



FIVE-YEAR BUSINESS PLAN AND 2015-2016 ANNUAL WORK PLAN

Forest Growth Organization of Western Canada

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Prepared by:
Sharon Meredith, MScF, RPF

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BACKGROUND

The Forest Growth Organization of Western Canada (FGrOW) will begin operating in April 2015 and is an amalgamation of four growth and yield associations: Alberta Forest Growth Organization (AFGO), Foothills Growth and Yield Association (FGYA), Mixedwood Management Association (MWMA) and the Western Boreal Growth and Yield Association (WESBOGY), with WESBOGY scheduled to join January 1, 2016. The intent of the amalgamation is to increase efficiencies and to attract more funding to growth and yield in Western Canada.

FGrOW is an association under the Foothills Research Institute (fRI), which acts as coordinating agency, providing accounting and administrative support.

Members of the four founding associations place a high value on continuation of existing projects and research, but also recognize the advantages of coordinating efforts to increase opportunities to attract funding and to raise the profile of growth and yield in western Canada.

This document contains both a business plan for FGrOW from its commencement of operations in April 1, 2015 to March 31, 2020 and a detailed work plan for the 2015-2016 business year.

MISSION

FGrOW will play a lead role in growth and yield research and related policy development in Western Canada. It will promote communications between members, within the forest industry, and with other industries interested in growth and yield. By working closely with the University of Alberta, it establishes the scientific credibility that allows it to act as the “one window” for growth and yield information in western Canada. FGrOW will actively pursue funding opportunities to initiate innovative priority research, with a long term goal of establishing a growth and yield research centre at the University of Alberta. It will work to develop capacity within the industry by delivering training and tech transfer to existing practitioners and by training new ones.

Success in achieving its mission will be measured by the following:

1. **Defensible data:** Availability of quality data collected to agreed-upon standards that can be used for growth model development and validation.
2. **Application of results:** Research is completed and knowledge transfer to members facilitates its implementation in forest management plans.
3. **Reduced costs:** Association results, products and strategic collaborations will lead to more efficient and robust yield estimation in support of forest management planning.
4. **Enabling informed policy decision making:** Scientifically defensible results are produced that support development and revision of forest management policy. It is anticipated that improved policies lead to common understanding of requirements which will allow for streamlined approval processes.

PROJECT PRIORITIES

Initially, FGrOW's highest priorities will be continuance of existing projects, which includes the work of the four founding associations, and three additional projects at the University of Alberta. These three projects were jointly identified at workshops in August 2013 and 2014 by members of the four associations and are supported by FRIAA open funds. An outcome of these workshops was a list of research priorities (Appendix 1) that will be used to select high priority projects when funding becomes available. FGrOW will also annually consult members on their current research priorities and update the priority list as needed.

Along with research priorities, FGrOW will pursue recommendations in AFGO's *Vision for Growth and Yield in Alberta* document, which was developed based on a workshop at the University of Alberta in April 2014. The two biggest challenges for growth and yield in Alberta, which also apply to the rest of Western Canada, were identified to be shortages of competent field and analytical staff, and availability of funding. FGrOW will look at avenues to address these challenges including researching new technology, training, coordination of data collection, and collaboration with the University of Alberta. The goal is to guide and facilitate research that will be beneficial to forest management which can be implemented in the near future. FGrOW will also support building on existing expertise and explore the establishment of an industrial NSERC Industrial Research Chair in growth and yield.

Based on successes, such as the Provincial Growth & Yield Initiative (PGYI), FGrOW will continue to facilitate cooperation in reviewing and providing recommendations for amendments to policy. It will recommend additions or changes to provincial policy based on sound science and economic efficiency. Workshops with growth and yield experts will determine priority areas to focus on and subcommittees will be struck as needed to address identified issues.

MANAGEMENT AND DECISION MAKING

PLENARY COMMITTEE

Decision making will be carried out by the membership as a whole through the Plenary Committee, which approves a business and work plan at each annual general meeting. The Plenary Committee is composed of one representative from each voting member. New projects or initiatives introduced in advance of completed work plans will be included in the work plan and will require approval by members. Where projects or initiatives are identified following approval of the work plan they will be tabled with the Plenary Committee for vote. As described below, the membership delegates certain authorities to the Executive Council and Management Team.

EXECUTIVE COUNCIL

The Executive Council will manage the ongoing affairs of FGrOW as directed by the membership. One of the primary functions of the Executive Council is to oversee the Management Team. The Executive

Council may coordinate broader discussions among the membership and others about the science of growth and yield in western Canada. The Executive Council may initiate ad-hoc committees as necessary.

The Executive Council Chair is also chair of the Plenary Committee. The Chair leads Executive Council meetings and records its decisions and key activities.

MANAGEMENT TEAM

The Management Team will consist of a Director and an Administrative Assistant who manage the day-to-day affairs of the organization. As the coordinating agency, fRI will provide accounting and administrative support. The team will operate under the direction of the Executive Council and strictly within the conditions laid out in the FGrOW MOU. The roles of the Director and Administrative Assistant are as follows:

Director:

- Complete annual reports, business plans and work plans
- Communications with members and stakeholders
- Represent the organization and act as an initial point of contact for external requests
- Have a high level knowledge of the timing and logistics of all projects
- Sit on the Executive Council and act as secretary
- Make decisions in delivering the projects, initiatives and any other activity identified in the business plan
- Provide support to projects as requested by Project Teams

Administrative Assistant:

- Maintain website and SharePoint site on an ongoing basis
- Support the Director in preparing annual reports, business plans and work plans
- Maintain the records of the organization
- Organize meeting and tours
- Take minutes at AGMs and plenary meetings
- Provide support to projects as requested by Project Teams

FINANCIAL MANAGEMENT

The management of finances is primarily carried out by the Management Team, with the Director carrying ultimate responsibility for managing revenues and expenses, and reporting variances to the Executive Council. Projects are expected to have a project plan and budget, either included or referred to, in the business plan that is approved by members and implemented by the Management Team. In the case of projects or programs managed at the University of Alberta, finances other than dues can

either be provided directly to the University or channelled through FGrOW to the project. New accounts will be established at fRI for each project or initiative to manage its revenues (grants, contributions etc.).

PROJECT TEAMS AND COMMITTEES

Project Teams and committees will be established to carry out specific tasks or to oversee specific projects and initiatives. The following teams/committees will be required:

- **Project Teams:** Ongoing Project Teams will be established to manage one or multiple projects of a similar nature that involve the delivery of work being funded or overseen by industry members. Initially, Project Teams are the programs of the four founding associations (i.e. AFGO, FGYA, MWMA, and WESBOGY). Additional Project Teams will be established as needed when additional projects or initiatives are added.
- **Ad-Hoc Committees:** Ad-hoc committees may be established for reviewing and recommending new projects or to solve emerging growth and yield issues.

COLLABORATION AND PARTNERSHIPS

The University of Alberta is a key partner in the delivery of FGrOW's program. In addition to housing the WESBOGY Project Team, it plays a key role in growth and yield research and training of new growth and yield practitioners. FGrOW will work with the university in three main areas:

- **Training.** Work with the university to ensure that students are receiving the practical education needed to fully understand the collection and analysis of tree and forest measurements.
- **Continuing education and extension.** Ongoing training and updating of practitioners regarding best practices and the use of growth and yield tools. FGrOW will work with the University to ensure timely and applicable transfer of knowledge to practitioners.
- **Research.** Engage in a dialogue with the U of A to ensure that their research program addresses industry needs while building capacity and experience. Part of this is to solicit industry funding for an NSERC Industrial Research Chair in growth in yield at the University. A first step has been the development of a proposal to build industry support for a chair position in growth and yield that includes both traditional quantitative work (measurements, data analysis, model development) and support for improving application of remote sensing and other new technologies to forest inventory and growth and yield.

FGrOW will also look to the rest of Canada for partnership and collaboration opportunities. Expertise in growth and yield exists in other parts of the country, notably British Columbia, New Brunswick, Ontario, and Quebec. FGrOW's long-term goal is to benchmark these programs, building on their experiences and identifying potential partners.

COMMUNICATIONS PLAN

FGrOW is focusing on communication with its members, which it does in four main ways:

1. Producing reports and summaries of findings from research and other projects.
2. Maintaining a website which makes reports and plans available to members and other interested parties.
3. Hosting an Annual General Meeting to report on results, discuss priorities and approve work plans.
4. Holding workshops or field tours to enable tech transfer.

ADMINISTRATION AND MANAGEMENT

One of the intents of forming FGrOW was to increase efficiencies in administration. Much of the administrative work that used to be part the original associations will now be performed by FGrOW for all members, and the amount of time spent on administering and managing the association will be tracked independent of project work. Administration and management includes reporting, website maintenance, communications and extension work conducted by the Director and Administrative Assistant that is not directly tied to any of the other projects. Funds to support administration and management come primarily from FGrOW membership dues (Table 2).

Estimated costs for administration and management of FGrOW are detailed in Table 1. The estimated costs exceed the income through membership dues by \$10,875 (Table 2). Appendix 2 provides details of membership dues payable in 2015-2016.

In 2015-2016, to make up the remainder required, the Foothills Pine, Mixedwood, and Policy and Practice Project Teams will each contribute an amount proportionate to their revenue. How to fund the shortfall for 2016-2017 and onward will have to be determined as part of the planning process for that fiscal year and approved by members.

Table 1. FGrOW administration expense summary.

Expense	2015-16	2016-17	2017-18	2018-19	2019-20	Total 2015-20
fRI Admin fees	3,600	3,600	3,600	3,600	3,600	18,000
Computer network	2,500	2,500	2,500	2,500	2,500	12,500
Director	10,000	10,000	10,000	10,000	10,000	50,000
Administrative Assistant	5,400	5,400	5,400	5,400	5,400	27,000
Meetings and tours	1,500	1,500	1,500	1,500	1,500	7,500
Supplies	500	500	500	500	500	2,500
Total	23,500	23,500	23,500	23,500	23,500	117,500

Table 2. FGrOW administrative funds income summary.

