Foothills Research Institute

2009 - 2010

Annual Work Plan

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research growing into practice.

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100 - Geographic Information Systems (GIS)

1. Prepared by:

Debbie Mucha, GIS/LLI Coordinator
Foothills Research Institute
Box 6330 Hinton, AB T7V 1X6
Ph (780) 865-8290 Fax: (780) 865-8331
Email: debbie.mucha@gov.ab.ca

2. Sign off Sheet

The GIS work plan has been reviewed and approved by the following individuals that are members of the GIS Activity Team:

_____ Tom Archibald, General Manager, Foothills Research Institute

_____ Carol Doering, Acting Ecosystem Data Specialist, Jasper National Park

_____ Sean Kinney, Communications and Extension Program Lead, Foothills Research Institute

_____ Debbie Mucha, GIS Coordinator, Foothills Research Institute

_____ Byron Vriend, GIS Analyst, Hinton Wood Products, A Division of West Fraser Mills Ltd.

_____ Christian Weik, GIS Unit Lead, Alberta Sustainable Resource Development

3. Executive Summary

The Foothills Research Institute's (FRI) GIS Program provides an exceptional level of GIS, GPS, and data management support services for FRI program areas. The activity team for the GIS Program was created in 2008. This document describes background information, program objectives, budget requirements, GIS time allocation, risks, and staff retention.

At FRI, the demand for GIS and associated data management services has increased greatly through Phase III. As the organization flows into the new business cycle, growth and demand for GIS and associated technologies has continues. GIS technology is also evolving at an unprecedented rate. Time needs to be committed in researching, planning, and evaluating GIS technology, software, and hardware. This investment in time is critical in order to plan for a GIS architecture that will meet the future needs and objectives of the FRI. An emphasis will be placed on efficient data sharing, and online Internet mapping technologies and efficient data management.

4. Introduction/Background Information

The FRI GIS has been in place to support FRI projects and promote the application of GIS since the first year of Phase 1 in 1992. Currently, the primary role of the GIS Program is to provide GIS, Global Positioning Systems (GPS), and data management support for the on-going projects undertaken by the Foothills Research Institute (FRI). This role will continue into 2009/2010. Debbie Mucha replaced Christian Weik, former GIS Coordinator in July 2006. It should also be noted that the GIS Coordinator has also been coordinating the Local Level Indicators Program (LLI). The LLI Program is wrapping and other then performing website updates for LLI, there is no other associated workload for the GIS Coordinator for LLI. Julie Duval is working full-time as a GIS Specialist. A third GIS position

was created within the GIS Program as a result of a cost-benefit that revealed is was more cost effective to have a full-time GIS position compared to contracting out a half-time GIS position through Timberline Forest Inventory Consultants. In addition, there was some additional funding to complete a spatial data inventory for the FRI which was allocated to the GIS Program. Katie Yalte was hired in the GIS Technician in May 2008. A continuing component of the GIS work plan will be scheduling time to investigate new and emerging GIS technologies in order to better position the FRI GIS Program into the future. A strong emphasis will be placed on data sharing between FRI program areas. Collaborative data sharing will also be a goal for data sharing with partners and other organizations. All FRI Programs are required to complete metadata for their spatial data holdings and to actively participate in creating a spatial data inventory for the FRI as directed by the Program Implementation Team in January 2008. Challenges for the GIS Program include working through historical barriers to data sharing outside of the organization and trying to consolidate and standardize GIS within the FRI (some programs have their own GIS Technician or contractor). A Five Year Business Plan has been completed for the GIS Program and this plan will be updated through time as the program evolves.

The GIS Program links to the Foothills Research Institute Business Strategy (2007-2012) through the program theme for data, information, and knowledge management. The main areas of focus for this program theme are a web-based data management program and innovative applications and tools for resource management. The GIS Program contributes to sustainable resource management by providing migrating data into sound information that can then be used to make powerful decisions by land and resource managers across the FRI's landbase.

5. Program Objectives

The primary role of the GIS Program is to support the on-going projects of the FRI. Most project objectives and deliverables are directly linked to support for priority projects by other programs in the FRI. Exceptions are general GIS program management and GIS training and the potential upcoming GeoConnections Integrated Land Management Decision Support System project.

Aboriginal Involvement - Brad Young (1.5 days/quarter)

- Aboriginal Involvement Program (AIP) currently has a near full-time GIS /data management technician position that is dedicated to the AIP. The AIP GIS technician will be involved in quarterly GIS program meetings for inter-technology/ knowledge transfer for FRI GIS. The GIS Technician will report to the AIP Program Lead. At the time of this writing 1.5 days/quarter GIS support is required from the GIS Program if the AIP GIS Technician is away due to illness or vacation time. Knowledge transfer from AIP GIS Technician to the GIS Program is critical. It is recommended that the GIS Program assists in running referrals when required.

Adaptive Forest Management - Bob Udell (7 days/quarter)

- Map(s) for future books (may include editing/updating of existing maps and/or new mapping products) – "A Human and Ecological Guide to the Highway 16 Corridor"
- Forest history database (would include interviews, photos, site information, and ecotour information).
- Whirpool mapping project in collaboration with Peter Murphy. Will include a data management component for GPS locations.

Communications and Extension – Sean Kinney (3 days/quarter)

- Environmental education – GIS Based Activities: This may include events such as *GIS Day* or other related GIS/GPS educational events or projects
- Mapping products – creation of maps for reports and communication products
- Joint proposals – collaborative funding proposals

Fish and Watershed Program – Rich McCleary (13 days/quarter)

- Managing data acquisition and dispersement for Riparian Research Project including LIDAR analysis within 4 pilot areas
- Develop procedure for completing LIDAR terrain analysis
- Gain proficiency with use of NetMap program
- Database development and support for Riparian Research Project
- Updates to Fish Inventory Database to ensure efficient data collection and report production
- Complete submission to FMIS
- Development of watershed network query tools
- Assistance with tech transfer sessions for fish probability model
- General data management support (ongoing)
- General mapping support/training as required

Foothills Growth and Yield Association (FGYA) – Bob Udell (1 day/quarter, *Note:* the FGYA is managed by Bob Held from Sundre Forest Products so the GIS support time required is minimal)

- FGYA database maintenance (master database in SQL Server) – copy at FRI
- FGYA database queries and reporting as required
- General data management
- Mapping products

Foothills Landscape Management Forum (FLMF) - Wayne Thorp (5 days/quarter)

- Attend FLMF meetings in Edmonton (when required)
- Assist FLMF half-time position with GIS support, learning, and mapping
- Management and maintenance of FLMF Geodatabase and associated spatial data
- Maintain website and map projects
- Assist with LTAP report due September 30, 2009 (GIS analysis, figures etc.)

GIS Program – Debbie Mucha (~40 days per quarter, also includes GIS Specialist and GIS Technician) GIS Vision – technology, software, and hardware scoping, investigation, and evaluation (through learning, training, conferences, seminars), proposals, special projects, GIS communication plan

- Budgeting
- Communications including phone calls, emails, and meetings
- GIS and database software maintenance and licensing
- Funding proposals and partnership building
- Equipment and hardware management including computer and plotter management
- Maintain updated data holdings and metadata for the GIS Program
- FRI tape backups (provide tapes to I.T. for weekly/monthly/yearly backups)
- GIS protocol and procedures document
- Formation of internal and external data sharing polices for the FRI
- Participation of FRI sub-committees and working groups
- Staff training in ArcGIS software and applications
- *Special Project for 2009/2010 (tentative):* GeoConnections Integrated Land Management Project (April 2009 to January 2010). Time for this project would be allocated from GIS Program time. Backfilling of any GIS positions would not be required for this project.
- *Special Project from 2008/2009 work plan (requested by the FRI Program Implementation Team):* Spatial data inventory catalogue for the FRI. The inventory needs monitoring along with the users that are creating metadata. Serve metadata online if software solution is discovered or determined.

Grizzly Bear Program – Gord Stenhouse (43 days/quarter, this includes 18 days per quarter for data management activities and an additional 25 days per quarter for new analytical GIS projects. Please note that the GB Program currently has a fulltime external GIS contractor that supports GB tools and deliverables and GB DNA mapping separate from the projects listed below)

- Database management: loading data into the database, structural upgrades, maintenance (grizzly bear database, microsite database etc.)
- Graph Theory Analysis: Work with Barb Schwab to bring her graph theory code into a format we can run at the FRI; Barb will defend her thesis in January 2009 so should be available to come on site for instruction and training with a GIS person. PRIORITY #1 for GBP GIS analysis projects.
- Movement Analysis: Involved with writing a paper on a comparison between a traditional method of looking at movement data with movement data from Andrew Hunter's pedometer data. PRIORITY #2 for GBP GIS analysis projects.
- How to manage/store Andrew Hunter's camera data: Need to develop a system to store, view and link data with images. PRIORITY #3 for GBP GIS analysis projects.
- Redefine and redesign the grizzly bear database to be a more global (data for all Alberta) and easily accessed by partners and researchers with defined limited access. This project would tie-in our efforts to have data and databases available on our Internet site.
- Provide support for GPS collar data management (scripts, tools, general support)
- Providing general GIS and database support to staff and research students
- Maintaining/updating the health data from Marc Cattett (data comes in 1-3 times per year)
- Providing support to Karen Graham for her 'roads' paper

Jasper National Park (JNP) – Carol Doering (2 days per quarter)

- As needed basis for JNP project support or training

Local Level Indicators (LLI) Program – Debbie Mucha (0.5 days per quarter)

- At the time of this writing the LLI program is wrapping up. Approximately 0.5 days per quarter will be required for website maintenance for the LLI website

Misc. Urgent or Surprise Requests – All program areas and beyond (11 days/quarter)

- Time budgeted for emergency/unexpected requests for GIS/GPS/data management
- May also be used for new program areas that are uncertain of their GIS requirements e.g., Water Program, Circumboreal and Climate Change

Mountain Pine Beetle Fire Ecology Program – Don Podlubny (2 days /quarter)

- General project support

Natural Disturbance – Dave Andison (12 days per quarter)

- General program support - map updates and overlaps from other program areas or the most recent layers of existing data for presentations and "camera ready" stuff for publications

Stream Crossing Association – Ngaio Baril/Jerry Bauer (4 days/quarter, Note: At the time of this writing, project funding for this program is uncertain so this is a general estimate).

- Updating/streamlining of queries for Stream Crossing Report (Deadline: Nov 15, 2009)
- Updates to Stream Crossing database as required
- Data logger support
- Online database technology investigation
- General data management
- Extension and training services for data collection and management
- General mapping support

Yellowhead Ecosystem Group – Bob Udell (4 days/quarter. *Note:* This is a new program so GIS needs are in the process of being determined).

- General data management and the creation of mapping products

6. Objectives and Deliverables for Communications and Extension

The Communications and Extension Plan for GIS is not completed. This plan was started last summer by the GIS intern and is in draft format. Updates and completion of the plan is scheduled for March 2009 with assistance and plan template to be provided by Sean Kinney.

Deliverables currently planned for 2009/2010 that have extension or communication aspects include:

- GIS Day: Plan and participate in GIS Day in November 2009. GIS Day is an international event where users of geographic information systems (GIS) demonstrate real-world applications that are making a difference in our society. Some examples of events include corporate open houses, hands-on workshops, GIS demonstrations, school assemblies, and more. This project is a joint project with the Communications and Extension Program and staff time is provided by each program for 1 day.
- Environmental Education – GIS Based Activities: Participate in GIS / GPS Environmental Education Activities. For example, the JNP Stewardship Program. Will be undertaken collaboratively with Communications and Extension Program. Estimate 1 day from each program.
- Website Improvement: Collaborate with Communications for the website redevelopment and focus on the improvement of the GIS and LLI sections of the FRI website. Estimate 1 day GIS Program time as GIS will do these updates.
- Bulletins: minimum of 1 *Quicknotes* providing summaries of program activities and updates. Time is to be provided by the Communications and Extension Program at 0.5 days.
- Internet Mapping: Work collaboratively with Communications and Extension in linking Internet mapping to the FRI website. The potential GeoConnections project for an Integrated Land Management Decision Support System will require communications and extension support if the proposal is accepted and funded. Time required by the Communications Program will be determined in the final project proposal which will be completed by December 31, 2008.

7. Inter Program Links

Because the main role of the GIS program is supporting FRI Program areas, the GIS Program will be working collaboratively with all program areas listed under Section 5 – Program Objectives. All FRI Program Areas listed in Section 5 will also be involved in the spatial data inventory catalogue for the FRI and the associated creation of spatial metadata. Many program areas will be involved with internet mapping through the GIS Program with an emphasis on the Communications and Extension program. There will also be possible synergies with the Fish and Aquatics Program in relation to the use of LiDAR imagery.

8. Funding Requirements

The GIS Program budget relies on funding provided by the FRI. Outside additional funding opportunities for the next business cycle will be pursued through opportunities such as GeoConnections. The Forestry Corp. provides 10 days per year in-kind technical support for the GIS program and there are 10 FRI project support days provided through the Timberline Natural Resource Group.

Table 1 summarizes the funding requested by item description for the GIS Program.

Table 1: GIS Program Budget Summary for 2009/2010

Item Description	Budget
Salaries and Benefits (3 full-time positions)	$204,400.00
Software	$18,000.00
Hardware	$5,600.00
Training	$7,000.00
Travel	$7,400.00
Office/Administration/Rent/Utilities	$6,250.00
Vehicle (including maintenance, insurance, and lease)	$3,800.00
Contingency/Emergency Fund	$1,500.00
GeoConnections Decision Support System	$60,000.00
Total	**$313,950.00**

Note: The vehicle lease is shared with the Communications and Extension Program. Additional core funds are requested this year due to the costs (hardware, training, travel, rent etc.) associated with the addition of the full-time GIS Technician position and with the addition of the GeoConnections Decision Support System project. For last year's workplan, the additional GIS position was a half-time contractor GIS position.

The GIS Program is requesting $234,500 FRI core funding for the 2009/2010 fiscal year. Additional funds for the budget in Table 1 will be attained through the carry-over of funds from this current fiscal year, through Association charges for GIS support and through possible GeoConnections funding (if this project goes ahead, it will have it's own project code). Please refer to the summary in Table 2 for the breakdown of GIS funding sources for the 2009/2010 fiscal year.

