Business and Work Plan rev Aug 2007

6.6. Environmental and Occupational Health and Safety Permits

With the exception of supervision, administration and data management tasks conducted directly by FRI staff, the FGYA program and projects are implemented by contractors. Contracts are administered by the FRI and stipulate statutory compliance of the contractor with the laws of Alberta, explicitly including the Occupational Health and Safety Act.

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

Table 13. Foothills Growth and Yield Association Representatives and Contacts (2008)

Role / Affiliation	First Name	Last Name	Telephone
<i>Chairman</i>	Dwight	Weeks	(780) 538-7745
<i>Management:</i>			
FRI General Manager	Tom	Archibald	(780) 865-8332
FGYA Director	Bob	Udell	(780) 865-4532
Research and Development Associate	Dick	Dempster	(780) 424-5980
Field Coordinator	Sharon	Meredith	(780) 865-4499
<i>Steering Committee:</i>			
ANC Timber	Daniel	Chicoine	(780) 778-7015
Alberta Sustainable Resource Development	Doug	Sklar	(780) 422-4590
Blue Ridge Lumber	Murray	Summers	(780) 648-6325
Canfor	Dwight	Weeks	(780) 538-7745
Foothills Research Institute Board	Murray	Summers	(780) 648-6325
Millar Western Forest Products	Tim	McCready	(780) 778-2221
Spray Lakes Sawmills	Ed	Kulcsar	(403) 932-2234
Sundance Forest Industries	John	Huey	(780) 723-3977
Sundre Forest Products	Bob	Held	(403) 638-4482
Hinton Wood Products	Richard	Briand	(780) 865 8181
Weyerhaeuser Canada	Greg	Behuniak	(780) 539-8207
<i>Technical Committee:</i>			
ANC Timber	Jason	Kennedy	(780) 778-7924
Alberta Sustainable Resource Development	Daryl	Price	(780) 422-0329
Blue Ridge Lumber	Colin	Scott	(780) 648-6200
Canfor	Melonie	Zaichkowsky	(780) 538-7720
Foothills Research Institute	Debbie	Mucha	(780) 865-8290
Millar Western Forest Products	Tim	McCready	(780) 778-2221
Spray Lakes Sawmills	Colin	Harvey	(403) 851-3389
Sundance Forest Industries	Pat	Golec	(780) 723-3977
Sundre Forest Products	Bob	Held	(403) 638-4482
Hinton Wood Products	Glenn	Buckmaster	(780) 490-2307
Weyerhaeuser Canada	Greg	Behuniak	(780) 539-8207

Appendix 1. Financial Allocations and Authorizations for the Period April 1, 2008 – March 31, 2009

Appendix 1.1. Project FOOMOD-01-03 – Foothills Growth and Yield Association Membership Fees

The 9 voting members are requested to provide the following authorization in writing to the Foothills Research Institute:

This is confirmation of our intent as a voting member of the Foothills Growth and Yield Association (“the Association”) to support the continued development and management of the Association by payment of an annual membership fee.

We agree that the membership fee for the period April 1, 2008 – March 31, 2009 be set at \$15,000 and made payable to the Foothills Research Institute who as Coordinating Agency for the Association will administer the project on our behalf.

- ☐ *We authorize FRIAA to transfer the above amount from FRIP funds to the Foothills Research Institute.¹⁵*
- ☐ *We will pay the amount directly, on receipt of an invoice from the Foothills Research Institute.¹⁶*

¹⁵ All voting members except Weyerhaeuser and Millar Western

¹⁶ Weyerhaeuser and Millar Western

Appendix 1.2. Project FOOMOD-01-02 – Measurement and Maintenance of Historic Research Trials

The following funds will be contributed subject to review and renewal of the July 2002 agreement between the Foothills Growth and Yield Association, Canadian Wood Fibre Centre, Foothills Research Institute and Alberta Sustainable Resource Development.

Company	Area (ha)	% of total	Computed allocation ¹⁷	Method of payment
Alberta Newsprint Company	106,870	5.22	1,594	FRIAA transfer
Blue Ridge Lumber	180,323	8.82	2,693	Other
Canfor	106,271	5.2	1,588	FRIAA transfer
Millar Western Forest Products	112,406	5.5	1,680	FRIAA transfer
Spray Lakes Sawmills	114,988	5.62	1,716	FRIAA transfer
Sundance Forest Industries	121,848	5.96	1,820	FRIAA transfer
Sundre Forest Products	293,655	14.36	4,385	FRIAA transfer
Hinton Wood Products	451,713	22.08	6,743	FRIAA transfer
Weyerhaeuser Canada	557,433	27.25	8,321	Other
Total	2,045,507	100	30,537	

¹⁷ Weyerhaeuser and Millar Western pay by direct billing, others by FRIAA allocation