Income	2015-16	2016-17	2017-18	2018-19	2019-20	Total 2015-20
Membership dues	12,625	14,500	14,500	14,500	14,500	70,625
Foothills Pine Project Team	4,870	9,000	9,000	9,000	9,000	46,875
Mixedwood Project Team	4,205					
Policy & Practice Project Team	1,800					
WESBOGY Project Team	0					
Total	23,500	23,500	23,500	23,500	23,500	117,500

FGrOW will provide the following deliverables to its members:

- Annually updated business and work plans
- Annual report
- Mid-year report
- Annual General Meeting
- Annual Business Meeting
- An up to date public website
- A SharePoint site where members can access reports and information
- One technical session or workshop

PROGRAM

The FGrOW Program is carried out by its four Project Teams: Foothills Pine, Mixedwood, Policy and Practice and WESGOY. The Project Teams are responsible for developing a work plan, timeline and budget for each of their projects. Project Teams will decide how best to carry out their project(s) and the extent to which the Director and Administrative Assistant will be involved either in project management or technical work. The use of the Director and Administrative Assistant for project-specific support is to be funded via the project-specific funding.

An overview of each of the Project Teams and their key projects is given below.

FOOTHILLS PINE PROJECT TEAM

The Foothills Pine Project Team (FPPT) continues the work of the Foothills Growth and Yield Association (FGYA), which formed in 2000 to co-operatively forecast and monitor managed stand growth and yield in Lodgepole pine. It was run as an association under fRI; its membership consisted of 9 companies holding Forest Management Agreements on the Eastern Slopes of Alberta. The mission of the FGYA was:

- 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.

Three current active projects will be continued through the FGrOW Foothills Pine Project Team:

- The Regenerated Lodgepole Pine (RLP) Project ;
- Cooperative Management of Historical Research Trial; and
- Stand Dynamics after MPB Attack.

Details of the work completed by the FGYA can be found in annual reports and other technical documents, as well as in *Progress and Achievements: Foothills Growth and Yield Association the Decade April 2000 to March 2010*. All of these documents are available on the fRI website.

REGENERATED LODGEPOLE PINE

The main focus of the FGYA was the Regenerated Lodgepole Pine project which assessed site and treatment effects on stand development following harvesting and planting of lodgepole pine, including:

- The effects of site, planting density and weeding on early crop performance;
- The effects of site, planting density, weeding and thinning on subsequent growth and yield;
- The link between early crop performance and subsequent growth and yield.

The Project consists of a long-term field trial, established in 2000 and 2001, and interim forecasting of effects using available models and data. The trial has a split-plot design. The basic balanced design consisted of 90 field installations (5 ecosites x 6 spacings x 3 replications), with each installation split two ways into four treatment plots (weeding, thinning, weeding and thinning, no weeding or thinning). Twelve additional installations (6 spacings x 2 replications) were added in the modal ecosite category, to produce a total of 102 installations (408 plots). Details of the design, installations and procedures are provided in an *Establishment Report* (April 2003) and a periodically updated field manual.

Details of the trial and its results to date are reported in the annual crop performance report, the most recent of which is *Regenerated lodgepole pine trial: crop performance report, March 2015*.

This has led to the initial development and review of a decision support tool (FRIPSY: the Foothills Reforestation Integrated Planning System) that allows managers to predict establishment and performance results based on site, stand, site preparation, planting, and vegetation management factors. A multi-disciplinary task force of 8 growth and yield and silvicultural practitioners reviewed the tool in 2013, and provided invaluable advice on its development which has been incorporated into this business plan. Enhancements to the user interface, establishment survey projection and top height projection were completed in June 2014. Other required improvements identified by the task force are being worked on, and will be added by June 2015. A workshop will be held in June 2015 for user training and feedback.

The 2014 version is restricted to lodgepole pine. Development work planned for completion by June 2015 includes:

- Addition of aspen performance prediction (spruce omitted owing to limited data and interest);

- Use of available data and expert opinion to differentiate between scarification and other site preparation methods;
- Enhanced mortality prediction;
- Extension of the stand age range over which the model predicts performance (utilizing the latest data collected in 2014).

Additional development work to be conducted in 2015 following the June workshop includes:

- Incorporation of a new batch processor and recommendations from workshop;
- Testing, validation and calibration against operational and research data;
- Technical and scientific documentation.

In view 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, exploratory analyses were conducted during 2007 linking growth and mortality during the first 5 years of the trial to regional and locally-interpolated climate records. Following a preliminary study of the RLP trial planted stock results (Interim Technical Note, February 2009), the work was expanded to include data from an earlier study of natural regeneration conducted by the CFS (*Technical Note 2010-3*, February 2010). Further analyses were conducted in 2010 and 2011, and a draft scientific paper was presented for membership review in March 2012. Results have been used in development of the regeneration model and to map health and mortality risks throughout the foothills region. The paper was not submitted for peer-reviewed publication as originally intended due to lack of required input from the co-author. However, following further mortality modelling work planned for 2015-16 as part of FRIPSY development, an updated paper will be developed for publication in 2015 on the fRI website or in a national journal.

A strategy for transition from the regeneration phase measurements to measurements in the growth phase of stand development was prepared in 2015 (*Strategy for Continuation of the Foothills Growth and Yield Association's Regenerated Lodgepole Pine Trial*, W.R. Dempster, January 19, 2015). Pending approval by members, the field manual and measurement schedule will be updated to reflect the transition.

Costs of fieldwork are 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). A new five year proposal for the next period April 1, 2011 to March 31, 2015 was submitted in July 2011 and approved as FRIAA Project FOOMOD-01-07. A new project proposal will be developed and submitted to FRIAA for the period April 1, 2015 to March 31, 2020. The project can be coordinated with other FGROW projects, if desired by members.

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 3 for the RLP Trial 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. Measurement costs per installation (cluster of 4 plots) are assumed at \$4,000 and \$600 for full measurements and status checks, respectively.

Table 3. Regenerated Lodgepole Pine project –Scheduled measurement by type and FMA, and estimated measurement costs.

Agency	2015 Check	2015 Full	2016 Full	Check Cost 2015	Full Measure 2015	Total Costs 2015
ANC			6	0	0	0
BRL	6		6	3,600	0	3,600
CFPGP			6	0	0	0
MWFP	6		6	3,600	0	3,600
SDA			6	0	0	0
SLS			6	0	0	0
SPI		14		0	56,000	56,000
WEYDV			6	0	0	0
WEYED			6	0	0	0
WEYGP	6	2	16	3,600	8,000	11,600
WWC	2	12	9	1,200	48,000	49,200
Total	20	28	73	12,000	112,000	124,000

Estimated costs for the RLP project for the period April 1, 2015 to March 31, 2020 are summarized in Table 4. A detailed summary of deliverables and next steps is in Appendix 3.

Table 4. Regenerated Lodgepole Pine project expense summary.

Expense	2015-16	2016-17	2017-18	2018-19	2019-20	Total 2015-20
R&D Associate	61,740	61,740	61,740	61,740	61,740	308,700
Coordinator	25,000	25,000	25,000	25,000	25,000	125,000
Field Auditor	20,000	20,000	10,000	20,000	10,000	80,000
Database	25,000	20,000	20,000	20,000	20,000	105,000
Other technical	20,000	0	0	0	0	20,000
Admin. Assistant	10,000	10,000	10,100	10,000	10,000	50,100
Total	161,740	136,740	126,840	136,740	126,740	688,800

COOPERATIVE MANAGEMENT OF HISTORICAL RESEARCH TRIALS

Beginning in the late 1930 and ending in 1980s, the Canadian Forest Service (CFS) established a number of trials in lodgepole pine stands throughout Alberta. These trials are considered invaluable resources

for monitoring and demonstrating the effects of nutrition and density management. Since 2002, the FGYA, Alberta Agriculture and Forestry (AF) and the Canadian Wood Fibre Centre (CWFC) of the CFS have had a signed agreement for cooperative management of the trials. The FGYA was responsible for measurements, maintenance and support for analytic work; FGrOW will assume these responsibilities.

Detailed information on the trials is found in *Long-term Lodgepole Pine Silviculture Trials in Alberta: History and Current Results*. Details on measurements conducted by the FGYA can be found in their annual reports. The measurement schedule for the next 5 years associated costs are in Table 5.

Table 5. Cost schedule for FGYA contribution to *Cooperative Management of Historic Research Trials* project.

Trial	Man days	2015-16	2016-17	2017-18	2018-19	2019-20	Total 2015-20
McCardell 1984 fertilization & thinning	36	0	0	0	0	22,000	22,000
MacKay thinning (A34)	56	0	0	0	33,600	0	33,600
Swan Lake thinning 1977	8	0	0	0	4,800	0	4,800
Teepee Pole Spacing 1967	20	10,080	0	0	0	0	12,000
Gregg spacing 1963	46	0	27,600	0	0	0	27,600
Gregg spacing (Medium)	11	0	0	0	0	7,000	7,000
Kananaskis European thinning (K-3)	18	0	0	0	0	0	0
Kananaskis economic thinning (K-58)	4	0	0	10,800	0	0	10,800
Clearwater fertilization & thinning 1968	22	0	0	2,400	0	0	2,400
Strachan Thinning 1952	0	0	0	0	0	0	0
Fertilization and Thinning Takyi Trials (SRD)	75	0	0	0	0	0	0
Quality Control	0	2,000	2,000	2,000	2,000	2,000	10,000
Signage, Equipment		5,000	0	0	0	0	5,000
Total Annual Expense		17,080	29,600	15,200	40,400	31,000	135,200

Table 6 summarizes all Foothills Pine Project Team costs for the Historic Research Trials for the period April 1, 2015 to March 31, 2020.