Table 2: GIS Program Budget Funding Breakdown (GIS 100) for 2009/2010

Contributing Organization (Incl. Requested from FRI)	Carry Forward	Cash Committed	Other	Total Confirmed Funding	Comments
FRI – Carry forward from GIS Budget	$30,000	$30,000	0	$30,000	This amount is an estimate. Will need to request all remaining GIS funds for carry-over. Association Hours are not guaranteed and funding will be required for GeoConnections This carry-over is due to the position being vacant for the half-time GIS Technician for a couple of months and the funds from the attainment of the NRCAN Science and Internship Program
FRI Core Funds Requested	0	$234,500	0	0	Core funds requested from FRI, this cannot be confirmed until reviewed and approved by the FRI Board of Directors
Associations (CLMA, SCA, and FGYA)	0	$9,450	0	$9,450	This is an estimate and should not be relied on a source of funding. FGYA will be paying for minimal GIS support for the 2009/2010 fiscal year
GeoConnections	0	0	$40,000	0	The proposal for GeoConnections funding was completed at the time of writing, the results are unknown
Totals	$30,000	$273,950	$40,000	$39,450	

Budget Note: If the requested FRI core funding does not occur, the only area that could be cut without affecting the daily operations of the GIS Program would be Internet Mapping ($20,000). However, FRI would not be able to provide matching funds in order to leverage GeoConnections funding for the Decision Support System project.

$273,950.00 (Total Requested Budget) - $20,000.00 (Internet Mapping Funds Requested) = $253,950.00 (Critical Funding Required)

The below is a detailed description of the items summarized in Table 1 and a description of the associated funds requested for the GIS Program.

Salaries and Benefits ($204,400.00): Covers the required salaries and associated benefits (EI, CPP, payroll costs) for one GIS Coordinator, one GIS Specialist, and one GIS Technician. Also includes a 3% estimate for potential raises associated with the annual performance review for each position.

Software ($18,000.00): Annual ESRI GIS software maintenance fees for 2 Arcinfo licenses and 3 Arcview licenses. These fees are not optional; we are required to pay this for support and upgrades to the software on a yearly basis. This would also cover 3 user licenses for Papertiger software (which helps digitally manage our filing of CDs and DVDs).

Hardware ($5,600.00): This budget covers the cost of computer leases for GIS staff, server lease, MD1000 lease, and the tape autoloader lease.

Training ($7,000.00): Training for all 3 GIS staff. GIS training is expensive (e.g., can be $1200.00 per course) but it is absolutely critical for GIS staff to be knowledgeable about GIS technology and software in order to support program areas in GIS and data management. GIS staff should be trained in ArcGIS Server this upcoming year.

Travel ($7,400.00): Travel for the GIS Coordinator and the GIS Specialist for training, workshops, meetings, and conferences. Will require approximately $2300.00 for the ESRI GIS Conference travel costs for one of the GIS Staff to attend in San Diego, CA in August 2008. This conference is critical for GIS professionals to attend in order to network, attend workshops, presentations, and to learn where the area of GIS is heading into the future. Program areas are to cover the travel/accommodations of GIS personnel that are requested to attend program specific meetings, workshops, or training.

Office/Administration/Rent ($6,250.00): Plotter supplies, office rent, photocopier, office supplies, water, etc.

Vehicle ($3,800.00): The GIS Program splits the cost of lease for a van that is shared with the Communications Program. The requested amount would cover the cost of the shared vehicle lease, insurance, maintenance and repairs.

Contingency Fund ($1,500.00): Emergency contingency funding.

GeoConnections Decision Support System ($20,000): The $20,000.00 being requested for the Decision Support System would be combined with FRI in-kind support and partner support in order to leverage funds from GeoConnections.

9. Program/Project Key Members and Responsibilities

GIS staff will be working on identified GIS and data management projects. GIS staff includes the following 3 positions:

GIS Coordinator – Debbie Mucha
GIS Specialist – Julie Duval
GIS Technician – Katie Yalte

10. Environmental/Occupational Health and Safety/Permits

N/A

11. Appendices

Predicted GIS Time Allocation

Table 3 summarizes the requested GIS support from program areas (please refer to Section #5 – Objectives for a description of GIS Program objectives) for the upcoming fiscal year 2009/2010. For example, the FLMF requires 5 days of GIS support for each individual quarter for a total of 20 days per year. Program areas that require a level of support that is beyond what can be provided by FRI's GIS staff (base level GIS support) will be required to budget for additional GIS support. Three program areas that follow this model are the Foothills Landscape Management Forum, the Aboriginal Involvement Project and the Grizzly Bear Program. The FLMF is currently funding a part-time road researcher, the AIP is funding a near full-time GIS position and the Grizzly Bear Program funds a full-time GIS contractor. It should be noted that if the CLMA, AIP, and Grizzly Bear Programs were not funding their own additional support, that the GIS Program would be unable to meet the requested days for GIS support for these program areas. Over the last two years, the GIS Coordinator has also been coordinating the LLI Program. Duties associated with the LLI Program for the GIS Coordinator are wrapping up and will be completed by March 2009. Other then minimal website maintenance for the LLI website, there are no future duties expected as the LLI Program has ceased. Table 4 is provided as reference for requested GIS support from program areas for the 2008/2009 fiscal year.

With reference to Table 3, the GIS Program is in near equilibrium with the number of support days requested and the number GIS support days available for FRI program areas. The total estimated GIS staff days that are available for requested project work is calculated by the following formula:

(Total workdays/quarter – (statutory holidays + vacation days + estimated sick days + GIS mngt + overhead.)) = GIS days available

Projects that have been listed and approved in Section #5 Objectives, will have first priority for work and completion by GIS staff. The GIS Coordinator will work with project leads to outsource where possible when program area GIS needs cannot be met through available staff hours. Projects that arise during the year that have not been listed in section #5 Objectives will only be completed should projects be approved for that program area's work plan and there be no outstanding deadlines for priority projects (and time permitting). If a program area has firm project deadlines that include GIS deliverables, GIS Staff will require 1 month's notice in order to plan to meet these deadlines. It should also be noted that requested support days for the GIS Program are not guaranteed to be met. In 2007, a GIS work request form was implemented for GIS projects to assist in managing the GIS workload and associated project management. In 2008, a GIS activity team was created to help provide overall direction and review the GIS work plan.

Program area hours can not be transferred from one program area to another program area. This would not be fair to program leads that are responsible for one program area. Unused program hours from previous quarters cannot be totalled and used at the end of the year. This is to avoid a GIS work request crunch at the end of each fiscal year due to program leads trying to use up their requested hours. In addition GIS program area hours cannot be transferred from one fiscal year to the next.

The Forestry Corp. provides 10 days of in-kind technical support time to the GIS program. These days can only be utilized by the GIS Program and are to be utilized at the discretion of the GIS Coordinator and through confirmation with the Forestry Corp.

Table 3 shows that there is an estimated buffer of 0.5 days (surplus). The GIS program is in an excellent position in regards to providing support due to the addition of the full-time GIS Technician Position (Katie Yalte).

It should be noted as a result of the successful submission of the Foothills Research Institute Regional Online Sustainable Land Management Atlas User Needs Assessment (UNA), at the time of this writing, a request for a full proposal for an integrated land management decision support system has been submitted to GeoConnections. If this project proposal is successful, it is estimated that this project will require a minimum of 8 months to complete and will require GIS staff (and other FRI staff) as project team members. Potential time for this project has been budgeted under GIS management within the 40 days per quarter.

Table 3: Estimated/Requested GIS Time Allocation by FRI Program Area for 2009/2010

Task/Program Area	Q1 (A, M, J)	Q2 (J, A, S)	Q3 (O, N, D)	Q4 (J, F, M)	Total
Aboriginal Involvement	1.5	1.5	1.5	1.5	6
Adaptive Forest Management	7	7	7	7	28
Communications	3	3	3	3	12
Fish and Aquatics	13	13	13	13	52
FGYA	1	1	1	1	4
FLMF	5	5	5	5	20
GIS Management	40	40	40	40	160
Grizzly Bear Program	43	43	43	43	172
JNP	2	2	2	2	8
LLI Program	2	0.5	0.5	0.5	3.5
Misc. Urgent Projects	11	11	11	11	44
Mountain Pine Beetle Fire Ecology	2	2	2	2	8
Natural Disturbance	12	12	12	12	48
Stream Crossing Association	4	4	4	4	16
Yellowhead Working Group	4	4	4	4	16
Total Project Days Requested	150.5	149	149	149	597.5
Staff Days Available (3 GIS staff)	155	137	148	158	598

Note: time estimates are in requested days per quarter, and it should be noted that these are estimates. GIS Staff days available takes the total number of work days and subtracts estimated holidays and sick days to get an estimated total number of work days available per quarter.

+0.5 days

Table 4: Estimated/Requested GIS Time Allocation by FRI Program Area for 2008/2009

Task/Program Area	Q1 (A, M, J)	Q2 (J, A, S)	Q3 (O, N, D)	Q4 (J, F, M)	Total
Aboriginal Involvement	1	1	1	1	4
Adaptive Forest Management	7	7	7	7	28
CLMA	10	10	10	10	40
Communications	2	2	2	2	8
Fisheries and Aquatics	12	12	12	12	48
FGYA	5	5	5	5	20
GIS Management	45	45	45	45	180
Grizzly Bear Program	18	18	18	18	72
JNP	2	2	2	2	8
LLI Program	8	2	2	2	14
Misc. Urgent Projects	4	4	4	4	16
Mountain Pine Beetle Fire Ecology	2.5	2.5	2.5	2.5	10
Natural Disturbance	12	12	12	12	48
Social Science	0	0	3	0	3
Stream Crossing Association	5	5	5	5	20
Total Project Days Requested	133.5	127.5	130.5	127.5	519
Staff Days Available (2.5 GIS staff)	131	114.5	130.5	138	514

Risks

-5 days

Risks that might affect the timelines of GIS projects and planning are listed below. Program leads should be aware of these risks, as it is possible that projects timelines, deliverables, and GIS support may be affected should these risks become reality.

- FRI is removed from the Alberta Government Network in 2009/2010 (in this case, program leads should budget a minimum of a 3 week delay in GIS project work).
- GIS does not have plotter access.
- New Program Areas e.g. Water, Circumboreal and Climate Change produce GIS requirements that push available GIS support days into a deficit.
- A GIS staff member is sick/injured for a period of time.
- FRI moves to a different location / building (in this case, program leads should budget approximately a 3 week delay in GIS project work).
- Aboriginal Involvement Program funding for a project specific GIS position does not occur.
- GIS Staff turnover, it will take time to search for, interview, and train a new person.
- Grizzly Bear Program funding for their independent GIS contractor position does not occur.
- FLMF funding for a project specific roads researcher does not occur.
- There are not sufficient GIS software licenses available to complete work.
- There are not sufficient FRI core funds to retain GIS program position(s).
- FRI is removed from the AB Government network and moves to a different location (in this case, program leads should budget approximately a 6 week delay in GIS project work.
- Knowledge transfer, data sharing, and GIS standardization within the FRI is reduced in a GIS context due to some programs having their own GIS technician and contractors.

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110 - Establishing Biophysical Targets for Sustainable Forest Management Planning Through the EMEND Project

1. Prepared by

Dr. John Spence, Chair and Professor
Department of Renewable Resources
University of Alberta
751 General Services Building
Edmonton, AB T6G 2H1
Ph: 780-492-1426
Fax: 780-492-4323
Email: john.spence@ales.alberta.ca
Project Manager: Dr. John Spence

2. Sign off Sheet

_____ Dr. John Spence, University of Alberta

_____ John Stadt, Alberta Sustainable Resource Development

_____ Dr. Jan Volney, Canadian Forest Service

_____ Jim Witiw, Daishowa-Marubeni Int.

_____ Christine Quinn, Canadian Forest Products Ltd.

_____ Tom Archibald, Foothills Research Institute

3. Executive Summary

The project entitled, "Establishing Biophysical Targets for Sustainable Forest Management Planning Through the EMEND Project" is a new FRI program for 2009. Over the next three years the program aims to develop clear and measurable sustainability targets for the 'Values, Objectives, and Indicators' outlined in Annex 4 of the Alberta Forest Management Planning Standards, as required by the Alberta Ministry of Sustainable Resource Development.

4. Background Information

Forest resources provide a wide range of economic, social, and environmental benefits to Albertans and forest management agencies are being challenged to demonstrate that these forest resources are managed sustainably. In Alberta, approved Forest Management Plans (FMPs) include objectives and strategies that reflect acceptable tradeoffs among the principal values derived from the forest land-base. The 'Values, Objectives, and Indicators' outlined in the Alberta Forest Management Planning Standard and elaborated in Annex 4 serves as a guide for developing these FMPs. However, the Planning Standard does not provide specific 'Targets' for each objective. These targets are presently developed through a company-led interactive negotiation process with government that

involves other stakeholders; however, there is a need to develop scientific information about reasonable and useful targets that can be practically applied to ensure sustainable forest management (SFM). Furthermore, increasingly complex demands on land and forest resources requires that the Government of Alberta (GOA) now provide clear direction for setting appropriate targets in the context of forest management objectives to ensure that forest management meets goals articulated in the planning standard.

The EMEND (Ecosystem Management Emulating Natural Disturbance) experiment in northwestern Alberta provides a near ideal opportunity to investigate and define appropriate levels for several such sustainability targets. This work can be greatly facilitated by EMEND because the experiment seeks to understand the complex relationships among several indicators of biophysical sustainability. EMEND includes an explicit comparison of conditions in harvested stands with those in burned stands as a basis for judging the approach of forestry practices in relation to the state of stands perturbed by fire, the most common natural disturbance in the region. A unique feature of this work is the array of ecosystem response variables that has been or will be tracked before (1998) and after the harvests were applied (1999 – 2009). As the experiment employs operational-scale treatment blocks that are embedded in a landscape actively managed for timber production, EMEND results will have the immediate relevance that few other investigations of this problem can achieve. The experiment is now approaching its 10th year post-treatment and requires resources to complete the first decadal reassessment of treatment responses. These responses are highly relevant to establishing targets for indicators of sustainability.