Costs incurred by the Foothills Pine Project Team for trial remeasurements will continue to be allocated among voting members according to the proportions of pine on their forest management areas (Appendix 4). The agreement approved by FRIAA: *Measurement and Maintenance of Historic Research Trials* (February 2015, FRIAA Project # FOOMOD-01-11) covers measurements for a five year period ending in 2019. The funding of measurements is subject to annual review of priorities by all three parties (FGYA, AF and the CFS), approval each year by the FGYA Steering Committee, and acceptance by FRIAA.

Table 6. Project Team costs for *Cooperative Management of Historic Research Trials* project.

	2015-16	2016-17	2017-18	2018-19	2019-20	Total 2015-20
Income						
Balance Forward	-1,742	0	0	0	0	-1,742
Member Contribution ¹	10,925	17,020	8,740	23,230	17,825	77,740
FRIAA	20,910 ²	12,580	6,460	17,170	13,175	57,460
CWFC CFS Contributions	50,000	50,000	50,000	50,000	50,000	250,000
Total Income	80,093	79,600	65,200	90,400	81,000	
Expense						
R&D Associate	4,410	4,410	4,410	4,410	4,410	22,050
Coordinator	3,200	3,200	3,200	3,200	3,200	16,000
Admin. Assistant	350	350	350	350	350	1750
Measurements	17,080	29,600	15,200	40,400	31,000	135,200
Analysis & Modelling	50,000	50,000	50,000	50,000	50,000	250,000
Total Expense	75,040	87,560	73,160	98,360	88,960	425,000

STAND DYNAMICS AFTER MPB ATTACK

The Mountain pine beetle monitoring project, *Stand Dynamics after MPB Attack*, was originally called *Regeneration Management in a Mountain Pine Beetle Environment* and was initiated as a result of a field tour to MPB-attacked areas around Prince George, BC in 2007. This project included 1) development of a Decision Support Tool intended to help managers decide on priorities for salvage and treatment in MPB attacked stands using the best available information, and 2) monitoring of PSPs attacked by MPB to assess stand response. The Decision Support Tool was completed in 2012 (*Enhanced Mountain Pine Beetle Decision Support Tool Application Development*, ForCorp Solutions, December, 2012).

Monitoring of attacked stands is on-going with support for field work in 2015 and 2016 being provided by the fRI Mountain Pine Beetle Ecology Program (MPBEP). After this time the need to continue monitoring will be assessed and, if necessary, alternate avenues for funding will be identified. One possible source of funding and collaboration through a proposal that will be submitted to the FRIAA MPB Rehabilitation Program is described below.

In 2014, 42 plots were scheduled for monitoring. The majority of the field work on these plots has been completed, through cooperation with AF. However, difficulty in finding a contractor to complete the

¹ Based on five FGYA members paying direct, four members through FRIP fund direction.

² Includes \$12,835 for work conducted in 2014-15 and \$8,075 for work to be carried out in 2015-16.

work means digital data is not yet available. The digital data will be available when the outstanding data is collected in 2015. As a result, deliverables originally scheduled for completed by the end of March 2015 have been pushed to 2016, as detailed below:

- Database with data collected in 2014 (42 plots) and 2015 (21 plots) added;
- Database technical report;
- Quicknote 2 Tree mortality in attacked stands – preliminary results; and
- Quicknote 3 Progress report

Final deliverables will be a scientific description of analyses and results, including quantitative models of mortality and regeneration trends (manuscript prepared for Canadian Journal of Forest Research or other peer reviewed publication) and a description of results and management implications (manuscript prepared for Forestry Chronicle or other professional journal). These are scheduled for completion by March 31, 2017.

Table 7 summarizes expenditures for the Stand Dynamics after MPB Attack for the period April 1, 2015 to March 31, 2020. The shortfall of \$2,197 for field measurements will be paid for by membership dues if other funding is not secured.

Table 7. Expense summary for *Stand Dynamics after MPB Attack*.

	2015-16	2016-17	2017-18	2018-19	2019-20	Total 2015-17
Income						
MPBEP Grant	26,600	53,200	0	0	0	79,800
Total Income	26,600	53,200	0	0	0	79,800
Expenses						
Field measurements	28,797	53,200	0	0	0	79,800
R&D Associate	17,640	17,640	0	0	0	35,280
Coordinator	10,000	10,000	0	0	0	20,000
Administrative Assistant	700	700	0	0	0	1,400
Total Expenses	57,137	81,540	0	0	0	136,480

FOOTHILLS PINE PROJECT TEAM FINANCIAL SUMMARY

Table 8 summarizes the income and expenditures of the Foothills Pine Project Team for the period April 1, 2015 to March 31, 2020.

Table 8. Foothills Pine Project Team financial summary.

	2015-16	2016-17	2017-18	2018-19	2019-20	Total 2015-20
Income						
Balance carry forward	81,466 ³	47,372	28,097	47,062	56,127	260,124
Membership dues (direct)	90,000	90,000	90,000	90,000	90,000	450,000
Membership dues (FRIAA)	72,000	72,000	72,000	72,000	72,000	360,000
HRT Management	80,093	79,600	65,200	90,400	81,000	396,293
MPB Monitoring	26,600	53,200	0	0	0	79,800
Total Income	350,159	342,172	255,297	299,462	299,127	1,546,217
Expenses						
RLP Project	161,740	136,740	126,840	136,740	126,740	688,800
HRT Management	75,040	87,560	73,160	98,360	88,960	423,080
MPB Monitoring	57,137	81,540	0	0	0	138,677
Administrative Assistant	1,000	1,000	1,000	1,000	1,000	5,000
Coordinator	3,000	3,000	3,000	3,000	3,000	15,000
FGrOW Admin	4,870	4,235	4,235	4,235	4,235	24,350
Total Expenses	302,787	314,075	208,235	243,335	223,935	1,044,630
Balance	47,372	28,097	47,062	56,127	75,192	

MIXEDWOOD PROJECT TEAM

The Mixedwood Management Association (MWMA) officially came into existence in the summer of 2001 with the signing of the Memorandum of Understanding between the eight member companies and the Alberta Sustainable Resource Development. Originally hosted by the Alberta Research Council, it changed to the University of Alberta from June of 2003 until March 2015.

The MWMA acted as a forum to collectively address practical and scientific issues around the implementation of managing mixedwood stands to sustain their mixed species characteristics. The Association goals were to:

- Increase knowledge through financial and in-kind support of basic and applied research;

³ The opening balance at the beginning of the fiscal year was -\$8,534, but has been adjusted to include a payment from FRIAA that was received in April 2015. This \$90,000 payment was for membership dues and should have been received in 2014-2015, but was deferred due to a request from FRI.

- Enhance the forest community's understanding of mixedwood through support for workshops and conferences; and
- Increase information collection, sharing, dissemination, and its application to day-to-day forest management activities.

The MWMA supported numerous projects completed through the University of Alberta, and provided more than \$750,000 of direct funding. Details of research completed are seen in *Mixedwood Management Association Five-Year Report* (March 2014). Its two long-standing projects, the Dynamic Aspen Density Experiment (DADE) and the Strip Cut Understory Protection Trial (SCUP) will be continued by the Mixedwood Project Team (MPT).

DYNAMIC ASPEN DENSITY EXPERIMENT

Although mixedwood stands containing hardwood and white spruce occur naturally across the boreal landscape, the presence of hardwoods in cutovers planted with white spruce is often cause for concern for many silviculturists. There are perceived risks associated with growing white spruce in pure (C) and mixed tree species (CD and DC) regenerating stands. It is well documented that there are both positive (e.g. protection from frost, decreased winter desiccation, reduced weevil strike incidences, and improved nutrient cycling through aspen leaf litter fall) and negative (e.g. reduced transmission of light through aspen canopy, mechanical damage to white spruce by overtopping hardwood, and below-ground competition for moisture and nutrients) effects of hardwoods on white spruce. However, it is not clear how these effects combine to influence the progression of stand development through time. In addition, the kinds of stand conditions that create positive or negative effects of aspen on white spruce are not well understood.

The objectives of Dynamic Aspen Density Experiment (DADE) are:

1. To identify the thresholds in hardwood density that determine stand condition during each of two stand development stages;
2. To determine the survival and growth of white spruce in different stand conditions during each of two stand development stages;
3. To determine the opportunity cost to hardwood production of optimizing white spruce survival and growth; and
4. To provide credible data with which to develop science-based alternative regeneration standards for mixtures of white spruce and aspen.

The Dynamic Aspen Density Experiment is investigating white spruce growth response to varying aspen overstory densities at two ages of stand development. For this purpose, seven 17- and seven 22-year old stands were selected with aspen densities greater than 10,000 stem per ha and planted white spruce at densities of at least 1000 stems per ha. Five density treatments were conducted in each stand: aspen densities were thinned to 0, 1000, 2500 or 5000 stems per ha and an un-thinned plot served as control.

In the center of each treatment, a 400m² Permanent Sample Plot (PSP) was installed and densities, height and diameter of aspen and spruce were measured pre- and post-thinning.

The experimental design is described in detail in *Dynamic Aspen Density Experiment for Crop Planning in the Boreal Mixedwoods of Alberta, Project Manual*, Revised December, 2009. Details of analyses completed to date are contained in the DADE annual reports, the most recent of which is *Dynamic Aspen Density Experiment Annual Report for 2013, OF-06-P013*, July 2014. The 2011 and 2012 annual reports contain results of analysis and comparisons with GYPSY and MGM projections. These documents will be available on the FGrOW website, which is expected to be available June 2015. Table 9 summarizes the location and timing of the plot establishments.

Table 9. Summary of DADE establishment locations and timing.

Installation Number	Company FMA	Location	Establishment Date	3-Year Measurement Date	8-Year Measurement Date	13 year Measurement Date
CM 17-1	AlPac	Touchwood Lake Road	September, 2007	September, 2010	Fall 2015	2020
CM 17-2	AlPac	AlPac "C" Road - Martinni	November, 2007	September, 2010	Fall 2015	2020
CM 17-3	Weyco	Sinkhole Lake, Drayton Valley	September, 2009	May/June, 2013	Fall 2017 or early 2018	2022
CM 17-4	Weyco	Sinkhole Lake, Drayton Valley	September, 2009	May/June, 2013	Fall 2017 or early 2018	2022
CM 17-5	Weyco	Sinkhole Lake, Drayton Valley	September, 2009	May/June, 2013	Fall 2017 or early 2018	2022
CM 17-6	Weyco	Sinkhole Lake, Drayton Valley	October, 2009	May/June, 2013	Fall 2017 or early 2018	2022
CM 17-7	Weyco	Sinkhole Lake, Drayton Valley	Sept/Oct, 2009	May/June, 2013	Fall 2017 or early 2018	2022
CM 22-1	AlPac	AlPac 1000 Road	October, 2007	September, 2010	Herbicide	Herbicide
CM 22-2	AlPac	AlPac 1000 Road	October, 2007	September, 2010	Fall 2015	2020
CM 22-3	AlPac	AlPac 1000 Road	Sept/Oct, 2008	Herbicide	Herbicide	Herbicide
CM 22-4	AlPac	AlPac 1000 Road	Sept/Oct, 2008	Herbicide	Herbicide	Herbicide
CM 22-5	DMI	South Harmon Valley MOF	September, 2008	October, 2011	Fall 2016	2021
CM 22-6	DMI	Kimewan Lake MOF	October, 2008	October, 2011	Fall 2016	2021
CM 22-7	DMI	South Harmon Valley MOF	October, 2008	October, 2011	Fall 2016	2021
CM 22-8	MWFP	Fort Assiniboine	September, 2013	2016	2021	2026
CM 22-9	MWFP	Fort Assiniboine	September, 2013	2016	2021	2026
CM 22-10	Tolko	High Level	May 2015	2019	2023	2028

Planned expenses for the DADE project are summarized below. After the 8-year measurements are completed on all of the original plots in 2018, data analysis will be done including:

- Comparison of observed trends in volume, diameter, height and density with those projected by GYPSY and MGM.
- Analysis of effects of stand age and aspen density on growth and mortality.

Table 10 summaries planned expenditures for the DADE project for the period April 1, 2015 to March 31, 2020.

Table 10. DADE expense summary.

Expense	2015-16	2016-17	2017-18	2018-19	2019-20	Total 2015-20
Measurements	24,360	60,300	71,441	27,000	0	183,101
Analysis	0	0	0	30,000	0	30,000
Coordinator	2,200	3,200	3,200	5,000	1,000	14,600
Field Auditor	2,000	2,000	2,000	0	0	6,000
Admin. Assistant	2,500	3,500	3,500	3,500	1,000	14,000
Total	31,060	69,000	80,141	65,500	2,000	247,701

Work is underway to identify and establish a replacement for the third block that was destroyed by herbicide application. Preliminary office work has been completed to identify potential blocks. Field scouting will occur in April, 2015, and if one of the blocks is suitable, installation, baseline measurement and treatment will commence before the beginning of the growing season. Costs of re-establishing the installation are being covered by FRIAA.

STRIP CUT UNDERSTORY PROTECTION TRIAL

Protecting understory white spruce during removal of overstory aspen will ensure the utilization and release of advanced spruce growth, which will result in a shortened rotation, reduction of reforestation cost, and eventually an increase of timber production per unit of land. While the strip-cut understory protection harvest is being increasingly adopted across Alberta, there is a lack of information on how residual spruce in removal strips respond to release and how successful aspen regeneration occurs on the extraction trails, which leaves uncertainty on the development of mixedwood stands treated through strip cut harvest.

A total of 18 understory protection PSP installations were established: 5 in 2005 and 13 in 2007 (Table 15).

The Strip Cut Understory Protection Trial (SCUP) project aims to fill the information gap required for growth and yield projection of aspen-dominated mixedwood stands treated with strip cut understory protection harvest. The objectives are to provide:

1. A measurement protocol to collect statistically valid data for describing the Block1-level stand performance following Strip Cut Understory Protection harvesting;

2. A protocol that is sufficiently flexible in order to be used by numerous companies, and to account for operational differences in the application of Strip Cut Understory Protection systems;
3. Re-measured data to quantitatively describe the post-harvest development of stands after Strip Cut Understory Protection harvest treatments;
4. Information required for growth model development and/or model calibration, with the potential for future use in process-based modelling; and
5. A monitoring protocol that is acceptable to the Alberta Sustainable Resource Development, Land and Forest Division, for use in monitoring and yield curve validation.

Table 11 summarizes the location and timing of SCUP establishments and remeasurements.

Table 11. Summary of SCUP establishment locations and timings.

Location	PSP Installation #	Plot #s	Established	Re-measure 1	Site Index Measurement	Re-measure 2	Re-measure 3
Van	7012	6	2005	2010	spring 2012	2015	2020
Al-Pac	27131	6	2005	2010	spring 2012	2015	2020
Al-Pac	19191	6	2005	2010	spring 2012	2015	2020
Al-Pac	29691	6	2005	2010	spring 2012	2015	2020
Al-Pac	16751	6	2005	2010	spring 2012	2015	2020
Al-Pac	11911	6	2007	spring 2012	included	2016 or spring 2017	2021 or spring 2022
Al-Pac	22361	6	2007	spring 2012	included	2016 or spring 2017	2021 or spring 2022
Al-Pac	36551	6	2007	spring 2012	included	2016 or spring 2017	2021 or spring 2022
Al-Pac	36271	6	2007	spring 2014	needed	2018 or spring 2019	2023 or spring 2024
Al-Pac	36381	6	2007	spring 2014	needed	2018 or spring 2019	2023 or spring 2024
Al-Pac	34591	6	2007	2013	included	2018	2023
Al-Pac	27631	6	2007	2013	included	2018	2023
Al-Pac	15571	6	2007	2013	included	2018	2023
Ains	572	2	2007	spring 2014	needed	2018 or spring 2019	2023 or spring 2024
Tolko	330	2	2007	spring 2014	needed	2018 or spring 2019	2023 or spring 2024
Tolko	2212	2	2007	spring 2014	needed	2018 or spring 2019	2023 or spring 2024
Al-Pac	17781	6	2007	2013	included	2018	2023
Al-Pac	20631	2	2007	2013	included	2018	2023

Planned expenses for the SCUP project for the period April 1, 2015 to March 31, 2020 are summarized in Table 12. The SCUP database will be updated annually as measurements are completed. Preliminary analysis is planned for 2016-2017 based on the 5-year re-measurements that were completed in 2014 and will include comparing observed trends to MGM projections and assessing mortality and ingress.

Table 12. SCUP expense summary.

Expense	2015-16	2016-17	2017-18	2018-19	2019-20	Total 2015-20
Measurements	95,900	42,500	0	64,300	65,590	268,290
Analysis	5,000	5,000	0	0	0	10,000
Coordinator	3,000	5,000	2,000	5,000	5,000	20,000
Field Auditor	2,000	2,000	0	0	0	4,000
Admin. Assistant	2,500	3,500	1,000	3,500	3,500	14,000
Total	108,400	58,000	3,000	72,800	74,090	316,290

MIXEDWOOD PROJECT TEAM FINANCIAL SUMMARY

The following table (Table 13) summarizes income and expenditures for the Mixedwood Project Team for the period of April 1, 2015 to March 30, 2020.

Table 13. Mixedwood Project Team financial summary.

	2015-16	2016-17	2017-18	2018-19	2019-20	Total 2015-20
Income						
Balance carry forward	9,513	848	4,768	52,547	10,167	77,843
Membership dues	140,000	140,000	140,000	105,000	105,000	630,000
Total	149,513	140,848	144,768	157,547	115,167	707,843
Expenses						
SCUP Project	108,400	58,000	3,000	72,800	74,090	316,290
DADE Trial	31,060	69,000	80,141	65,500	2,000	247,701
Administrative Assistant	4,000	5,000	5,000	5,000	5,000	24,000
Coordinator	1,000	2,000	2,000	2,000	2,000	9,000
FGrOW Admin	4,205	2,080	2,080	2,080	2,080	12,525
Total	148,665	136,080	92,221	147,380	85,170	609,516
Balance	848	4,768	52,547	10,167	29,997	

POLICY AND PRACTICE PROJECT TEAM

The Alberta Forest Growth Organization (AFGO) was created in 2009 by a partnership between the Alberta forest companies forming the Mixedwood Management Association (MWMA), along with Hinton Wood Products, Sundre Forest Products and Blue Ridge Lumber. AF was involved from the beginning as a non-voting member but subsequently joined AFGO as a full member, as did Edson Forest Products and Canadian Forest Products. AFGO's mandate was to expedite and co-ordinate the development of a recognized, secure and well-funded forest growth and yield sector in Alberta that operates effectively and efficiently to address emerging issues in all of Alberta's natural resource management sectors that require growth and yield knowledge and expertise for solutions.

With the formation of the new association, this mandate will be carried out by FGrOW. The Policy and Practice Project Team (PPPT) will continue the AFGO initiatives that centered on improving forest management practice and influencing Alberta policy. It is also expected that the resulting policy recommendations will have applicability in other jurisdictions in Western Canada.

PROVINCIAL GROWTH AND YIELD INITIATIVE

The objective of the Provincial Growth and Yield Initiative (PGYI), fondly referred to as “piggy”, is to collectively obtain data on tree growth through repeated measurements of Permanent Sample Plots (PSPs) to develop/calibrate/validate growth models for forest management yield curve development. This collaborative data collection is intended to benefit participating companies and AF by reducing their individual data collection requirements, as well as producing a superior dataset

The PGYI subcommittee was established in 2011 and currently is made up of the following participants: Darren Aitkin (AF), Greg Behuniak (Weyerhaeuser), Gitte Grover (AI-Pac), Bob Held (SFP), Shongming Huang (AF), Tim McCready (Millar Western), and Sharon Meredith (FGrOW).