The responses monitored in the EMEND experiment provide a sound template to address four of the six CCFM Criteria listed in ANNEX 4 of the Performance Standards. These include 1) Biological Diversity, 2) Ecosystem Productivity, 3) Soil and Water, 4) Biogeochemical Cycles. The appeal of the EMEND template is that it monitors indicators or sustainability for each of these criteria, individually and in combination, on the same land-base and across the full range of boreal mixedwood cover-types. The work also supports definition of protocols for extrapolation of the detailed results to the landscape level and tests of these extrapolations are underway. As such, the experiment permits an unrivalled basis for establishing the relationships among intensity of harvesting and indicators of SFM. The objectives and deliverables proposed here provide a clear direction on the setting of targets for forest objectives to ensure that Alberta's forests will provide the range of benefits that Albertans expect.

The Biophysical Targets for SFM Planning Program is a new program for 2009-2010 and thus work toward meeting all objectives laid out here will be initiated January 2009. The program objectives will be achieved through analysing existing data in the extensive EMEND database along with field work to collect 10 year post-harvest data.

5. Objectives

The primary objective of the Biophysical Targets for SFM Planning Program is to establish recommendations for clear, measurable targets to guide development of objectives and targets for Detailed Forest Management Plans as required by the Alberta Forest Management Planning Standard. These objectives will be achieved through analysing existing data in the extensive EMEND database along with field work to collect 10 year post-harvest data. The program is scheduled for three years and consists of three projects:

Project 1: Forest Sustainability Targets for CCFM Criterion 1: Biological Diversity.

Directed by John Spence, University of Alberta, this Project will use existing data within the EMEND Project Database and the 10 year post-harvest data collected via this program to establish realistic and implementable sustainability targets for forest biological diversity. Project 1 is scheduled to start 2009 and run until 2011.

Project 1 Deliverables for 2009:

Field Work

1. Collect baseline biodiversity data for ground arthropods. Timeline May-September 2009.
2. Collect baseline biodiversity data for understory vegetation. Timeline May-September 2009.

Synthesis work

1. Hire a post-doctoral fellow as Science Lead. Timeline: 30 March 2009.
2. Use existing EMEND data for the following objectives.
   Produce an inventory of species found on the EMEND landscape and associate these with the cover-type, successional stage, proximity to undisturbed stands and access roads. Timeline: September 2009.
   Associate measures of biotic community composition, richness and diversity with forest ecosite categories to provide an easily monitored parameter for wide-ranging biodiversity assessment. Timeline: October 2009.
   Prepare an analysis of the relationship between the attributes described in 1 and 2 to determine how forest landscape criteria might be configured into targets to address CCFM Objectives 1.1.1.1 through 1.1.1.5 as a strategy for maintaining biological diversity on forested boreal landscapes. Timeline: September 2009.
   Produce a synopsis of stand characteristics including standing timber, biomass of trees and shrub and coarse woody material in conjunction with mensurational data. Timeline: October 2009.
   Link stand characteristics (item 4) and the associated plant and arthropod species (parts of item 1) to determine how targets to meet objectives for stand level structure (1.1.2.1 and 1.1.2.1) can be configured. Timeline: November 2009.
3. Produce interim report for Project 1. December 2009.

Project 2: Forest Sustainability Targets for CCFM Criterion 2 and 3: Ecosystem Productivity and Soil and Water.

Directed by John Spence, University of Alberta, this Project will use existing data within the EMEND Project Database and the results from Project 1 to establish realistic and implementable sustainability targets for forest ecosystem condition and productivity and soil and water processes. Project 2 is scheduled to start 2009 and run until 2011.

Project 2 Deliverables for 2009

Field work

1. Upgrade and repair existing hydrology monitoring data loggers at the EMEND Research Site. Timeline: May 2009.
2. Collect ground water flow data using already installed peizometer wells.

Synthesis work

1. Develop biomass equations to estimate productivity of forest stands using existing EMEND data. Timeline: March 2009.
2. Produce an interim report on biomass and productivity of the EMEND experimental area. Timeline: December 2008.

Project 3: Forest Sustainability Targets for CCFM Criterion 4: Global Ecological Cycles.

Directed by John Spence, University of Alberta, this Project will use existing data within the EMEND Project Database and the results from Projects 1 and 2 to establish realistic and implementable sustainability targets within the CCFM Criterion 4 –Global Ecological Cycles. Project 3 is scheduled to start 2010 and run until 2011.

Project Deliverables for 2009

None, project will be initiated in 2010.

6. Objectives and Deliverables for Communications and Extension

The program will develop a detailed communication and extension plan by March 2009 for submission to the FRI Communications and Extension program.

1) Host a workshop for EMEND and FRI partners and participants with a focus on indicators and targets of sustainable forest management. Timeline: 16-17 April 2009.
2) Host a field tour of EMEND Project for FRI personnel. Timeline: Summer 2009
3) Develop a Quicknote describing Projects 1 and 2. Timeline: August 2009.
4) Develop an interim report for Project 1 by December 2009.

7. Inter Program Links

We propose to develop linkages that may be useful with other FRI projects during the first year (i.e. Natural Disturbance and Water For Life Programs). International linkages exist with research programs in Finland (Jari Kouki, University of Joensuu) and Australia (Simon Grove, Forestry Tasmania) and we propose to develop further international linkages through the Circumboreal Initiative.

8. Funding sources for this period

Table 1: 2009 Budget:

Budget Category	Budget Item	Total Amount	FRI Contribution	EMEND Contribution
Staffing	Post-doctoral fellow, 1 yr salary + benefits	$48,000	$48,000	
	EMEND Field Coordinator, 1 yr salary + benefits	$60,000	$30,000	$30,000
	EMEND Data Manager, 1 yr salary + benefits	$40,000	$20,000	$20,000
	EMEND Summer Core Staff (6 staff @ $2300/month for 4 months)	$55,200	$27,600	$27,600
Field Work	Supplies	$6,000		$6,000
	Vehicle Fuel and Maintenance – 2 trucks	$10,000		$10,000
	ATV fuel and maintenance – 7 ATVs	$7,000		$7,000
	Accommodation (EMEND Facility at $75/person/night)	$38,000		$38,000
	Equipment - calibration and repairs for hydrology data loggers (Project 2)	$8000		$8000
Meetings	Annual EMEND workshop ($1200 Hosting, $1800 Travel)	$3000		$3000
	Annual Activity Team meeting (Travel)	$4000	$4,000	
Technology Transfer	Field tour for FRI partners	$3000	$3000	
	Totals	$282,200	$132,600	$149,600

Table 2: Funding Sources 2009.

(Biophysical targets for SFM Planning & Code)

Contributing Organization (Incl. Requested from FtMF)	Carry Forward	Cash Committed	Total Confirmed Funding	In-kind Support	Comments (including in-kind descriptions)
Foothills Research Institute		$132,600	$132,600		Funding via ASRD
EMEND Project		$149,600	$149,600	$800,000	$800,000 for existing datasets to be used for analysis
Canadian Forest Service				$50,000	10,000 Salary in-kind + existing Hydrology data loggers.
University of Alberta				$15,000	Salary in-kind, administrative/tech support
DMI				$5,000	Salary in-kind
Canfor				$5,000	Salary in-kind
SRD				$10,000	Salary in-kind
Totals		$282,200	$282,200	$835,000	

Note: In-kind salary support is estimated. Actual value depends on total time commitments required by Activity Team members for required meetings and input into review of Targets. Contribution from EMEND Project is an estimate of costs associated with the data collection process from the past 10 years of field work at EMEND.

9. Program/Project Key Members and Responsibilities

The Program Activity team consists of all members from EMEND Management Committee (EMC) and a representative from the Foothills Research Institute.
The EMC includes representatives from ASRD Forest Management Branch, two industrial partners (DMI and CanFor) and two research agencies (University of Alberta, Department of Renewable Resources and Natural Resources Canada, Canadian Forest Service). It is expected that findings of the research and analyses will be open to all members of the Activity Team for comment to improve interpretations of results. The EMC functions to develop a consensus view on issues without undue influence of any partner. It is expected that this will continue with respect to the scientific aspects of this project. Additional Activity Team members are pending development of linkages to other FRI programs.

Program Key Members:

John Spence - Program lead and Academic lead.

Spence will oversee program progress and ensure objectives are met by required timelines. Spence will also act as supervisor to all academic staff and technicians related to the program.

Contact: Dr. John R. Spence, Professor & Chair
Department of Renewable Resources
751 General Services Bldg
University of Alberta
Edmonton, Alberta T6G 2H1
Tel: 780-492-1426
Fax: 780-492-4323
E-mail: John.Spence@ualberta.ca

To be Named – Science Lead

This position is to be filled by 30 March 2009. Primary tasks will be to analyze data and prepare final reports.

John Stadt - Provincial Government Representative and Policy/Planning Implications lead.

Forest Management Branch staff will assist and guide each facet of program delivery. Stadt will ensure direct linkage between the Forest Planning Section and members of the research program and ensure all results are directly applicable to the Forest Management Planning Standards. Stadt will serve as liaison between SRD staff and the EMC.

Contact: Mr. John Stadt, Forest Ecology Specialist
Alberta Sustainable Resource Development
Forest Management Branch
8th Floor, Great West Life Building
9920 108 Street
Edmonton Alberta T5K 2M4
Tel: 780-422-3047
Fax: 780-427-0084
E-Mail: John.Stadt@gov.ab.ca

Jan Volney - Federal Government Research Representative.

Volney will provide federal government insight to the results and outcomes of this program. Volney will ensure program results and implications are applicable at a national level.

Contact: Dr. Jan Volney, Senior Research Scientist
Northern Forestry Centre, Canadian Forest Service
5320 - 122 Street
Edmonton AB T6H 3S5
Tel: 780-435-7329
Fax: 780-435-7359
E-mail: Jan.Volney@nrcan.gc.ca

Jim Witiw - Forest Industry Representative

Witiw will be responsible for ensuring all forest management recommendations are practical and directly implementable by the forest industry in Alberta. Witiw will focus on applying research results at the FMA level.

Contact: Mr. Jim Witiw,
Forest Resource Coordinator - Biodiversity Stewardship
Forest Resources Business Unit
Daishowa-Marubeni International Ltd.
Peace River Pulp Division
Postal Bag 6500
Peace River, Alberta T8S 1V5
Tel: 780-624-7430
E-Mail: jwitiw@prpddmi.com

Christine Quinn - Forest Industry Representative

Quinn will be responsible for ensuring all forest management recommendations are practical and directly implementable by the forest industry in Alberta. Quinn will focus on applying research results at the forest tenure holder level.

Contact: Mrs. Christine Quinn, Planning Forester
Canadian Forest Products Ltd.
9401 108 Street
Postal Bag 100
Grande Prairie Alberta T8V 3A3
Tel: 780-538-7738
Fax: 780-538-7800
E-mail: Christine.Quinn@canfor.com

Tom Archibald – Foothills Research Institute Representative.

Archibald will represent the interests of the Foothills Research Institute and ensure the Activity Team meets all Institute administrative requirements.

Contact: Mr. Tom Archibald, General Manager
Foothills Research Institute
Box 6330
Hinton, Alberta T7V 1X6
Tel: 780-865-8332
Fax: 780-865-8331
E-Mail: Tom.Archibald@gov.ab.ca

10. Environmental/Occupational Health and Safety/Permits

None.

11. Appendices

1. Appendix 1: EMEND FRI Proposal
2. EMEND Background Document
3. References.

Alberta Forest Management Planning Standard, Alberta Sustainable Resource Development, Public Lands and Forests Division, Forest Management Branch
Version 4.1 - April 2006

Criteria and Indicators of Sustainable Forest Management in Canada: National Status 2005. Canadian Council of Forest Ministers, 2006.

Foothills Research Institute Annual Work Plan For 2009/10

128 - Natural Disturbance Program

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Introduction

The Foothills Research Institute and its' partner organisations initiated a program in 1995 to study and describe natural and cultural disturbance across over two million hectares in the Rocky Mountains and Foothills natural regions. The program, and its' inclusive projects, are designed to deliver research, communication, and implementation initiatives to support and demonstrate the integration of natural disturbance patterns into forest land management. In recognition of the significant scope of this mandate, a long-term natural disturbance research program (or business plan) for the Foothills Research Institute was first drafted in 1996, and has since been updated eleven times (Andison 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2006, and 2008).

The long-term plan now includes a detailed list of over 50 individual research projects that range in scope from empirical data collection, to communication, to simulation modelling, to decision-support tools. Together, the projects represent a package of potential knowledge on how natural disturbance-related processes created the historical patterns in Alberta and beyond. The projects listed in this annual work plan represent the most recent priorities of the various ND Program partners in the context of the work already accomplished by the program and the available resources.

All ND projects listed in the long-term plan are connected to each other through scale, but also through one of three key priority areas; 1) research, 2) communication, and 3) integration. It is important to realize that it is the overall package of project results that provides the greatest benefits, and that this work plan is the eleventh such iteration of that holistic plan. The specific linkages are listed in the individual projects, as they are applicable. It is a formulae that has worked well in the past, and after ten years, the FRI ND Program is arguably one of the more influential SFM programs in western boreal Canada.

The 2009/10 version of the ND work plan includes 14 projects, and a total budget of $880,911.38. The "base budget" of the FRI ND program from the four main program partners is as follows:

81,000 - Hinton Wood Products
33,000 - Alberta Newsprint Co.
23,000 - Alberta Sustainable Resource Development
40,000 - Jasper National park
$177,000 TOTAL

Expenditures above and beyond the base budget of the program (directed towards individual projects) are identified in Table 1, and in each project budget

Table 1. Summary of ND Project Budget for 2009/10.