By March 31, 2015, the PGYI Subcommittee had:

- Developed a document describing the proposed initiative and presented it to interested organizations (*Provincial Growth and Yield Initiative*, September 2012).
- Produced a framework document describing how participation in PGYI fits with FMA holders’ requirements for a growth and yield plan (*Framework for Alberta Growth and Yield Plans*, September 2012).
- Developed a “Best Practices Manual” to facilitate uniformity and consistency of data submitted by different companies and AF (*Minimum Standards and Suggested Protocol and Priorities for Establishing and Measuring Permanent Sample Plots in Alberta*, March 2014).
- Completed a gap analysis comparing existing PSPs with desired PSPs to fill a matrix of natural subregion and stratum combinations.
- Completed a preliminary plot assignment for participating companies allowing trades between companies to utilize as many of the existing PSPs as possible.
- Written a memorandum of understanding which describes responsibilities of organizations participating in PGYI that was signed in June 2014 for 17 FMAs and by AF.

Work is underway on a database application to house the PSP information in a standardized format and to provide quality control. Development of this web-based database application has taken longer than originally anticipated, but is now expected to be completed in June of 2015. The data submission formats will be finalized as the database application is finalized. Other tasks to be completed in 2015-2016 include:

- Finalizing plot allocations and selected plot lists;
- Members completing their initial load of the data by December 31, 2015;
- Initial review of submitted data; and

- Determining arrangements for ongoing hosting of the database application.

As data is submitted to the database, the PGYI Subcommittee will review data on an ongoing basis to ensure that it meets the needs and intent of PGYI.

Table 14 summarizes planned expenditures for the PGYI project.

Table 14. PGYI expense summary.

Expense	2015-16	2016-17	2017-18	2018-19	2019-20	Total 2015-20
Database development	15,000	0	0	0	0	15,000
Database hosting	15,000	15,000	15,000	15,000	15,000	75,000
Database testing	3,600	0	0	0	0	3,600
Database improvements	0	0	20,000	20,000	0	40,000
Coordinator	22,800	10,000	15,000	10,000	20,000	77,800
Application support	10,000	5,000	2,500	2,500	2,500	22,500
Total	66,400	30,000	52,500	47,500	37,500	233,900

CUTBLOCK INVENTORY CLASSIFICATION SUBCOMMITTEE

The Strata Subcommittee was formed in September 2012 to answer questions about the accuracy of the photo interpreted labels developed through Reforestation Standard of Alberta (RSA) performance survey programs, and whether the rules used to assign sampling units into strata were suitable for use in landbase stratum assignment. The subcommittee's work focused on the following:

- Assessment of variability within RSA sampling units assigned to strata using both true color and color infrared aerial photography.
- Alternate methods of stratifying stands, including use of density caps and thresholds, and different break points for both density and stocking.
- Discussion of questions around the link between RSA and growth and yield.
- Discussion of appropriate uses of RSA data and how they can be used to assign post-performance aged stands to strata for timber supply analysis and landbase reconciliation purposes.

The Subcommittee produced a series of recommendations that have been submitted to the RSA Management Committee, entitled:

- *Current and potential uses of RSA data and limitations;*
- *Use of MAI as a link between early stand performance and stand yield;*
- *Differentiating use of aerial stratification data for MAI assessment and for stratum assignment for timber supply analysis and strata reconciliation; and*

- *Use of stocking to assign RSA sampling units to strata.*

Additionally, the Subcommittee identified a number of additional questions that were considered either outside its scope or which could not be resolved:

- How does the TBA AF Strata Reconciliation Process affect recommendations made by the Strata Subcommittee?
- What process should be used for developing successional yield curves?
- What yield strata classes can be assigned to allocate performance survey age stands to a stratum for yield curve development and stratum reconciliation?
- Guidelines for how (if) to use RSA data for FMP-specific TSA strata, assuming that the recommendation to use the data differently for that purpose is accepted.
- Limitations in how strata are assigned for yield curve development and strata reconciliation due to tenure.

The subcommittee’s final report, *Report to AFGO Members from the Strata Subcommittee*, is available on the fRI website (<https://afgo.foothillsri.ca/resource/>).

A new subcommittee, the Cutblock Inventory Classification Subcommittee (CICS), has been formed to address the outstanding issues and questions. The subcommittee is made up of the following participants: Greg Behuniak (Weyerhaeuser), Gitte Grover (Al-Pac), Bob Held (Sundre Forest Products), Terry Kristoff (Alberta Plywood), Tim McCready (Millar Western), Tim Gauthier (Tolko), Sharon Meredith (FGrOW), and Shane Sadoway (Blue Ridge). It is in the process of developing a work plan for addressing these questions. At its initial meeting in January of 2015, members agreed that the approach should be high-level and focus on developing a recommended process that speaks to the objectives of strata reconciliation and stratum assignment. Expenses for the CICS are summarized in Table 15.

Table 15. CICS expense summary.

Expense	2015-16	2016-17	2017-18	2018-19	2019-20	Total 2015-20
Coordinator	15,000	8,000	0	0	0	23,000
Analysis	5,000	5,000	0	0	0	10,000
Total	20,000	13,000	0	0	0	33,000

GROWTH AND YIELD MODEL SUPPORT

Growth and yield models that accurately forecast stand development and future yield are gaining more relevance as the forest is transitioning from un-managed, post-fire dominated stands to managed, post-harvest stands. Since only a few managed stands are approximately 50 years old, not enough data are available that would enable the development of empirical yield curves. Hence, growth & yield models that were built based on natural stand data but can be calibrated using the early stand development managed stand data, need to be employed to forecast managed stand development and yield.

Two models, which have different strengths and weaknesses, are currently used by the Alberta forest industry community for yield curve development, i.e. Growth and Yield Projection Systems (GYPSY) and the Mixedwood Growth Model (MGM). FGrOW will work with the model developers to support and facilitate enhancements through existing and new projects. A first step to ensure this occurs is for the PPPT Coordinator to attend meetings of the GYPSY Advisory Committee and the MGM Strategic Development Team.

Until additional activities are agreed upon, the costs to conduct this project (Table 16) are limited to the Policy and Practice Project Team Coordinator to attending approximately 6 meetings per year and posting meeting minutes to the FGrOW SharePoint site. The Coordinator will also provide a synopsis to members on pertinent information arising from the meetings. The usefulness of the Coordinator attending these meetings will be evaluated overtime.

Table 16. Growth and Yield Model Support project expense summary.

Expense	2015-16	2016-17	2017-18	2018-19	2019-20	Total 2015-20
Coordinator	8,000	8,000	8,000	8,000	8,000	40,000
Total	8,000	8,000	8,000	8,000	8,000	40,000

POLICY AND PRACTICE PROJECT TEAM FINANCIAL SUMMARY

Table 17 summarizes income and expenditures for the Policy and Practice Project Team from April 1, 2015 to March 31, 2020.

Table 17. Policy and Practice Project Team financial summary.

	2015-16	2016-17	2017-18	2018-19	2019-20	Total 2015-20
Income						
Balance carry forward	49,896	9,326	12,521	11,842	16,163	99,748
Membership dues	60,000	60,000	60,000	60,000	60,000	300,000
PGYI DB Cost-sharing	3,980	3,980	9,286	9,286	3,980	30,512
Total	113,876	73,306	81,807	81,128	80,143	430,260
Expenses						
PGYI	66,400	30,000	52,500	47,500	37,500	233,900
CICS	20,000	13,000	0	0	0	33,000
G&Y Model Support	8,000	8,000	8,000	8,000	8,000	40,000
Administrative Assistant	4,320	4,320	4,000	4,000	4,000	20,640
Coordinator	4,000	4,000	4,000	4,000	4,000	20,000
FGrOW Admin	1,830	1,465	1,465	1,465	1,465	7,690
Total	104,550	60,785	69,965	64,965	54,965	355,990
Balance	9,326	12,521	11,842	16,163	25,178	

WESBOGY PROJECT TEAM

The Western Boreal Growth and Yield (WESBOGY) Association first met informally in the mid-1980s and established its Association Agreement at the University of Alberta and 5-year business plan in 1996. In 2015 WESBOGY consists of 12 partners involved in forest growth and yield, stand dynamics, inventory and planning in western Canada. The Association works to improve the efficiency of growth and yield research and development efforts; by facilitating data sharing; by supporting development of MGM and other growth and yield models; by developing and supporting the WESBOGY long-term study; and by providing a forum for communication.

WESBOGY will become part of FGrOW in January 2016, but the majority of its work will continue to be carried out at the University of Alberta, with funding arrangements being described in an agreement between it and fRI.

The WESBOGY plan for the next five years is:

1. To continue analysis of the WESBOGY long-term study including:
 - a. Height, diameter, and density patterns for aspen in the natural plots; -Height and diameter growth of spruce and aspen in treated plots;
 - b. Mortality of spruce and aspen;
 - c. Recruitment (ingress) of new trees into natural and treated plots;
 - d. Preparation of manuals, reports, papers, extension notes and posters for distribution to Members and for journal publication;
2. To continue development of MGM to improve its ability to represent stand responses to silviculture. This will include;
 - a. Refinement of mortality, breakup and self-thinning functions for aspen;
 - b. Evaluation of model sensitivity to site index;
 - c. Natural regeneration and ingress of white spruce and aspen; -Refine calibration for lodgepole pine;
 - d. -Calibrate MGM for black spruce, jack pine and balsam poplar; -Model Validation and publication of results;
 - e. -Demonstration and training.
3. To update and maintain the WESBOGY long-term study data collection manual, the database, and the WESBOGY web site and sharepoint site.
4. To seek to expand the scope of WESBOGY activities and influence.
 - a. To identify and approach potential new Members;
 - b. To seek opportunities and develop proposals for potential complementary funding from other agencies.
 - c. To work with other groups and co-operatives and to promote WESBOGY activities and information in growth modeling, silviculture practices and forest management activities.
5. To organize the WESBOGY Fall, Spring, and Steering Committee meetings each year. Prepare the meeting minutes and WESBOGY annual reports.