Project	Code	Funding 2009/10					Expenditure in '09/10	Carryover to '10/11
		From 08/09	ND Base Budget	Other	In-Kind	Total (cash only)		
Program Coordination	128	0	53,000		6,000	53,000	53,000	0
Communications & Extension	128.8	0	52,000		5,000	52,000	52,000	0
Large Woody Debris	128.6	0	5,000	60,000	18,000	65,000	65,000	0
NRV Short Courses I and II	128.9	0	17,000	60,000	10,000	77,000	77,000	0
Hwy40 Demo – Caribou	128.4	105,000			7,000	105,000	25,000	80,000
East Slopes Fire / MPB Regimes	128.16	118,911.38				118,911.38	35,000	83,911.38
Harvesting / Fire Integration Demo	128.17	10,000			6,000	10,000	10,000	0
Natural Wildfire Patterns	128.3	100,000		10,000		110,000	110,000	0
Cultural Wildfire Patterns	128.11	4,000	40,000			44,000	44,000	0
NRV Panning Tool – NEPTUNE	128.5	15,000			3,000	15,000	10,000	5,000
Healthy Landscapes	128.15	95,000				95,000	95,000	0
Historical Event Patterns	128.14	48,000				48,000	48,000	0
Sub-surface Fire Severity Project	128.18	25,000				25,000	25,000	0
Land-Water DSS development (WFL)	228	18,000	10,000	35,000	10,000	63,000	35,000	28,000
TOTAL		**538,911.38**	**177,000**	**165,000**	**65,000**	**880,911.38**	**684,000**	**196,911.38**

1. Prepared by

Dr. David Andison
3828 West 22nd Ave, Vancouver, BC, V6S 1J7
Phone: (604) 225-5669 Fax:(604) 225-5668
Email: andison@bandaloop.ca

2. Sign off (FRI ND Activity Team)

Rick Bonar, Hinton Wood Products Ltd. _____

Greg Branton, Alberta Newsprint Company _____

Tom Archibald, FRI _____

David Smith, Jasper National Park _____

Herman Stegehuis, Alberta SRD _____

John Stadt, Alberta SRD _____

3. Executive Summary

This is a general project category that includes all expenditure associated with running a complex, connected *program*. The Natural Disturbance Program is now responsible for more than ten research, education, communication, integration, and demonstration projects, several of which involve external partners. A sustained effort is required to ensure that all current and future projects are consistent with the mandate of the ND Program specifically, and the goals of the FRI in general. Specific tasks under this project include applying for external funds, drafting the work plan and updating the long-term (business) plan and communications plan, expanding the partnership base, soliciting and hiring staff and sub-contractors, commitments related to the Research Institute network, meetings and presentations to the FRI activity team and board of directors, working with other FRI program leads on project integration, dealing with requests and queries, administration, budgeting, training and supervision of staff and sub-contractors, administrative support, and office and utilities costs.

4. Background Information

The ND Program has had a long-term (business) plan for eleven years, and a communications plan for six years. Version 11 of the long-term plan was completed in November of 2008. Two internal program reviews have been completed over the last ten years, one in 1998, and another in 2002, with an external review pending.

5. Objectives

Objective #1: Hold at least two NDP activity team meetings.

Objective #2: Meet all FRI work plan, administrative, and budgetary requirements.

Objective #3: Meet with other FRI program leads at least two times to discuss integration opportunities between projects.

Objective #4: Develop and deliver the annual ND Program work plan to the satisfaction of the FRI and the NDP activity team.

Objective #5: Continue to build and market the project, partnership, and support base as relates to ND program objectives.

6. Objectives and Deliverables for Communications and Extension

None.

7. Links

The ND Program has direct links to the FRI Water for Life Program, the FRI Fish and Watershed Program, and the FRI Communications and Extension Program. Discussions are ongoing with the MPZB, FLMA and the Aboriginal Programs.

8. Funding sources for this period (128)

All funds for this activity will come from the NDP base budget (with the original funding source shown in brackets).

Contributing Organization (Incl. Requested from FRI)	Carry Forward 09 / 10	Cash Committed 09 / 10	Total Confirmed Funding	In-kind Support	Comments
FRI ND base		53,000	53,000		
Activity team time & travel				6,000	
Totals		53,000	53,000	6,000	

9. Program/Project Key Members and Responsibilities

Dr. David Andison, Bandaloop	- Program leader
Mr. Chris Stockdale	- Project coordinators
Dr. Rick Bonar, HWP	- Activity team
Mr. Greg Branton, ANC	- Activity team
Mr. Herman Stegehuis, ASRD	- Activity team
Mr. Dave Smith, JNP	- Activity team
Mr. Tom Archibald, FRI	- Activity team

10. Environmental/Occupational Health and Safety/Permits

None.

11. Appendices

Version 11 of the ND Strategic Plan is available upon request.

Natural Disturbance Program – Communications and Extension (128.8)

1. Prepared by

Dr. David Andison
3828 West 22nd Ave, Vancouver, BC, V6S 1J7
Phone: (604) 225-5669 Fax: (604) 225-5668
Email: andison@bandaloop.ca

2. Sign off (FRI ND Activity Team)

Rick Bonar, Hinton Wood Products Ltd. _____

Greg Branton, Alberta Newsprint Company _____

Tom Archibald, FRI _____

David Smith, Jasper National Park _____

Herman Stegehuis, Alberta SRD _____

John Stadt, Alberta SRD _____

3. Executive Summary

As per the long-term plan of the ND program, the emphasis on communication and extension has been steadily increasing over the last few years. Today, it is one of the fundamental elements of the program, and all indications are we have been successful. A recent survey revealed that 90% of the land management organizations in Alberta have used, or are using information, knowledge, or tools created by the FRI ND program. The communications strategy of the FRI ND program is to develop a broad range of C&E products that are accessible to as wide an audience as possible. For example, the ND Program now boasts five different, but connected types of written material through the FRI; the *Quicknote* series, the *Integration Note* series, the *Research Report* series, the *Research Methods* series, and the new *Demonstration series*. In addition, there are also scientific manuscripts, posters, and news articles. Presentations, tours, workshops, and invited lectures to a wide range of professional and public audiences remain a mainstay of the ND program C&E efforts. Attending and presenting findings at conferences and other academic venues is necessary to help maintain scientific credibility.

4. Background Information

The ND Program created a Communications and Extension plan five years ago with the assistance of the FRI C&E Program.

5. Objectives

None.

6. Objectives and Deliverables for Communications and Extension

C&E Objective #1: Produce four Quicknotes.

C&E Objective #2: Produce one Integration Note.

C&E Objective #3: Produce two first draft manuscripts.

C&E Objective #4: At least four presentations on various ND topics.

C&E Objective #5: At least one presentation at a scientific conference.

7. Links

N/a

8. Funding sources for this period (128.8)

All funds for this activity will come from the NDP base budget (with the original funding source shown in brackets).

Contributing Organization (Incl. Requested from FRI)	Carry Forward 06 / 07	Cash Committed 08 / 09	Total Confirmed Funding	In-kind Support	Comments
FRI ND base		52,000	52,000		
FRI C&E Program				5,000	
Totals		52,000	52,000	5,000	

9. Program/Project Key Members and Responsibilities

Dr. David Andison, Bandaloop	- ND Program lead
Mr. Chris Stockdale	- ND Projects coordinator
Mr. Sean Kinney	- FRI C&E support

10. Environmental/Occupational Health and Safety/Permits

None.

11. Appendices

Version 11 of the ND Program Long-Term Plan and the ND Communications and Extension plan are available upon request.

Natural Disturbance Program – Coarse / Large Woody Debris Study (128.6)

1. Prepared by

Dr. David Andison
3828 West 22nd Ave, Vancouver, BC, V6S 1J7
Phone: (604) 225-5669 Fax: (604) 225-5668
Email: andison@bandaloop.ca

2. Sign off (FRI ND Activity Team)

Rick Bonar, Hinton Wood Products Ltd. _____

Greg Branton, Alberta Newsprint Company _____

Tom Archibald, FRI _____

David Smith, Jasper National Park _____

Herman Stegehuis, Alberta SRD _____

John Stadt, Alberta SRD _____

3. Executive Summary

Riparian zones pose a unique challenge for an NRV framework. Foothills Research Institute (FRI) Research suggests that riparian zones are historically disturbed by wildfire (a chemical disturbance process) almost as often as upland areas of the landscape. There are many examples of the positive biological benefits of disturbance in riparian zones from both an aquatic and terrestrial perspective. However, harvesting - a mechanical disturbance process - increases the risk of soil compaction and erosion, and physical damage to the aquatic system, and removes critical large biomass. On the other hand a disturbance avoidance-protection strategy will likely result in the slow degradation of the "natural" biological system. Neither management solution is ideal since both represent a significant shift away from how the natural system functioned. It was our belief that a more robust management solution begins with a better understanding of the patterns and process of riparian zone dynamics. Towards that larger goal, we chose to focus first on gathering new knowledge on the dynamics of large woody debris (LWD). Not only does LWD play a key role in the functioning of both aquatic and terrestrial ecosystems, but also the FRI is particularly well positioned to address this issue. To facilitate this work, the FRI Natural Disturbance (ND) Program and the FRI Fish and Watershed (F&W) Program initiated a partnership several years ago to address separate, but linked LWD questions. The F&W program focused on methods of quantifying overall LWD budgets, and the relationships between LWD and other physical stream characteristics such as sediment loads and stream structure. The ND program initiated work that focused on tracking the "life" of LWD over time, from recruitment through the many stages of decay and function. In other words, when is woody debris created, by what disturbance mechanism, when, how much, and how long does it last in various stages of decay? Without knowledge of these very fundamental questions, we are not likely to sustainable choices for LWD values in riparian zones over the long–term. The ultimate goal of the project also involves some field-scale LWD decision-support tools for planners.

4. Background Information

Under the auspices of the ND Program, HWP and ANC first sponsored this research in 2004 through a pilot study carried out by a graduate student at UBC Department of Geography. These funds represented a financial commitment above and beyond the base FRI ND budget, other than the time and travel of the ND program lead. Based on the complex findings from the first study, HWP and ANC agreed to extend the study both in breadth and depth for another three years. A Post-Doctoral Fellow with UBC Geography has been retained to lead the work, and ANC and HWP have agreed to fund this position above and beyond the base budget for the ND Program. We were successful in obtaining ACA and matching NSERC CRD funding. The efforts to ensure that this work integrates with the LWD and stream work of the FRI F&W program will continue. This is year three of a three year project

5. Objectives

Objective #1: Sample at least 10 sites for LWD.

Objective #2: Process the summer '08 samples.

Objective #3: At least one meeting with F&W Program lead to discuss integration.

Objective #4: Participate in any new Water related proposals relevant to this work.

6. Objectives and Deliverables for Communications and Extension

C&E Objective #1: Lead one field tour.

C&E Objective #2: One conference presentation.

7. Links

Intra-Program Links:
This project is part of the NDP long-term plan, and the concept developed from basic disturbance research efforts in riparian zones. The ultimate plan is to link the results of this back to several ND projects such as LANDMINE simulation modelling and the riparian disturbance research results. Furthermore, this project is using many of the databases that the ND program has created over the last several years, including the stand origin maps and detailed fire patterns of historical wildfires.

Inter-Program Links:
The riparian dynamics work at the FRI has been a collaborative effort between the ND Program and the Fish and Watershed Program for several years now. For this project, we will make every effort to share study sites, data sources, and sampling methods, and we will continue efforts to maximize the opportunities for research and tool integration.

External Program Links:
UBC Department of Geography is the scientific lead on this project, through Dr. Lori Daniels. Dr. Marwan Hassan, also in the Geography Department, is the scientific lead on the F&W LWD research. This project also may become part of an integrated Water For Life proposal in collaboration with a dozen other scientists and professionals.

8. Funding sources for this period (128.6)

The annual commitment of 30k each from ANC and HWP to support the UBC post-doc position is above and beyond the ND base budget contributions. We were successful in obtaining an NSERC collaborative industrial grant for matching funds. The remaining 5k base funds are FRI ND program support to UBC, and integration with F&W.

Contributing Organization (Incl. Requested from FRI)	Carry Forward 08 / 09	Cash Committed 09 / 10	Total Confirmed Funding	In-kind Support	Comments
FRI base (HWP)		5,000	5,000		Assistance, support, GIS.
NSERC		60,000	60,000		Industrial Development Grant
UBC				18,000	Time, office and lab space, supplies.
Totals		65,000	65,000	18,000	

9. Program/Project Key Members and Responsibilities

Dr. David Andison	- ND program lead
Chris Stockdale	- Project assistance
Dr. Lori Daniels	- Principle Investigator
Dr. Trevor Jones	- Post-Doc Researcher

10. Environmental/Occupational Health and Safety/Permits

None.

11. Appendices

None.

1. Prepared by

Dr. David Andison
3828 West 22nd Ave, Vancouver, BC, V6S 1J7
Phone: (604) 225-5669 Fax: (604) 225-5668
Email: andison@bandaloop.ca

2. Sign off (FRI ND Activity Team)

Rick Bonar, Hinton Wood Products Ltd. _____

Greg Branton, Alberta Newsprint Company _____

Tom Archibald, FRI _____

David Smith, Jasper National Park _____

Herman Stegehuis, Alberta SRD _____

John Stadt, Alberta SRD _____

3. Executive Summary

Interest in natural disturbance patterns has grown at a rapid pace over the last few years. The interest in, and attraction to natural disturbance emulation strategies is understandable. Such knowledge can potentially be used as ecologically-defendable "coarse filters" to help guide forest management decision-making. However, despite its potential, using natural disturbance patterns to help forest management is still a fragile proposal. There is broad agreement by forest and land managers that the concept of using natural patterns to guide management decisions is a good idea. However, there is an obvious and significant gap on how, where, when, and even if natural patterns should be applied in forest management decision-making. This disparity is potentially affecting the quality of decisions as they relate to the ultimate goal of sustainable land management. For example, small differences in levels of understanding, perception, or the meaning of natural disturbance terms can lead to disagreements, prolonged approval process, and the rejection of what might be progressive plans. These in turn lead to the erosion of trust, decreased likelihood of achieving adaptive forest management, and the adoption of more conventional rules. Ultimately, this may lead to the rejection of all natural disturbance (ND) approaches, which may represent a significant lost opportunity for Alberta, and potentially a diminished progression of sustainable forest management ideals. The solution for many other jurisdictions has been to develop prescriptive "guidelines" that mandate the details of how, what, and where to harvest. However, this solution does not always allow for exploration and experimentation, or necessarily a true understanding of the value of coarse-filter knowledge. We feel that the answers lay less in science than they do education and communication based on sound science. By exposing Alberta's forestry professionals to the same basic general level of knowledge about NRV as we know it today, we are better able to build a universal foundation of understanding and language. Towards this, in 04/05 we began developing an intensive 3 day short course "primer" on natural disturbance. As the first in a series of three short courses, it covers the basics, including nomenclature, the theoretical underpinnings, examples of comparisons with current practices, different models of integration, an overview of research challenges, and research output interpretation.

4. Background Information

Course #1 was completed in '06/07 and was offered three times in 2007 and twice more early in 2008. For now, the course sponsors (HWP, ANC, JNP, ASRD, and SIAST) are supporting each and every course offering since they shared the cost of the original course development. The course offerings in 2009/10 will be given at a cost-recovery basis. We are projecting another two courses somewhere across Canada, with an average of 20 students per course. In addition, based on feedback from students, work on course #2 will commence in 2009/10 as well.

5. Objectives

Objective #1: Offer and deliver NRV course #1 at least twice.

Objective #2: Begin development of materials for course #2.

6. Objectives and Deliverables for Communications and Extension

C&E Objective #1: Help develop marketing materials for the short courses.

7. Links

Intra-Program Links:
This project is part of the NDP strategic plan.

Inter-Program Links:
The course has been developed collaboratively with the FRI Communications and Extension Program, and this association will continue throughout '09/10.

External Program Links:
Bandaloop will continue to donate time towards course marketing and development.

8. Funding sources for this period (128.9)

Assuming the current difficult economic situation for forest management partners continues, we have trimmed the tuition fee to include only cost-recovery. The course will be offered as many times as the market demands, which we assume will be two times in 09/10. The funds to start development of course #2 will come from the base budget.

Contributing Organization (Incl. Requested from FRI)	Carry Forward 08 / 09	Cash Committed 09 / 10	Total Confirmed Funding	In-kind Support	Comments
Course fees collected		60,000	60,000		Based on 3 courses x 20 students x $1,000 tuition fees
Bandaloop				5,000	Professional time.
FRI Admin, C &E, and GIS support				5,000	Portion of course fees that will go into the development of course #2.
HWP (base)		17,000	17,000		
Totals		77,000	77,000	10,000	

9. Program/Project Key Members and Responsibilities

Dr. David Andison	- Course Coordinator
Sean Kinney	- FRI C&E Liaison

10. Environmental/Occupational Health and Safety/Permits

None.

11. Appendices

None.

1. Prepared by

Dr. David Andison
3828 West 22nd Ave, Vancouver, BC, V6S 1J7
Phone: (604) 225-5669 Fax: (604) 225-5668
Email: andison@bandaloop.ca

2. Sign off (FRI ND Activity Team)

Rick Bonar, Hinton Wood Products Ltd. _____

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Tom Archibald, FRI _____

David Smith, Jasper National Park _____

Herman Stegehuis, Alberta SRD _____

John Stadt, Alberta SRD _____

3. Executive Summary

The volume of natural disturbance pattern results from the FRI Natural Disturbance Program and beyond has been tremendous over the last several years. The challenge now has shifted to more practical considerations of implementation guidelines, operational realities, ecological impacts, and social and economic limitations. While small, isolated integration efforts have become fairly commonplace, no one has tried to integrate a wide range of many different NRV patterns, and develop a plan based on NRV patterns from step 1 across a very large area. The Hwy40 Natural Disturbance Demonstration project (originally from the FRI ND 2003/04 work plan) was designed to borrow heavily from the natural disturbance toolkit to install a large experiment on or near the FRI landbase to test various ecological, social, and economic aspects of adopting some or all parts of the natural disturbance model. The outcome from the original Hwy40 Demo project is a 10-year "disturbance plan" that identifies locations, sizes, and types of planned disturbance activities for a 70,000 ha area including parts of the Hinton Wood Products, ANC, and Foothills Forest Products management areas, and the Willmore Wilderness Area. This is the first such plan of its type, in no small part because it considered the entire land area for disturbance activities, and thus logging will be combined with prescribed fire and other (non-merchantable) mechanical treatments, as well as oil and gas activities where possible, to achieve our disturbance design.

The three main objectives of the Hwy 40 Demo project are:

a. Evaluate the robustness of an NRV strategy as a package.
b. Identify and explore potential convergences and conflicts with existing policies, practices, objectives, and other economic, social, and ecological values, and.
c. Build a common understanding of the concept and practice of adopting a natural disturbance based plan.

It would be difficult to achieve these goals without developing a comprehensive monitoring program for the Hwy40 project linking a coarse filter-based plan to specific fine filter predictions and outcomes. The most

obvious species for monitoring in this area is woodland caribou. The location of the Hwy40 study site overlaps a portion of the current range of the A la Peche herd. The opportunity to not only learn about how caribou respond to the unique disturbance activities in Hwy40, but also to add to the overall understanding of woodland caribou dynamics, makes this an ideal opportunity for both monitoring and research activities. Despite some excellent recent focused research, little is known about why, when, or how woodland caribou migrate or choose to move from one geographic location to another. Given the state of caribou herds, and our insistence of focusing on "protection" strategies until now, this knowledge will be critical to the survival of the species in Alberta.

4. Background Information

During 2005 and 2006, we successfully secured funds from HWP, ANC, ASRD, and FRIAA OPEN FUNDS to support this project above and beyond the ND program base budget. With the help of ASRD F&W, we deployed one caribou collar in the spring of 2006. That summer we contracted a dedicated wildlife biologist, Matt Wheatley. Under Matt's leadership, in December of 2006 we recovered the first collar and collared seven animals with very little stress on the herd (which was the limit of our existing permit). The remaining five collars were deployed in JNP / Willmore area several weeks later. In the absence of provincial leadership or program, Matt has been collaborating with JNP wildlife biologists on data and proposals.

5. Objectives

Objective #1: Continue to manage / deploy / collect radio collars and data as necessary.

Objective #2: Continue to explore additional funding and partnership sources.

6. Objectives and Deliverables for Communications and Extension

C&E Objective #1: One Hwy40 update on caribou.

C&E Objective #2: One presentation / tour on Hwy40 caribou.

7. Links

Intra-Program Links:
This project is part of the Hwy40 project under the auspices of the ND long-term plan. It provides vital information on the ecological response to natural patterns, but more appropriately belongs under a program more focused on wildlife research. However, when this change occurs, we fully anticipate maintaining strong links with this project.

Inter-Program Links:
Over the last few years, we have relied heavily on the expertise and assistance from the FRI Grizzly Bear program both technically and administratively, particularly prior to having a dedicated wildlife biologist.

External Program Links:
We have received assistance with caribou collaring from ASRD F&W over the past year, and previous to that, relied heavily on them for advice on technical issues wrt the number and type of radio collars to purchase, and capturing, collaring, and submitting capture permits. Every effort has been made over the last two years to inform and/or collaborate with associated caribou research at the provincial level through the University of Alberta, the Alberta Caribou Committee and the Caribou Land Management Association. Lastly, our PI on the project Matt Wheatley, now works for Alberta Tourism Parks and Recreation.

8. Funding sources for this period (128.4)

As of April 1, 2009, all committed funds will be deposited in the project account – no new funds are planned. Note that funding for this project is on a calendar year.

Contributing Organization (Incl. Requested from FRI)	Carry Forward 08 / 09	Cash Committed 09 / 10	Total Confirmed Funding	In-kind Support	Comments
Cash April 1, 09	105,000	0	105,000		This project does not operate on an April – March fiscal year.
Alberta TRP				7,000	Matt Wheatley time to manage collars and data.
Totals	105,000	0	105,000	7,000	

9. Program/Project Key Members and Responsibilities

Dr. David Andison - Project lead
Matthew Wheatley - Lead Scientist

10. Environmental/Occupational Health and Safety/Permits

Wildlife capture permits from ASRD and Parks have been obtained, and will be updated annually as required.

11. Appendices

None.

1. Prepared by

Dr. David Andison
3828 West 22nd Ave, Vancouver, BC, V6S 1J7
Phone: (604) 225-5669 Fax: (604) 225-5668
Email: andison@bandaloop.ca

2. Sign off (FRI ND Activity Team)

Rick Bonar, Hinton Wood Products Ltd. _____

Greg Branton, Alberta Newsprint Company _____

Tom Archibald, FRI _____

David Smith, Jasper National Park _____

Herman Stegehuis, Alberta SRD _____

John Stadt, Alberta SRD _____

3. Executive Summary

Rare natural disturbance events like the MPB outbreak we are experiencing are important to understand, but challenging to study. All we know at this point is that we are likely experiencing a rare permutation of prime (insect) population, weather and forest conditions. One obvious question we have not yet asked is; *how does the historical fire regime align in time and space with historical MPB outbreaks?* The interaction of fire regimes with MPB regimes is intimate, and well understood. Stand-replacing wildfires on extended fire cycles are far more likely to create the stand composition and density conditions favourable to MPB. Stand-maintaining and mixed fire regimes are far less likely to create those conditions. The Alberta Foothills is the most likely location where those two fire regime types intermix over time and space. If we can understand this dynamic historically, we can better predict MPB risk for future landscape scenarios – even under climate change scenarios.

4. Background Information

This is an old idea from the ND strategic plan, but formally, a new ND project that will be formally developed in collaboration with (at a minimum) the CFS Pacific Forestry Centre, Alberta SRD, University of Victoria, the FRI MPB program and the FRI Climate Change program.

5. Objectives

Objective #1: Develop a detailed project proposal with all willing partners.

Objective #2: Explore and determine the most robust methods.

Objective #3: Prepare and submit funding proposals to agencies and partners.

Objective #4: Install field pilot studies as required.

6. Objectives and Deliverables for Communications and Extension

C&E Objective #1: Present / introduce the project to partners and audiences.

7. Links

Intra-Program Links:
This project is a combination of two proposed projects in the ND Strategic plan, and is entirely consistent with the mandate of the ND program. A substantial list of methods and partnerships exist because of the 15-year history of the ND program.

Inter-Program Links:
This project links directly to the FRI MPB and Climate Change programs.

External Program Links:
As a large integrated project employing various methods, we will (at a minimum) be working with staff at the CFS Pacific Forestry Centre, University of Victoria, Alberta SRD, and the BC Ministry of Forests.

8. Funding sources for this period (128.16)

The funds here include 85k of those provided to the ND program by Alberta SRD originally under project 128.1. We have also included 15k from the "Montane Disturbance Dynamics Study" (128.10) into this budget (since project objectives align).

Contributing Organization (Incl. Requested from FRI)	Carry Forward 08 / 09	Cash Committed 09 / 10	Total Confirmed Funding	In-kind Support	Comments
FRI cash April 1, 09	118,911.38		118,911.38		
Totals	118,911.38		118,911.38		

9. Program/Project Key Members and Responsibilities

Dr. David Andison - Project lead
Chris Stockdale - Project team

10. Environmental/Occupational Health and Safety/Permits

None.

11. Appendices

None.

Natural Disturbance Program – Demonstrating the Integration of Fire and Harvesting (128.17)

Project Deferred

1. Prepared by

Dr. David Andison
3828 West 22nd Ave, Vancouver, BC, V6S 1J7
Phone: (604) 225-5669 Fax: (604) 225-5668
Email: andison@bandaloop.ca

2. Sign off (FRI ND Activity Team)

Rick Bonar, Hinton Wood Products Ltd. _____

Greg Branton, Alberta Newsprint Company _____

Tom Archibald, FRI _____

David Smith, Jasper National Park _____

Herman Stegehuis, Alberta SRD _____

John Stadt, Alberta SRD _____

3. Executive Summary

The ND Hwy40 project demonstrated the conceptual value of planning harvesting and prescribed burn operations together. Due to unforeseen circumstances, the installation of the Hwy40 disturbance plan as envisioned did not happen. This project proposes applying that new knowledge to another part of the Foothills landbase to demonstrate how on-the-ground disturbance activities may be integrated towards a greater objective.

4. Background Information

Since the FRI is neither a management nor advocacy agency, the initiation of the location, scope, and partnerships for this project will have to come from the ND activity team membership. The FRI participation in this project will be limited to provide scientific input as relates to natural disturbance event patterns, OR discuss or interpret any wisdom gained through the Hwy40 collaborative planning experience.

5. Objectives

Objective #1: Provide scientific expertise as requested towards a joint prescribed fire / harvesting operation.

6. Objectives and Deliverables for Communications and Extension

C&E Objective #1: Develop written materials and tour information.

7. Links

Intra-Program Links:
This project is part of the ND long-term plan.

Inter-Program Links:
FRI C&E program will provide assistance with written materials, signage, tours, etc.

External Program Links:
The lead for this project is Alberta SRD, and one or more of the industrial partners will need to participate.

8. Funding sources for this period (128.17)

The funds identified here were ASRD directed funds to the ND program, originally allocated to 128.1

Contributing Organization (Incl. Requested from FRI)	Carry Forward 08 / 09	Cash Committed 09 / 10	Total Confirmed Funding	In-kind Support	Comments
FRI (ASRD directed)	10,000		10,000		
ASRD + Industrial Partners				6,000	Staff time and travel
Totals	10,000		10,000	6,000	

9. Program/Project Key Members and Responsibilities

Herman Stegehuis, SRD - Project lead
Dr. David Andison - Project team
Chris Stockdale, FRI - Project team

10. Environmental/Occupational Health and Safety/Permits

None.

11. Appendices

None.