6. To review and update the list of priority and ongoing projects.
7. To undertake high priority Sponsored Research Projects as recommended by the Steering Committee and approved by the Members.
8. To work with Members in the development of proposals for high priority associated research projects.

Table 18 contains the budget estimates for the WESBOGY Project Team for January 1, 2016 to March 31, 2016. Additional detail around the WESBOGY project team will be added to the business and work plan for 2016-17.

Table 18. Draft WESBOGY Project Team budget estimates for January 2016 –March 2016.

Expenses	2015-16
Salaries and Benefits	
Mike Bokalo	30,554
Field and office tech support	4,120
Grad Students/Research Projects	1,250
Travel (Wesbogy meetings and other business)	0
Supplies, Communication	2,000
Subtotal	37,924
U of A RenR Grant and Project management (5%)	1,896
U of A Overhead (10%)	3,792
Contribution to Salary Reserve	8,000
Total	43,613
Cost per member (11 members)	3,965

FRIAA FUNDED PROJECTS

While the discussions leading to the formation of FGrOW were underway, representatives of the four Alberta-based growth and yield associations began to collaboratively identify research priorities. Workshops held in August of 2013 and 2014 led to the development of three successful proposals for FRIAA open funds. An early example of the benefits of collaboration, these projects are considered part of the FGrOW program and described below. Work on all three projects is being carried out at the University of Alberta under the supervision of Dr. Phil Comeau.

STAND DYNAMICS FOLLOWING CANOPY REMOVAL AND RELEASE OF ADVANCE REGENERATION IN ASPEN AND LODGEPOLE PINE DOMINATED STANDS

Sustainable forest management in Alberta is threatened by shrinking landbase (due both to the increasing need for protected areas and to energy sector activities), forest disturbance (due to MPB and fire), and climate change. Many aspen stands have abundant and vigorous advanced regeneration of

white spruce. Merchantable aspen can be harvested while protecting this advanced regeneration; however, MGM and other models used to forecast future yields need to be refined to provide more accurate estimates of stand yields and implications of understory protection to both aspen and spruce yields. Accurately forecasting growth of advanced regeneration following death of lodgepole pine due to MPB is of vital importance to evaluating yield implications related to leaving these stands unsalvaged and for exploring alternative options. Growth models such as GYPSY and MGM that can forecast stand development are available. However, it is widely recognized that these models require work to improve their abilities to model responses of advanced regeneration to death and harvesting of overstory trees.

The objectives of this project are to improve our understanding and modeling of release responses of advanced regeneration and aspen regeneration/ingress dynamics following: 1) Understory protection harvest of aspen dominated stands with a white spruce understory; and 2) Mountain Pine Beetle induced mortality of overstory pine in stands with understory black spruce.

Field work on the project began in 2014 and included data collection in Strip Cut Understory Protection Sites and MPB-attacked stands. In 2015, field work will be completed and analysis will begin. Project completion is scheduled for completion in March 2017. The industry lead for this project is Greg Behuniak, Weyerhaeuser Grande Prairie. The total project budget for 2014 to 2017 is \$298,878.

IMPROVED ESTIMATION OF TREE MORTALITY AND STAND BREAKUP

Better understanding and modeling of tree mortality is needed to improve characterization of stand dynamics and estimation of future stand conditions and yields. While stand density, tree age, tree vigour, and competitive status of a tree influence probability of survival, there is substantial variation in survival or mortality rates that are thought to reflect effects of climate, site, insects, and disease. Current mortality models implemented in the MGM rely on tree age, tree vigour and competition and do not perform consistently in predicting mortality and breakup of mature and overmature stands. As a consequence, while MGM validates well on average for Alberta mixedwood stands, it does not perform well for characterizing the successional dynamics of aspen and mixedwood stands that experience stand breakup earlier or later than the average.

The objective of this project is to develop improved models of survival probability for trembling aspen, balsam poplar, white spruce, black spruce, lodgepole pine and jack pine based on data from the extensive network of permanent sample plots in western Canada and collection of supplemental data. Models will consider interacting effects of climate, insects, tree size, tree age, stand characteristics, and site. Resulting predictive equations will be incorporated into MGM and GYPSY. End products from this project will include:

1. Equations for predicting survival probability;
2. Manuscript prepared for peer review on age structure of aspen dominated stands;
3. Manuscript on maximum density and aspen survival probability;
4. Manuscript on maximum densities of pine, spruce and mixed stands;
5. Manuscript on survival probabilities of balsam poplar, white spruce, black spruce and jack pine;

6. Revised version of MGM;
7. Manuscript on the validation and demonstration of MGM with these new functions;
8. Presentations demonstrating MGM and project results at growth and yield and other workshops and conferences; and
9. Report summarizing project results as a whole.

Work on the project has started with gathering available PSP data from industrial partners. Next steps include acquiring and preparing climate data for the PSPs and making field visits to the plots selected for dendrochronological study. The project is scheduled for completion in 2017. Terry Kristoff of Alberta Plywood is the industry lead for the project. The total project budget is \$329,145.

IMPROVING SITE INDEX ESTIMATION FOR ALBERTA

Accurate determination of site index is critical to estimating potential yield of regenerating stands and is a key input into growth and yield models used in Alberta. However, accurately determining site index in stands that are less than 15 years of age is problematic since early growth of trees can be influenced by a number of factors. These factors include site conditions, climate trends, site preparation and competing vegetation. While site index could be estimated from measurement of the original preharvest stand, this may be inaccurate due to: 1) the advanced age of trees on the site (making accurate age determination problematic due to missing rings and stem decay); and, 2) the fact that naturally regenerated white spruce or black spruce often grow up under aspen or pine canopies and other vegetation during the first 60 to 80 years after regeneration. In addition, site index is difficult to estimate when there is a desire to establish and grow a species that was not present in the preharvest stand (eg. establishment of white spruce following harvesting of a pine or aspen stand), and data from the preharvest stand is of limited use. Promising alternatives to direct measurement of site index include the use of environmental information (i.e. climate, slope, aspect, soil moisture regime, soil nutrient regime), ecosite, and conversion equations between species. Where trees are of sufficient age, growth intercept methods may be used to estimate site index. This project will focus on development of site index estimators based on the use of the use of environmental and ecological data, species conversion equations, and growth intercept models.

The objective of this project is to develop tools that can be used for determining site index for trembling aspen, white spruce, and lodgepole pine in Alberta based on environmental factors, ecosite classification, site index conversions between species, and growth intercept models. End products will include:

1. Equations for site index estimation for implementation in growth models;
2. A revised version of the Mixedwood Growth Model which includes these models for site index determination;
3. A detailed report on results from the project;
4. Data for further analysis; and
5. Two draft manuscripts ready for submission to peer reviewed journals.

Field work on the project will begin in 2015 and the project is expected to be completed in 2018. Tim McCready of Millar Western is the industry lead for the project. The total project budget is \$384,493.

PROPOSED PROJECTS

ESTABLISHMENT OF PSP NETWORK TO MONITOR STAND DYNAMICS AND ESTABLISH YIELD CURVES FOR STANDS KILLED BY MPB

While there is a substantial network of government and industrial PSPs throughout the province, the number of plots in pine dominant stands with significant MPB-caused mortality is limited. The current network is not sufficient to inform decision making regarding rehabilitation intervention. Nor is the current network sufficient to provide data for modeling and yield curve development to estimate growth rates in stands with significant pine mortality.

To inform decision-making, it will be important to understand post-MPB attack stand dynamics in various Natural Sub-Regions and Ecosites at varying levels of mortality without any intervention. We are now 9 years post-attack in many stands and have an excellent opportunity to establish a PSP network to provide this information. Recruitment of natural regeneration, rates of fall down and growth and release of residual trees and saplings are among the stand attributes that need to be tracked. Monitoring these plots for at least the next 15-20 years would greatly assist our understanding of stand dynamics in killed stands.

FGrOW will work with AF to develop a proposal to the FRIAA MPB Rehabilitation Program in 2015. If the proposal is successful, the project will be managed by the Foothills Pine Project Team and additional details will be added to subsequent business and work plans. Costs to FGrOW for proposal development will be negligible.

2015-2016 WORK PLAN

Table 19 lists deliverables and deadlines for all projects in 2015-2016.

Table 19. 2015-2016 deliverables and deadlines.