1. Prepared by

Dr. David Andison
3828 West 22nd Ave, Vancouver, BC, V6S 1J7
Phone: (604) 225-5669 Fax: (604) 225-5668
Email: andison@bandaloop.ca

2. Sign off (Current Project Partners)

John Stadt, ASRD _____

George Duffy, Slave Lake Pulp _____

Elston Dzus, Alberta Pacific Forest Industries _____

Jim Witiw, Daishowa Marubeni Int. Ltd. _____

Ed Anderson, Tolko Industries. Ltd. _____

Steve Blanton, Manning Diversified FP _____

3. Executive Summary

The original "Island Remnants Patterns" research project from the NDP work plans starting in 1998 produced a wealth of new insights into detailed natural patterns of wildfires in west-central Alberta. This study captured highly detailed survival patterns of post-fire vegetation for 24 natural historical wildfires in the Alberta foothills using historical aerial photography. Detailed information on pre-burn vegetation conditions was also collected on a subset of 17 of these fires. The spatial overlays were analysed using a wide range of techniques and summarized in a simple format. The complexity revealed by this work strongly suggested that natural patterns at intermediate spatial scales were far more complex, but also far more robust, than anyone had imagined In fact, the project expanded to produce three full research reports, and is the source of information for at least 15 Quicknotes, and the first Integration Note. The original island remnants project is also responsible for developing the new spatial language that is currently folded into the new GIS-based DSS tool, NEPTUNE (project 128.5). NEPTUNE also uses the results of that study to define the Natural Range of Variation (NRV) for its 10 key metrics. As the desire to understand, and defend the use of natural disturbance patterns to regulators, the public, and certification agencies increased, the value of this new knowledge became evident beyond the original partnership base. This project represents the expansion of the original wildfire pattern research to northern Alberta and north-eastern BC. This will be year four of a four-year project.

4. Background Information

The original wildfire database of 24 fires across 56,000 ha was completed in 1999, and parts of the analysis are in fact still ongoing as layers of relationships continue to be discovered (although the original objectives of the project have long since been achieved). From 2001 to 2005, the exact methods for the FRI study were adopted by a research study in Saskatchewan (by Dr. Andison), and the results analysed and

summarized in exactly the same way. The Saskatchewan database includes 29 wildfires totalling 76,000 ha. Early in 2006, preliminary discussions occurred with Daishowa Marubeni International (DMI) about expanding the wildfire pattern study to northern Alberta, which ultimately led to the support of several other key Alberta partners, including Alberta-Pacific, Manning Diversified, Slave Lake Pulp and Tolko to pursue the project further. Around this same time, the BC Ministry of Forests contacted the ND Program regarding the potential of using some of the existing wildfires in Alberta as part of a (well funded) historical retrospective study of boreal mixedwood dynamics. After some negotiation, it was agreed that the BC study would adopt the same methods and criteria as the original FRI study in order to allow us to "trade" data from across the provincial boundary, and increase the sample size of each project. At this point, several other industrial partners, including Canfor in both BC and Alberta, are supporting the project, although have not yet committed funding. Based on the high level of support for the project, the NDP applied for, and was successful in obtaining OPEN FRIP funds for three years to cover approximately 60% of the project costs. The existing partners have agreed to provide the remaining funds.

5. Objectives

Objective #1: Complete the analysis

Objective #2: Complete all reports and manuscripts

Objective #3: Convert the output into NEPTUNE input formatting

6. Objectives and Deliverables for Communications and Extension

C&E Objective #1: Detailed presentations to the staff of each partner.

C&E Objective #2: Widely disseminate the results of this study across western Canada, but in particular within Alberta.

7. Links

Intra-Program Links:
This project is a continuation of one of the first projects initiated by the ND program back in 1998. It benefits now from the perfection of the methods, criteria, trained personnel, expectations, communications efforts, and spatial definitions developed over the last 10 years. Note also the direct link to the Cultural Wildfire Pattern study (128.11), which will, for the first time in Canada, compare the patterns of wildfires under the influence of fire control activities, to those of "natural" wildfires. The NEPTUNE decision-support model (project 128.5) was developed by the ND program three years ago, and the results from this project are designed to fit into that model for other parts of Alberta (facilitating future partners' needs).

Inter-Program Links:
None at this time, although the potential links of natural patterns to many other SFM values is relevant to several key FRI program areas.

External Program Links:
The spatial definitions created by the ND program under the auspices of this program have been adopted by the Saskatchewan government, and the Alberta SRD is fully supportive of the idea of a standardized language.

8. Funding sources for this period (128.3)

There are several funding sources for this project, but note that none require financial support from existing ND program partners. In 09/10, almost all of the funding will be rolled over from up-front invoices to pay for the analysis, report writing and communications.

Contributing Organization (Incl. Requested from FRI)	Carry Forward 08 / 09	Cash Committed 09 / 10	Total Confirmed Funding	In-kind Support	Comments
Cash in hand, April 1, 08	100,000		100,000		
DMI		10,000	10,000		
Totals	100,000	10,000	110,000		

9. Program/Project Key Members and Responsibilities

Dr. David Andison - Project lead

10. Environmental/Occupational Health and Safety/Permits

None.

11. Appendices

None.

1. Prepared by

Dr. David Andison
3828 West 22nd Ave, Vancouver, BC, V6S 1J7
Phone: (604) 225-5669 Fax: (604) 225-5668
Email: andison@bandaloop.ca

2. Sign off (Current Project Partners)

Rick Bonar, Hinton Wood Products Ltd. _____
Greg Branton, Alberta Newsprint Company _____
Tom Archibald, FRI _____
David Smith, Jasper National Park _____
Herman Stegehuis, Alberta SRD _____
John Stadt, Alberta SRD _____

3. Executive Summary

The original "Island Remnants Patterns" research project from the NDP work plans starting in 1998 produced a wealth of new insights into detailed natural patterns of wildfires in west-central Alberta. The original island remnants project is also responsible for developing the new spatial language that is currently folded into the new GIS-based DSS tool, NEPTUNE (project 128.5). NEPTUNE also uses the results of that study to define NRV for 10 key metrics. The interest in this work was such that it is now being expanded to include wildfires from northern Alberta and northeastern BC (see project 128.3). Consistent with the concept of taking advantage of "natural" disturbance patterns, one obvious outstanding question is the degree to which, or in what way(s), the spatial patterns of wildfires that we have aggressively fought with modern fire control techniques emulate the patterns of "natural" wildfires. This is the second year of this study, and represents preliminary data gathering, as well as partnership and funding development.

4. Background Information

This project is a logical extension of the wildfire pattern study (project 128.3), and will take advantage of the same methods, expertise, language, and even some of the same data. However, it will still require a considerable financial commitment over the long term since it involved detailed interpretations of aerial photos (representing the bulk of the expense involved). Some work was completed in 2007/08 to identify eligible wildfires. The budget for this year will be used to attract other funding and begin some interpretation work. This is year two of a three year project.

5. Objectives

Objective #1: Seek out partnerships, collaborators, and supporting funds to support the project.

Objective #2: Begin the process of photo interpretation of some fires.

6. Objectives and Deliverables for Communications and Extension

None.

7. Links

Intra-Program Links:
This project is an extension of one of the wildfire pattern project – the longest running, and perhaps most influential project of the ND program over the last 10 years. It benefits now from the perfection of the methods, criteria, trained personnel, expectations, communications efforts, and spatial definitions developed.

Inter-Program Links:
None at this time, although the potential links of natural patterns to many other SFM values is relevant to several key FRI program areas.

External Program Links:
It is not unreasonable to assume that the results of this project would be of great interest to agencies involved in fire control and / or prescribed burn activities such as Parks Canada and ASRD Forest Protection Branch.

8. Funding sources for this period (128.11)

At this time, only ND base budget funding is available.

Contributing Organization (Incl. Requested from FRI)	Carry Forward 08 / 09	Cash Committed 09 / 10	Total Confirmed Funding	In-kind Support	Comments
FRI cash April 1, 08	4,000		4,000		
FRI (base)		40,000	40,000		
Totals	4,000	40,000	44,000		

9. Program/Project Key Members and Responsibilities

Dr. David Andison - ND Program lead
Chris Stockdale, FRI - Project lead

10. Environmental/Occupational Health and Safety/Permits

None.

11. Appendices

None.

Foothills Research Institute Annual Work Plan
Natural Disturbance Program – NRV Planning Tool - NEPTUNE (128.5)

1. Prepared by

Dr. David Andison
3828 West 22nd Ave, Vancouver, BC, V6S 1J7
Phone: (604) 225-5669 Fax: (604) 225-5668
Email: andison@bandaloop.ca

2. Sign off (Current full NEPTUNE members only)

Dr. Rick Bonar, Hinton Wood Products Ltd. _____

Mr. Greg Branton, Alberta Newsprint Company _____

Mr. Roger Nesdoly, Mistik Management Ltd. _____

Dr. Elston Dzus, Alberta Pacific Forest Industries Ltd. _____

Mr. Herman Stegehuis, Alberta SRD _____

3. Executive Summary

The ultimate goal of the FRI Natural Disturbance Program is to develop simple, universal, value-neutral, and scientifically defendable decision-support tools for managers, planners, regulators, and other professionals within Alberta and beyond. However, such tools require a level of understanding of natural disturbance patterns that did not exist prior to the inception of the FRI ND Program. Towards that, the FRI ND program focused initially on gathering this knowledge, and today has arguably complied the most comprehensive knowledge base of intermediate and fine scale wildfire patterns in all of Canada – including the development of a new spatial language with which to interpret the results. This knowledge has now been captured within a GIS-based decision-support tool that allows existing and future disturbance patterns to be compared to the range of patterns created by natural wildfires. NEPTUNE (New Emulation Planning Tool for Understanding Natural Events) installs as a tool within ESRI's ArcGIS software and calculates 10 operational-scale pattern metrics from shapefiles and compares the output to the natural range of variation (NRV) for each one. The model accepts up to several thousands of polygons as input, and the output includes a shapefile of the disturbance "events" that NEPTUNE creates, plus an Excel workbook with the associated graphs and tables of all the results. The NRV data for NEPTUNE are taken directly from previous ND research, as well as a parallel research project conducted in Saskatchewan two years ago. To date, the model is calibrated for west-central Alberta and western Saskatchewan. Research is currently underway to expand the calibration of the model to the rest of Alberta and north-eastern BC. Although still being managed by the FRI ND Program and is linked through various projects, the NEPTUNE initiative is funded and managed as an independent entity. In other words, it is self-sufficient with its own terms of reference, objectives, funds, and partnership list. Currently, there are five full partners involved in NEPTUNE; West Fraser, ANC, AlPac, Mistik Management, Alberta SRD. NEPTUNE membership includes training, support, and a voice at the table with respect to upgrade priorities, distribution, training, and new memberships.

4. Background Information

NEPTUNE development began in the fall of 2004 with seed funding from HWP and ANC, and in-kind support from Bandaloop. The model was developed by The Forestry Corp under the direction of the ND Program. Early in 2006, Mistik Management (Meadow Lake, Saskatchewan) and the Alberta SRD joined the partnership, and later in 2006, Alberta Pacific agreed to join the NEPTUNE team. Version 1.0 of NEPTUNE was released in the fall of 2006 and is now operational at the designated location(s) of each partner. Version 1.0 offers basic functionality, and our focus has largely been dealing with bugs and compatibility issues. As the model developed, and the partnership base grew, a "wish list" of potential model upgrades was tracked and prioritized. Several items remain on this list, and in fact it continues to grow with time. For example, linked with other ND projects (see projects 128.3, 128,14, 128.17 and 128.11 in this work plan) the model can be calibrated to other geographic areas, and other disturbance types. The ultimate decision of which upgrades to pursue and when sits now with the NEPTUNE members. However, given the need for this type of tool in Alberta (and beyond) it is not unrealistic to presume that over the next several years, as the model is used and demonstrated, and as more research results come on line, that NEPTUNE membership will grow. In the past year, Version 2.0 of NEPTUNE was developed, increasing capacity significantly. Plans for 09/10 include marketing and expanding the partnership.

5. Objectives

There are currently no outstanding model development objectives at this time. Any new development objectives during the 2009/10 FRI fiscal year will be decided by the NEPTUNE management partners.

Objective #1: Provide a maximum of ten person-days of (GIS, technical, or research) support during the 2009/10 fiscal year to the existing NEPTUNE members.

Objective #2: Hold at least one meeting of the NEPTUNE partners during the 2000/10 fiscal year.

Objective #3: Ensure that any new FRI foundation natural pattern research is consistent with the methods and language of that already used by NEPTUNE.

6. Objectives and Deliverables for Communications and Extension

C&E Objective #1: Host at least one demonstration / presentation of NEPTUNE to an external audience.

7. Links

Intra-Program Links:
NEPTUNE input relies entirely at this point on the foundation research of wildfire patterns. The natural wildfire patterns (project 128.3), the cultural wildfire patterns (project 128.11), the historical disturbance patterns (128.14) and the fire/ harvesting demonstration project (128.17) will be conducted using the exact methods and spatial definitions adopted for the previous work, allowing any results to be adopted by NEPTUNE directly.

Inter-Program Links:
The potential exists for NEPTUNE to link to other DSS models being developed / proposed by other program areas at the FRI. The most obvious links are to various existing spatial models of Grizzly Bear Program and the proposed watershed disturbance models of the Fish and Watershed program. The respective program leads are aware of NEPTUNE and these potential linkages are will continue to be pursued.

External Program Links:
As part of the natural wildfire pattern project (128.3) the BC Ministry of Forests will be identifying fires and collecting raw data using the same criteria, standards, and resolution as the original FRI NDP research. The Saskatchewan wildfire pattern research completed by Bandaloop in 2006 used the same procedural standards, as well as the same spatial definitions as those developed by the FRI ND Program. The spatial language developed by the ND Program used in NEPTUNE has been summarized in a four-page Integration Note in 2006, and widely distributed across Canada. The issue of a standardized set of spatial definitions of natural patterns is considered to be one of the main stumbling blocks of adopting a natural pattern strategy in Canada, and until now, no one has suggested a single universal, simple solution. NEPTUNE thus potentially represents a national standard.

8. Funding sources for this period (128.5)

The funding structure for NEPTUNE was developed and agreed upon during the 2006/07 fiscal year between the funding partners. A NEPTUNE membership as of now sits at $35,000. The total dollar investment in NEPTUNE from the five full partners to this point is $175,000, plus an equal amount by Bandaloop in-kind. The total investment in NEPTUNE *to date* is thus $210,000. The budget below reflects the anticipated funds that will technically "roll over" from the 2008/09 budget as per the FRI fiscal year. Note that all identified funds are spoken for in terms of future model development and support at the discretion of the NEPTUNE members.