2015-2016 Deliverables	Details and Deadlines
FGrOW Management and Administration	
Annually updated business and work plan	Final 2015-2016 Plan, June 30, 2015 Draft 2016-2017 Plan, February 28, 2016
Annual report	Draft 2015-2016 Report, February 28, 2016
Revised Research Priorities	August 30, 2015
Mid-year report	Delivered at Fall Business Meeting
Annual General Meeting	April, 2016
Fall business meeting and tech session	September 30 and October 1, 2015
An up to date public website	Initiated June 30, 2015 On-going updates and maintenance
SharePoint site for members	Live by June 30, 2015 On-going updates and maintenance
Invoice for membership dues	April 30, 2015
Policy and Practice Project Team	
<i>Provincial Growth and Yield Initiative</i>	
Finalize plot allocations	Distribute to participating organizations, April 30, 2015
Finalize selected plot lists	Distribute to participating organizations, April 30, 2015
Completed database application	Testing completed and available for loading, July 30, 2015
Initial data load	Existing plot measurements to be loaded by December 31, 2015
Review of submitted data	February 28, 2016
Hosting arrangements	Subcommittee will explore options and make recommendations for long-term hosting, February 28, 2016
<i>Cutblock Inventory Classification Subcommittee</i>	
Develop work plan	May 30, 2015
Produce recommendations	March 30, 2016
<i>Growth and Yield Model Support</i>	
Coordinator to attend meetings	Attend GYPSY Advisory Committee and MGM Strategic Direction Team meetings as scheduled. Meeting minutes posted to the FGrOW SharePoint. Provide summary to members after each meeting.
Foothills Pine Project Team	
<i>Regenerated Lodgepole Pine Trial</i>	
Complete scheduled measurements	2015 measurement schedule, June 2015 Measurements completed by October 30, 2015
Updated field manual	Revised by June 15, 2015
Updated digital database	Loading database provided to contractors by June 30,

	2015 Data submitted to database manager by November 30, 2015 Data loaded to master by December 31, 2015 Master database cleaned and approved by January 31, 2016
Crop performance report	Updated based on 2015 measurements, March 2016
FRIPSY Version 3	Add aspen performance prediction to base model, 5 June 2015 Review additional soil/site variables. Incorporate user input for % of block treated, 5 June 2015 Add options for user-defined mortality rates and / or additional input variable, 5 June 2015 Extend model predictions to 14 years after cut, incorporate early planting, plus delayed planting if possible, 5 June 2015 Batch processor completed, 31 October 2015 Final calibration, 31 December 2015
FRIPSY Workshop	For user training and feedback, June 2015
Proposal for new FRIAA project	Project will enable membership fees to be paid through company FRIAA funds. Submit to FRIAA by April 30, 2016
<i>Cooperative Management of Historical Research Trials</i>	
Teepee Pole spacing trial remeasurement	Digital data available by October 30, 2015
<i>Stand Dynamics after MPB Attack</i>	
Detailed monitoring	Completed for 21 plots by September 30, 2015
Digital database	Updated for 2014 measurements by June 30, 2015 Updated for 2015 measurements by November 30, 2015 Database technical report, December 30, 2015
Quicknotes	Quicknote 2 Tree mortality in attacked stands-preliminary results , August 31, 2015 Quicknote 3 Progress Report, January 31, 2016
MPB Research Forum	Presentation, April 23, 2015
Mixedwood Project Team	
<i>Dynamic Aspen Density Experiment</i>	
New installation completed	Field scouting locations, April 2015 Complete layout, measurements and spacing, May 31, 2015
Re-measurements	8-year re-measurements completed on 3 installations, October 31, 2015
Updated database	Complete data cleaning and loading, December 31, 2015
<i>Strip Cut Understory Protection Trial</i>	
Re-measurements	Complete second re-measurement on five blocks, October 31, 2015
Updated database	Data cleaning for existing measurements, July 30, 2015 Upload and clean 2015 measurements, November 30, 2015

Analysis of first re-measure	To be completed by June 30, 2016
WESBOGY Project Team	
Annual report	Prepared and provided to members, March 31, 2015
Work Plan for 2016 activities	March 31, 2016
WESBOGY Long Term Study	
Maintain Long-Term Study database.	Ongoing
Long-Term Study Data Collection Manual	Providing guidance and direction relating to measurement and maintenance of installations. Ongoing
WESBOGY SharePoint site	Maintenance ongoing.
MGM Development and Support	
VSTO Version of MGM	Complete conversion of multistrata model, complete evaluation and testing. Ongoing through 2016
MGM Website and Documentation	Updated for VSTO version. Ongoing through 2016
Work plans and priorities for ongoing work on AGM	Developed through work with the MGM Strategic Development Team. Ongoing.
User support	Ongoing
Best Practices Documents	Development ongoing
Gap loss	March 31, 2016
Associated Projects	
Enhancing Growth and Yield Data Collection Methods using Airborne Image Technology	Ongoing. To be completed by March 31, 2017
Understory Protection Yield Curves for S17	Ongoing. To be completed by March 31, 2018
FRIAA Funded Projects	
Stand Dynamics Following Canopy Removal	
Data collection	Complete field sampling of selected research sites Collect and process disks
Improved Estimation of Tree Mortality and Stand Breakup	
Prepared PSP data	Collect, compile and prepare for analysis
Climate data for PSPs	Acquire and prepare data
Dendrochronological study site selection	Field visits for final selection
Improving Site Index Estimation for Alberta	
Data collection and analysis	Field sampling Process increment cores Data entry and analysis
MPB PSP Network	
FRIAA Proposal	Prepare in collaboration with AF, June 15, 2015

Table 20 summarizes FGrOW income and Expenditures for all Project Teams for 2015-2016.

Table 20. 2015-2016 financial summary for all FGrOW Project Teams.

Income						
	Admin	Foothills Pine	Mixed-wood	Policy and Practice	WESBOGY	Totals
Carry forward	0	81,466	9,513	49,896	0	140,875
Membership Dues	12,625	162,000	140,000	60,000	43,615	417,061
Other project contributions	0	106,693	0	3,980	0	110,673
Totals	12,625	350,159	149,513	113,876	43,615	668,609
Expenditures						
Administration	12,625	4,870	4,205	1,830	0	23,530
Projects	0	297,917	144,460	102,720	43,615	587,272
Total	12,625	302,787	148,665	104,550	43,615	610,802
Balance	0	47,372	848	9,326	0	57,546

APPENDIX 1: GROWTH AND YIELD GAP ANALYSIS AND RESEARCH PRIORITIES

GROWTH MODELLING

	Activity/Question	Project(s)	Group	Status
1.	Growth Model Development	Development and validation of MGM Development and validation of GYPSY	U of A AF	Ongoing Ongoing
2.	Volume Loss Factor development	Development for MGM	U of A	Ongoing
3.	Pine regeneration modelling	FRIPSY (Foothills Regeneration Integrated Planning System)	FPPT	Working version of model complete and being reviewed by FGYA members
4.	Variability of net “competitive” effects of aspen on white spruce	Proposed project - Comeau.	WESBOGY	Under development
5.	Volume Loss, Natural Regeneration and Stand Horizontal Structure	Proposal being developed	WESBOGY	
6.	Mortality curves for young aspen (juvenile aspen stand dynamics)	Utilize WESBOGY LTS data	WESBOGY	Underway (Comeau and Bokalo)
7.	Projecting future yield and stand structure from young stand condition (characterizing future condition from performance survey data)	Sask Environment funding project by Kirk Johnson, Phil Comeau and Mike Bokalo	WESBOGY	Completed
8.	Density management diagrams for aspen, white spruce and mixedwoods	Valentin Reyes-Hernandez and Phil Comeau	WESBOGY	Completed
9.	Improve understanding of factors influencing conifer natural regeneration – and model it.	FRIPSY (pine focus)	FPPT	See 3. above
10.	Better understanding and modeling of natural regeneration of spruce, aspen, pine	None		

	Activity/Question	Project(s)	Group	Status
11.	Linking site (eg wet areas mapping; edatope) to productivity	High precision prediction of site index and future yield by use of wet areas mapping and full feature LiDAR	WESBOGY	Gabriel Oltean (M.Sc), Phil Comeau and Mike Bokalo – work being done at Judy Creek and at WESBOGY LTS sites. Field work initiated April 2013.
12.	Determining appropriate site index (growth curves) for forest modeling	See 11		
13.	Model growth of stands after natural disturbance and harvest	None		
14.	Modeling young stand response to establishment and tending.	FRIPSY (pine focus) Phil Comeau modelling project (spruce focus)	FPPT U of A	Underway Underway
15.	Collect data across the provincial range of natural subregions and cover types in natural and post-harvest stands for use in growth model development.	Provincial Growth and Yield Initiative	PPPT	Underway
16.	Aspen break-up modelling	Improved Estimation of Tree Mortality and Stand Breakup	U of A	Ongoing
17.	Accurate modelling of changing seral stages throughout succession			
18.	Modeling partial harvest and dynamics of structured stands, understory projection, aspen- pine interactions, pine- black spruce mixes	Stand Dynamics Following Canopy Removal	U of A	Ongoing.
19.	Quantifying and modeling treatment effects	FRIPSY	FFPT	On going
20.	Distance dependent models			
21.	Support for validation and documentation, best practices documentation, etc.			
22.	Incorporation of climate into MGM.			

	Activity/Question	Project(s)	Group	Status
23.	Development of regeneration models for use in MGM.			
24.	Tools for estimating site index that would work where good top height trees are not available.	2014 MWFP Open Funds Proposal—Comeau	U of A	On going

SILVICULTURE TREATMENT AND GROWTH

	Activity/Question	Project(s)	Group	Status
25.	Silvicultural prescriptions to maintain mixedwood stands – radial herbicide treatment and thinning	Judy Creek	WESBOGY and CFS	10 th year measurement completed in 2012. Thinning completed 2012. Ongoing
26.	Influence of ecosite and treatment on lodgepole pine regeneration	Regenerated Lodgepole Pine Trials	FPPT	102 installations established between 2000 and 2001. On going
27.	Effect of density management on lodgepole pine	Historic Lodgepole Pine Trials	FPPT, AF and CFS	Various trials. On going
28.	What is the most economic method for producing a DC forest	None		
29.	Growth and yield implications of retention prescriptions	None		
30.	Growth and yield implications of harvesting to natural boundaries rather than rectangular blocks	None		
31.	Are there yield advantages to cutblock size when harvesting mixedwood blocks? What are the economic implications?	None		
32.	Effects of timing and radius of cutting on spruce growth and aspen resprouting	Effects of radius and timing of radial brushing treatments on aspen suckering and spruce growth - Field experiments near LacLaBiche and Judy Creek – Phil Comeau	U of A	Established in 2002 (Judy Creek), 2007 (Lac La Biche)
33.	Evaluation of banding as an alternative for establishing mixedwood stands	Comparison of banding (15 m bands treated with herbicide (vision and arsenal), arsenal spot treatment, radius brushing, and thinning – Phil Comeau	MPT	Initiated in 2006. 4 sites included in the study (established in different years)