Contributing Organization (Incl. Requested from FRI)	Carry Forward 08 / 09	Cash Committed 09 / 19	Total Confirmed Funding	In-kind Support	Comments
Cash from Mar 31, 08	15,000		15,000	0	Remaining partner funds
Bandaloop	0		0	3,000	Consultant time.
Totals	15,000		15,000	3,000	Support, calibration, upgrades.

9. Program/Project Key Members and Responsibilities

The NEPTUNE structure currently includes three levels of participation. "Members" each have a single voice at the NEPTUNE table, including any changes to the terms of reference, funding structure, model development priorities, and communications. The "project lead" is responsible to the members to manage all aspects of the project including model development, communications, and solicitation (note that Bandaloop is both project lead and member – Bandaloop's responsibilities to the team take precedent over any voting proclivities). TFC as the software development lead is responsible for specific tasks as assigned by the project lead under contract with the FRI, and with the approval of the membership.

Dr. David Andison, Bandaloop - Project lead.
Mr. Brian Maier, TFC - Software development lead
Dr. Rick Bonar, HWP - Member
Mr. Greg Branton, ANC - Member
Mr. Herman Stegehuis, ASRD - Member
Mr. Roger Nesdoly, Mistik Mgmt. - Member
Dr. Elston Dzus, AlPac - Member

10. Environmental/Occupational Health and Safety/Permits

None.

11. Appendices

Version 1.0 of the NEPTUNE users' manual is available upon request, and version 2.0 will be available soon.

1. Prepared by

Dr. David Andison
3828 West 22nd Ave, Vancouver, BC, V6S 1J7
Phone: (604) 225-5669 Fax: (604) 225-5668
Email: andison@bandaloop.ca

2. Sign off

Rick Bonar, Hinton Wood Products Ltd. _____

Greg Branton, Alberta Newsprint Company _____

Tom Archibald, FRI _____

David Smith, Jasper National Park _____

Herman Stegehuis, Alberta SRD _____

John Stadt, Alberta SRD _____

3. Executive Summary

The idea of using natural patterns as decision-making filters grew into the idea of using natural patterns as decision-making baselines in the Hwy40 project. The next logical step is to use natural patterns as the foundation for all land management decision-making. The concept is sound, but radical – use natural patterns as a proxy for landscape health, and agree to manage landscapes first and foremost for health. This turns the existing process on its head – landscape conditions and secondary impacts become a shared primary objective, which is then overlaid by the social, economic, and fine-filter ecological needs and wants of society. This potentially involves all land management agencies - private and public – and provides a viable framework for achieving the goals of the draft Land Use Framework. The project translates the concept into practice in the form of a) a process, and b) a demonstration.

4. Background Information

This project began at the request of Alberta SRD in January of 2008. It has produced four conceptual documents already, and is proceeding to explore the willingness of various partners to collaborate on a demonstration of the potential of this approach.

5. Objectives

Objective #1: Identify an existing or new partnership that is willing and able to collaboratively explore the potential of using an ND foundation for land planning.

6. Objectives and Deliverables for Communications and Extension

None.

7. Links

Intra-Program Links:
This requires the use of virtually every piece of past and current ND related output.

Inter-Program Links:
Potentially, any other FRI programs that are working towards integration such as the FLMA.

External Program Links:
This potentially has direct links to the provincial Land Use Framework initiative.

8. Funding sources for this period (128.15)

This project was specifically funded through direct funds from Alberta SRD in January of 2008.

Contributing Organization (Incl. Requested from FRI)	Carry Forward 08 / 09	Cash Committed 09 / 19	Total Confirmed Funding	In-kind Support	Comments
Cash from Mar 31, 09	95,000		95,000	0	Remaining
Totals	95,000		95,000	0	

9. Program/Project Key Members and Responsibilities

Dr. David Andison, Bandaloop	- Project lead
Dr. Rick Bonar, HWP	- Technical team
Dr. Daryl Hebert	- Technical team
Mr. Laird Van Damm, KBM	- Technical team
Dr. Stan Boutin, UofA	- Technical team
Ms. Margaret Donnelly	- Technical team
Mr Tom. Moore	- Technical team

10. Environmental/Occupational Health and Safety/Permits

None.

11. Appendices

None.

1. Prepared by

Dr. David Andison
3828 West 22nd Ave, Vancouver, BC, V6S 1J7
Phone: (604) 225-5669 Fax: (604) 225-5668
Email: andison@bandaloop.ca

2. Sign off

Rick Bonar, Hinton Wood Products Ltd. _____

Greg Branton, Alberta Newsprint Company _____

Elston Dzus, Alberta Pacific _____

Herman Stegehuis, Alberta SRD _____

3. Executive Summary

The development of the NEPTUNE model (project 128.5) created some new opportunities. One of the most obvious prospects is the capacity to evaluate the past, current, and future disturbance patterns across landscapes relative to historical NRV, particularly given the capacity to differentiate between the patterns of forest management activities and the impacts of other sectors. Alberta Pacific and Hinton Wood Products simultaneously expressed interest in using NEPTUNE to create a "state of the forest" report that evaluated past and current harvesting designs relative to NRV. They were also interested in a cumulative measure of cultural disturbance activity. This project will use NEPTUNE to describe the patterns of all disturbance activities over the last few decades on four different landscapes across Alberta.

4. Background Information

After several meetings among the partners to refine objectives, it became clear that NEPTUNE would require an upgrade. Version 2.0 of NEPTUNE will be ready by March 31, 2009 and used on one chosen landscape from each partner. Alberta SRD's interest in this project goes to the value of such information for Land Use Planning exercises. This will be the first formal use of NEPTUNE for strategic purposes.

5. Objectives

Objective #1: Quantify and compare past and current disturbance patterns on four landscapes to the pre-industrial range of disturbance patterns.

6. Objectives and Deliverables for Communications and Extension

None.

7. Links

Intra-Program Links:
This requires the use of NEPTUNE and the spatial language developed by the ND program.

Inter-Program Links:
Potentially, the FLMA and the Grizz Program because of the linear features analysis.

External Program Links:
This potentially has direct links to the provincial Land Use Framework initiative.

8. Funding sources for this period (128.14)

This project was funded through shares from Alberta Pacific, Hinton Wood Products, ANC and ASRD (originally allocated to 128.1).

Contributing Organization (Incl. Requested from FRI)	Carry Forward 08 / 09	Cash Committed 09 / 19	Total Confirmed Funding	In-kind Support	Comments
Cash from Mar 31, 09	48,000		48,000	0	Remaining
Totals	48,000		48,000	0	

9. Program/Project Key Members and Responsibilities

Dr. David Andison, Bandaloop - Project lead
Mr. Brian Maier, TFC - NEPTUNE development

10. Environmental/Occupational Health and Safety/Permits

None.

11. Appendices

None.

Project Deferred

1. Prepared by

Dr. David Andison
3828 West 22nd Ave, Vancouver, BC, V6S 1J7
Phone: (604) 225-5669 Fax: (604) 225-5668
Email: andison@bandaloop.ca

2. Sign off

Rick Bonar, Hinton Wood Products Ltd. _____

Greg Branton, Alberta Newsprint Company _____

Tom Archibald, FRI _____

David Smith, Jasper National Park _____

Herman Stegehuis, Alberta SRD _____

John Stadt, Alberta SRD _____

3. Executive Summary

The ND Program research thus far has focused on arboreal patterns of mortality associated with (natural and cultural) disturbance. This project expands to include surface and sub-surface pattern impacts associated with wildfire. The list potentially includes moss, lichen, and lower vegetation mortality, as well as sub-surface impacts on soil chemistry and structure. The value of this information is that it may provide managers considering prescribed burning better understanding of some of the natural benefits of fire.

The broad scope of this project, combined with the wealth of research already conducted on this topic in the boreal forest is such that we will begin with a literature review in 09/10.

4. Background Information

It is unknown whether the project will continue beyond the literature phase at this time. That decision will be made by the partners when the literature review is complete.

5. Objectives

Objective #1: Complete a literature review of the surface and sub-surface impacts of fire in the boreal forest.

6. Objectives and Deliverables for Communications and Extension

None.

7. Links

Intra-Program Links:
We already have patterns of tree mortality from other projects that could be used towards this project.

Inter-Program Links:
None.

External Program Links:
This potentially has links to the prescribed burn program of the Alberta SRD.

8. Funding sources for this period (128.18)

The funds identified here were ASRD directed funds to the ND program, originally allocated to 128.1

Contributing Organization (Incl. Requested from FRI)	Carry Forward 08 / 09	Cash Committed 09 / 19	Total Confirmed Funding	In-kind Support	Comments
Cash from Mar 31, 09	25,000		25,000	0	Remaining
Totals	25,000		25,000	0	

9. Program/Project Key Members and Responsibilities

Dr. David Andison, Bandaloop - ND Program lead
Chris Stockdale, FRI - Project lead

10. Environmental/Occupational Health and Safety/Permits

None.

11. Appendices

None.

Foothills Research Institute Annual Work Plan

131 Aboriginal Involvement Program - Version 6.0

1. Prepared by

Bradley Young, Program Lead
130 Reimer Dr., Hinton, AB, T7V 1K1
Ph: 780-740-1493
Fax:780-865-1740
Email: b_young@telusplanet.net

2. Sign off Sheet

The Aboriginal Involvement Program steering committee approved, with edits, the work plan on March 17, 2009.

3. Executive Summary

Four major foci for the Aboriginal Involvement Program have been identified. The first is to complete development of the "Foothills Aboriginal Engagement Pilot" with Bighorn Stoney First Nation and Foothills Ojibway. The second is to develop a capstone report for the Aboriginal Involvement Program that will highlight the history of the program, lessons learned, accomplishments, and challenges. The third area is to identify alternative research avenues. The fourth area is to continue to host, maintain, and support the GPS/GIS functions of the program.

4. Background Information

The program began operations in 2002. It connects back to the FtMF 5 year business plan's strategic objective 3.1 (ii) Partnerships:

> Maintain and build upon a varied and active partnership for all program areas, continuing the focus from Phase III on the aboriginal and environmental non-governmental organization (ENGO) areas

The program involves three inter-related sub-program areas: community mapping, technical support (including training), and development of the Foothills Engagement Pilot.

In terms of community mapping, two communities, Foothills Ojibway and Bighorn Stoney First Nation are conducting traditional use mapping research. Sunchild First Nation is currently on hold. Information on over 1970 unique cultural sites are retained in our centralized database.

Numerous other first nations in Western Canada are interested in our process and results. Samson Cree Nation, Montana First Nation, Mountain Cree, the Federation of Saskatchewan Indian Nations have all expressed interest in partnering with the Foothills Research Institute. Resources and projects are being investigated to facilitate these relationships.

Technical support and training are on-going, buttressing and maintaining excellence in our primary research efforts.

The Referral Process is being used as a voluntary consultation notification/mitigation process right now. Automated disturbance notifications supporting Aboriginal consultation engagement discussions can be facilitated for large volumes of potential resource development. This year, the committee has decided to push, with partner support, the process into being a "Foothills Aboriginal Engagement Pilot" mandated for a sub-unit of the Foothills SRD district. A review and approval workshop for the pilot is scheduled for April 2009.

2008-9 Deliverables

Community Acronyms: Aseniwuche Winewak Nation (AWN), Nakcowinewak Nation (NN), Foothills Ojibway Society (FOS), Bighorn Stoney First Nation (BIG), Sunchild First Nation (SUN)

Deliverable Priority / Project	**Specific Objectives**	**Status**	**Comments**
1. Multi-community traditional use study	A. Assist AWN, NN, SUN, BIG, FOS communities with completing the 1st phase of their mapping studies	75% complete (by sites) AWN, NN discontinued FOS, BIG completed SUN On hold	-Politics (AWN, SUN) impacted two studies -Administrative difficulties derailed one (NN) -Two studies (FOS, BIG)were completed -As a group over 2600 sites have been identified and stored at one time in the FRI database -Currently over 1970 sites are resident including SUN despite their on-hold status
2. One window for notification of consultation pilot	A. Complete programming	75% complete	Automated referral system programming done Web access programming (web page, email account) in final stages
	B. Complete pilot documentation	90% complete	The information package explaining the pilot has been prepared; It includes a pilot description, budget, and powerpoint presentation
	C. Complete pilot area mapping	50% complete	FOS and BIG are actively mapping and will be completed around the end of March 2009
	D. Host Government Pilot workshop	25% complete	Materials have begun to be prepared; scheduling and content still has to be approved
3. On-going training and technical support	A. Host committee meetings	100%	5 steering committee meetings have been hosted
	B. Training	100%	Community training happens as needed
	C. Technical support	100%	The site database is maintained and access to community site information is on-going as needed; technical assistance is also provided as needed
4. Liaise with additional Aboriginal communities, and as funding permits, partner with them	A. Facilitate community partner growth	25%	Resource availability has restricted this deliverable from being acted upon. However, Montana First Nation and Samson Cree Nation via the Battle River Watershed Alliance are approaching us for partnership
5. Five year work and communications plan	A. Develop and receive approval	0%	Program changes have made this item unfeasible until new resources and research priorities are secured

5. 2009-10 Deliverables and Objectives

Deliverable **Priority / Project**	**Specific Objectives**	**Funding Source/ Amounts**	**Timeline**
1. Foothills Aboriginal Engagement Pilot	A. Finish development of pilot and present to Gov't of Alberta	105K	January - April 2009
	B. Conduct Workshop		April 2009
	C. Develop capstone report		April 2009- March 2010
2. Capstone Report	A. Document history, budget, lessons learned, accomplishments, and challenges of AIP	Part of 105K	March-May 2009
	B. Development of 'mapping' handbook based on AIP operations to date	Under development	March-June 2009
3. Identify Alternative Research	A. Battle River Watershed Alliance Partnership (Montana, Samson Cree)	15K projected	March-April 2009
	B. Monitoring	Under development	March-June 2009
	C. Other (proposed Aboriginal Biomass)	Under development	March-June 2009
4. Support and Training	A. Train elders and technicians in basic gps/gis techniques	Jasper National Park 10,000	On-going
	B. Technical support – maintain site database and provide community access to information	Jasper National Park 10,000	On-going

Deliverable Discussion

Both deliverables 1, 2, and 4 are straightforward items and clarifications can be handled by contacting the program lead. However, deliverables 3a, 3b, 3c, the identification of alternative research projects, will be explained fuller here.