	Activity/Question	Project(s)	Group	Status
34.	Site preparation effects on early growth of white spruce	Included in #14 (Comeau) – Analysis to be based on available PSP and Performance Survey Data	WESBOGY	Underway
35.	Spruce growth in response to thinning aspen to different densities	Dynamic Aspen Density Experiment	MPT	11 existing installations established between 2007 and 2009.
36.	Spruce growth in response to thinning aspen to different densities	WESBOGY Long Term Study	WESBOGY	First installations established in 1990 and thinned in 1995. (2 replicate blocks at each of 11 locations)
37.	Stand development after strip cut understory protection harvest	Strip Cut Understory Protection (SCUP) Project Stand Dynamics Following Canopy Removal	MPT UofA	5 installations established in 2005 and 13 established in 2007. On going
38.	Develop methods to integrate tree improvement into growth and yield estimates/models	Planned Post-doc project funded under chair in Tree Improvement	UofA	Start in 2015
39.	Design realized gain trial system to monitor deployment impacts	None		
40.	Establish realized gain trials for selected programs	None		
41.	White spruce release after understory protection	SCUP Stand Dynamics Following Canopy Removal	MPT UofA	See 37 above. On going
42.	Stand dynamics after partial harvest and effect of larger spruce on regenerating aspen	None		
43.	Site Index for white spruce understory after release	None		
44.	Black spruce productivity under different management practices and climate change	None		
45.	Incidental spruce replacement options-- putting spruce on deciduous sites	None		

	Activity/Question	Project(s)	Group	Status
46.	Stand break up regardless of species	Improved Estimation of Tree Mortality and Stand Break Up—Comeau	U of A	In progress
47.	Natural ingress over time in natural and managed stands			
48.	Managed forests-response to treatments			
49.	Bench marking study of 15-20 year old mixedwood stands and how they grow after fire compared to after harvest			

OTHER

	Subject	Project(s)	Group	Status
50.	Explore the effects of drought on aspen and spruce mortality	Analysis of WESBOGY Long Term Study Data and climate data (Ted Hogg, Mike Bokalo, Phil Comeau)	CFS and WESBOGY	
51.	Effects of aspen density on aspen and spruce wood quality	Could be addressed by collecting supplemental data at WESBOGY LTS, Judy Creek, DADE and other studies	WESBOGY	Proposal under development for supplemental crown and branch measurements on WESBOGY LTS sites.
52.	Economics of mixedwood management options	None		
53.	Economic and yield implications of permanent gaps in forest stands and implications of efforts to regenerate gaps	None		
54.	Understanding of stand dynamics in permafrost areas	None		
55.	Carbon storage and cycling in single species and mixedwood stands.	Claudia Rivera-Rios PhD project underway.	WESBOGY	Field work completed in 2012 at Judy Creek. Data analysis and further sampling underway.
56.	Biodiversity effects of silviculture practices on boreal mixedwood sites.	None. (Identified by Saskatchewan Environment.)		
57.	Effects of stand density and composition on key stem and crown characteristics for aspen and white spruce – links to wood quality	Derek Sattler (PhD) and Phil Comeau FORVALUENET project. Work focussed on Mature Spruce and Mixedwood Stands	U of A	Field work completed, data analysis is underway. 1 paper submitted for publication in CJFR.
58.	Lodgepole pine stand development after attack by mountain pine beetle	Regeneration in a Mountain Pine Beetle Environment	FPPT and fRI	Completed 6 years of measurements. Funding is in place for 2 more.
59.	Effect of density management on lodgepole pine wood quality	Historic Research Trials	FPPT and CFS	On going

	Subject	Project(s)	Group	Status
60.	Impact of temperature change on lodgepole pine regeneration	Dempster and Hamann paper in progress.	FPPT	On going.
61.	Effects of nutrition and density management of lodgepole pine growth	Enhanced Management of Lodgepole Pine	FPPT and UofA	Complete. Plots under protection and could be re-measured.
62.	Site index for advanced growth to include in RSA MAI projections	None		
63.	Technology and how it can be applied in growth and yield--can we do our business better for cheaper? LiDAR, etc.	Bokalo	U of A	On going
64.	Linking RSA and DFMP (Policy)			
65.	Offsetting existing costs for G&Y association costs by enhancing existing studies to get more value			
66.	Climate change impacts around insects and disease; how existing trials can help answer questions about climate.			
67.	Natural disturbances and their impacts			
68.	Post mountain pine beetle response in black spruce and other species.	Stand Dynamics Following Canopy Removal	U of A	Ongoing.
69.	Practices in mixedwoods to mitigate MPB effects			
70.	Other sources of fibre as energy sources			
71.	Landscape level implications of stand-level responses to natural disturbance, treatments, climate change			
72.	Support for PGI database management		PPPT	
73.	Land use rationalization for protected areas		Silvacom	Analysis done for some areas.

APPENDIX 2. MEMBERSHIP AND PROJECT TEAM DUES BY ORGANIZATION FOR 2015-2016.

Full Member	Project Dues				Membership Dues**	Total
	PPPT	FPT	MPT	WESBOGY*		
Alberta-Pacific Forest Industries Inc.	5,000	0	20,000	3,965	500	29,465
Alberta AF	5,000	0	20,000	3,965	500	29,465
Alberta Plywood Ltd.	5,000	0	20,000	3,965	500	29,465
Alberta Newsprint Company	0	18,000	0	0	500	18,500
Blue Ridge Lumber Inc.	5,000	18,000	0	0	500	23,500
Canadian Forest Products Ltd.	5,000	18,000	0	3,965	500	27,465
Daishowa-Marubeni International Ltd.	5,000	0	20,000	3,965	500	29,465
Edson Forest Products	5,000	18,000	0	0	500	23,500
Hinton Wood Products	5,000	18,000	0	0	500	23,500
Louisiana-Pacific Canada, Ltd., Manitoba	0	0	0	3,965	125	4,090
Louisiana-Pacific Canada, Ltd., Dawson Creek	0	0	0	0	0	0
Manning Diversified	0	0	0	3,965	125	4,090
Millar Western	5,000	18,000	20,000	0	500	43,500
NWT, Wildlife and Economic Development	0	0	0	3,965	125	3,959
Saskatchewan ENV	0	0	0	3,965	125	4,090
Spray Lake Sawmills	0	18,000	0	0	500	18,500
Sundre Forest Products	5,000	18,000	0	0	500	23,500
Tolko, High Level	5,000	0	20,000	0	500	25,500
Vanderwell	0	0	0	0	5,000	5,000
Weyerhaeuser Company, Alberta Forestlands	5,000	18,000	20,000	3,965	500	47,465
Wood Fibre Centre, CFS, NRCAN	0	0	0	3,965	125	4,090
Total Dues	60,000	162,000	140,000	43,615	12,625	418,240

*WESBOGY dues are prorated to cover the period of January 1, 2016 to March 31, 2016.

**FGrOW Membership dues for organizations who have only been WESBOGY members are prorated for the period of January 1, 2016 to March 31, 2016.

APPENDIX 3. SUMMARY OF DELIVERABLES AND PROGRESS FOR THE REGENERATED LODGEPOLE PINE TRIAL.

Deliverable	Progress / Next Steps	Reference
Measurement and treatment schedule (annually by June 15)	Completed for 2014. Next schedule June 2015.	RLP measurement schedule (spreadsheet), 2014.
Field measurements	Continue measurements according to the transition strategy pending approval). Complete measures by Oct, 30, final data submission by Nov. 30. Update field manual to reflect transition strategy (June 2015).	Strategy for Continuation of the Foothills Growth and Yield Association's Regenerated Lodgepole Pine Trial, January, 2015
Summary status and verification reports (January 31, prior to final payments to sponsors by FRIAA)	Will be distributed annually by January 31.	Audit and work verification reports, February 2014.
Digital database (updated annually, December 31)	Loading database provided to contractors annually by June30. Field data uploaded to database by December 31. Master database requires loading, clean-up and approval.	RLP Task Force Report, July 10 2009. Latest database version: <i>RLPMaster_20140107</i>
Field treatments	Pre-commercial thinning scheduled for 2012 - 2015 has been completed.	Field manual supplement and schedule (June 2014).
Crop performance report (updated annually, March 31)	Annual updates will be made based on the most recent field measurements.	Regenerated lodgepole pine trial: crop performance update, March 2015.
Regeneration model deployment plan	Last revised March 2015. Revise annually under direction of FRIPSY task force.	FRIPSY Enhancement and Deployment Schedule-Update for 2015, February 2015
Regeneration model: demonstration and distribution	User training and feedback workshop, June 2015	
Regeneration model enhancement	FRIPSY Version #2: enhanced user interface, establishment survey projection and top height projection, 30 June 2014. FRIPSY Version #3 (base model): incorporating other enhancements identified by task force (see text), 30 June 2015.	FRIPSY_BP_20140630.xlsm (Excel file). FRIPSY User's Guide Version 2.0 (June 2014). Update on Development of FRIPSY, February 2015 FRIPSY Enhancement and Deployment Schedule – Update for 2015

Deliverable	Progress / Next Steps	Reference
	FRIPSY Version 3 batch processor: 31 October 2015. FRIPSY Version 3 final calibration: 31 December 2015	
Assessment of climate effects	Incorporation of climate related variables in the regeneration model is still under investigation. An updated report will be prepared during 2015, and re-considered for publication.	Update on Development of FRIPSY, February 2015

APPENDIX 4. FOOTHILLS PINE PROJECT TEAM WORK AND COST 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
Edson Forest Products	121,848	6.0
Sundre Forest Products	293,655	14.4
Hinton Wood Products	451,713	22.1
Weyerhaeuser Canada	557,433	27.2
Total	2,045,507	100.0