3A - Battle River Watershed Alliance Partnership (Montana, Samson Cree)

In the fall of 2007 Samson Cree Nation formally (and informally traditional knowledge holders from the other 3 nations at Hobemma - Montana First Nation, Ermineskin Cree Nation, and Louis Bull First Nation) requested information from FRI regarding potential partnership through the Aboriginal Involvement Program. Previous to this, Mountain Cree / Smallboy's Camp in the fall of 2006 also requested participation with the Aboriginal Involvement Program. Mountain Cree members are predominantly from Ermineskin Cree Nation, but members from the other 3 nations at Hobemma are also represented. Historically, the 4 nations at Hobemma are very closely related to and share many traditional sites and areas with Sunchild First Nation, Bighorn Chiniki First Nation, and Foothills Ojibway. That Mountain Cree is located in the near vicinity to both the Sunchild and Foothills Ojibway (Hinton) communities speaks to this reality. Unfortunately lack of resources and administrative challenge precluded formal partnerships from being acted upon.

Recently, the potential partnerships with one or more of the Hobemma First Nations have re-emerged after the Battle River Watershed Alliance requested a meeting/presentation from the Aboriginal Involvement Program in late February 2009. The Battle River Watershed Alliance is a research and planning group affiliated with Alberta's Water for Life Strategy. Montana First Nation also sits on the Battle River Watershed Alliance Board. They have been investigating assisting Montana First Nation and/or Samson Cree Nation with mapping research to facilitate interaction with their table. The Aboriginal Involvement Program's research record, past dealings with Montana and Samson, and reputation have made FRI the shop that is most likely to successfully assist with this research. On the strength of the February 2009 presentation to their board, the Battle River Watershed Alliance, Montana First Nation, and the Aboriginal Involvement Program are arranging formal discussions to explore a potential partnership to 1)

facilitate an assessment of Montana and/or Samson's mapping research to date 2) identify remedies to any shortcomings 3) conduct additional mapping research 4) assist with limited derivative discussions (help Battle River Watershed Alliance, the First Nations, and FRI with inter-linking their data sets with each other). For the Aboriginal Involvement Program, having one or more of the Hobemma nations' datasets in our database would remedy undercoverage of their sites in our database as they are known to have many sites on the Eastern Slopes.

Battle River Watershed Alliance has identified a budget to facilitate these discussions and is offering FRI a contract that will cover the Aboriginal Involvement Program's expenses, including staff time. The initial amount forecasted to cover the discussion phase is $15,000.

3B - Monitoring

The other area of alternative research is site monitoring. Essentially now that FRI has information on over 1970 sites from Foothills Ojibway, Bighorn Chiniki First Nation, and Sunchild First Nation, monitoring these sites for status and maintaining them for continued have been identified as logical next steps. Health Canada, and other to be named government entities (I have withheld their identities at their request for confidentiality) are very interested in developing additional research projects along these lines. This represents a natural evolution from the primary research on data mapping to derivative research that can ultimately lead to proactive planning. For example hard buffer areas and proscriptive resource development procedures (e.g. timing, impact thresholds, extraction methods) could natural flow from this area. Scoping discussions with potential partners and identification of budgets are planned to facilitate development of this alternative research area.

3C - Aboriginal Biomass[1]

On March 16, 2009 a meeting was attended by the Aboriginal Involvement Program lead and representatives of Fox Creek Development Association, a local Aboriginal non-profit association that contracts in resource development. The Aboriginal Involvement Program was identified as the potential partner for an Aboriginal Biomass project. Essentially with the economic downturn, wood product prices have depressed, with much biomass being burned off or left to rot in the woods by both the forestry and energy industries. Fox Creek Development wants to investigate potential diversion methods of this excess biomass. Firewood production and power production are two diversion methods that have been identified. Theoretically, the diversion of these carbon producing and storing activities is in line with global warming and carbon credit market research worldwide, whereby carbon storage and diversion methods are forecasted to play integral roles. This kind of applied research combining local Aboriginal capacity, private industrial know-how, and the research strengths of FRI represents yet another promising applied research project with the potential for international recognition. In terms of specifics, the Aboriginal Involvement Program would be responsible for developing the modelling and forecasts, as well as analysing the costs, benefits, and impact of diverting the excess biomass away from burning and rotting into productive uses. Fox Creek Development would provide the human resources and field capacity for the biomass diversion and production. Other partners such as HWP and Alberta SRD (forestry) would have to brought on board as well. Further development of this initiative will require additional scoping, identification of partners, securing a budget, and subsequent planning.

6. Objectives and Deliverables for Communications and Extension

Due to funding pressures and staff changes, this deliverable will consist of the following deliverables:

a. New website content; Sept. 2009

[1] Federal Budget 2009 identifies two programs that we are eligible to pursue to facilitate this item: 1)$1 billion over two years for a Community Adjustment Fund that will help mitigate the short-term impacts of restructuring in communities. This support for communities in all regions will be provided through regional development agencies. Alberta has $10,000,000 for an initial amount. 2) $80 million over two years to Natural Resources Canada for the Transformative Technologies program administered by FPInnovations. FPInnovations is a not-for-profit forest research institute that focuses on the development of emerging and breakthrough technologies related to forest biomass utilization, nanotechnology and next generation forest products.

b. Presentations; Continually redesigned as per audience

When the Foothills Aboriginal Engagement Pilot is approved a complete brochure package will be designed. Also, a five year work plan and communications plan will be prepared if the program secures that time horizon in funding and outlook.

7. Inter Program Links

The program works closely with GIS and communications.

If there are additional resources, Adaptive Forest Management/History may be approached for selective historical projects. This could involve production of more detailed histories from the communities traditional use data.

In terms of administration, the General Manager continues to play an important role in advising on all aspects of program planning, implementation, and administration.

Also, subject to approvals, there may be opportunities for other Foothills Research Institute data layers to be considered along with the traditional use data layers of the communities for separate planning projects. In particular, the FLMA and Fish and Watershed Program have been contacted and are planning to work collaboratively with Aboriginal Involvement. The projects are yet to be identified.

More detailed plans will be drafted as the steering committee advises. At this point, however, inter program links are secondary to the deliverables focus of this work plan.

8. Funding sources for 2009-10 period

Aboriginal Involvement Program – 131					
Contributing Organization (Incl. Requested from FtMF)			**Total Potential Funding 2009-10**	**In-kind Support**	**Comments (including in-kind descriptions)**
Balance Forward			19,500		
Abor. Relations			40,000		
Battle River Watershed Alliance			15,000		Expense contract for facilitating Montana and Samson Cree Nation program entry
Jasper National Park			20,000		Core contribution
Communities			100,000	In-kind HR secondments	
Totals			220,000		

The projected cash budget for the program is below:

	April 1 – June 30, 2009 Remaining Operating Budget	
Revenues		
Partner	**Item**	**2008-9**
Current Balance	Mar. 31, 2009 Balance	20,000
Ab. Abor. Relations	Pilot funds (105K rec'd), Remaining 2007-9 (40K)	40,000
West Fraser	FRIAA project 2007-9 (80k Rec'd), Remaining Terms of Ref (10K)	10,000
Jasper National Park	Program support (40K rec'd), 20K 2009 core contribution	20,000
Battle River Watershed All.	Expense Contract (To be finalized)	15,000
	Subtotal	**105,000**
Expenditures		
Item	**Detail**	**2008-9**
Community Research	Agreement Cancellation Costs	
Foothills Ojibway	Pilot (12k invoiced, Remaining 18k)	18,000
Bighorn	Pilot (15k invoiced, Remaining 13k)	13,000
Capstone Report	Pilot (30k to be paid back or put towards capstone report)	30,000
Program Costs		
Pilot Technology	Referral Process Automation (Server upgrade, programming, training)	0
Program Lead	Contract	20,000
Advisory Committee	Mtg expenses - committee travel, hospitality	4,000
GIS Support	Technician Salary	15,000
Admin support	Office costs, supplies, expenses	5,000
	Subtotal	**105,000**
	Surplus/Deficit	**0**

9. Program/Project Key Members and Responsibilities

Bradley Young, Contracted Program Lead

Mailing Address: 130 Reimer Dr., Hinton, AB, T7V 1K1
Phone: 780-740-1493/780-865-1699
Fax: 780-865-1740
Email: b_young@telusplanet.net

Brad is the head administrator, responsible for supervising Aboriginal Involvement Program Staff, liasing with communities and government as needed, monitoring agreements and budgets, organizing and chairing meetings, and drafting workplans.

Melissa Pattison, GIS Specialist

Melissa provides GIS related support. This includes maintaining the cultural study database, operating the Referral Process, assisting with community research tasks, training community members in GIS related functions. Also Melissa has taken on administrative support functions such as note taking for meetings and basic office communications.

Mailing Address: Box 6330, Hinton, AB T7V 1X6
Phone: 780-865-8393
Fax: 780-865-8331
Email: Melissa.Pattison@gov.ab.ca

10. Environmental/Occupational Health and Safety/Permits

N/A

11. Appendices

N/A

Foothills Research Institute Annual Work Plan 2009/2010

140 - Foothills Stream Crossing Program

1. Prepared by

Jerry Bauer and Ngaio Baril
Foothills Research Institute
Box 6330 Hinton, AB T7V 1X6
Ph: Jerry Bauer (780) 532 0851, Ngaio Baril (780) 865 8381
Fax: (780) 865 8331
Email: jerrybauer@xplornet.com, ngaio.baril@gov.ab.ca
Project Manager: Jerry Bauer

2. Sign off Sheet

FSCP Co Chair	Company	Signature
Mark Schoenberger	West Fraser Mills Ltd.	
Garth Davis	ConocoPhillips	

3. Executive Summary

The overall goals of the programs are to monitor and improve the status of stream crossings, to develop and oversee the implementation of new ideas for stream crossing management in Alberta and to improve the conservation record of participating organizations.

The main focus for 2008 was to complete all member owned crossings in the FMA (427) and design an integrated remediation process. Baseline pre mitigation fish data were collected in the Pine and Nosehill Creek watersheds. The Steering Committee met three times plus a field trip in September. In partnership with the Woodlands Operators Learning Foundation (WOLF) a road maintenance course was developed which will assist road construction and maintenance operators in managing roadways in an ecologically friendly manner.

2009 and 2010 will bring an increased focus on watershed level remediation with the addition of four high priority watersheds in the West Fraser FMA. A fish monitoring plan will be implemented for a total of six watersheds. Stream crossing inspections will be completed for all the crossings in the four new watersheds and for all new FSCP members with stream crossings within the FMA. Integrated remediation plans will be completed for the Nosehill Creek and Pine Creek watersheds before the start of the 2009 field season. The completed remediation plans will be sent to regulatory agencies representing a commitment by the FSCP members to repair faulty crossings and as leverage to entice non-member companies to join the FSCP.

A stronger relationship with the FSCP Department of Fisheries and Oceans (DFO) representative and a partnership with FP Innovations have created opportunities for demonstrating innovative stream crossing technology in the form of Geo textile Reinforced Structures. FSCP Project Coordinator, Ngaio Baril will coordinate the partners involved and provide technical guidance. FP Innovations will be responsible for the ensuing technical documents and research.

The FSCP will continue to expand its membership, increase its role in riparian conservation, and provide dependable commitment to its partners through 2009 and 2010.

4. Background Information

This project was conceived in 2004 by West Fraser and the Foothills Research Institute to identify road crossings that potentially impacted upstream movement of fish. The partnership not only looks at the concept of rehabilitating currently impacted areas, but also focuses on developing a long-term strategy that will allow stream crossing owners (companies working in the area) to manage their own corridors while ensuring connectivity of aquatic ecosystems.

Fish populations can become isolated below barriers (hanging culverts) resulting in a reduction in species richness and loss of local genetic diversity.

This program will effectively enable local industry to take a leadership role in the identification and maintenance of stream crossings throughout these watersheds.

Problem crossings throughout the FMA have been identified. Remediation plans are now designed for Pine Creek and Nosehill Creek with the development of plans for four additional watersheds scheduled to be created in 2009.

5. Program Objectives

The primary goal of the FSCP is to improve the condition of stream crossings therefore improving the surrounding riparian areas. To accomplish this goal the FSCP works with many stakeholders and government agencies to prioritize watersheds based on size, environmental conditions, number of participating stakeholders present, and chance of success. Several objectives are fundamental to the success of this goal;

Increase membership – Jerry Bauer – *on-going*

- A goal of signing on new members was achieved with the addition of Shell/Duvernay. Husky has committed to join early in 2009, and Imperial Oil/Exxon Ltd. has expressed interest in joining in time to participate in the 2009 field season. Discussions with CN regarding their potential involvement with the FSCP are on-going. Jerry Bauer is following up and continuing to present on behalf of the FSCP at government and industry directed conferences, such as the Cumulative Environmental Management Association (CEMA) conference this January in Edmonton. Interest for expansion of the FSCP into the Fort McMurray area was expressed at this conference and continued dialogue is on-going. A communications plan will be designed with the assistance of Sean Kinney (FRI) to raise the profile of the program in untapped sectors.

Remediation plans for priority watersheds – Ngaio Baril (30 days) - *Due March 1st 2009 and April 2010*

- The remediation strategies of the FSCP members for the Pine Creek and Nosehill Creek watersheds will be integrated into one multi-stakeholder remediation plan by March 1st, 2009. These plans will then be sent to DFO and ASRD as a commitment on behalf of the FSCP members to repair faulty crossings. They will also inform the regulators as to what companies are participating. DFO and ASRD has also committed to sending letters suggesting FSCP membership to non member companies with stream crossings within the pilot watersheds. The remediation plans for the four additional watersheds will be completed by April 2010.

Fish population monitoring – Ngaio Baril (60 days) – *Due December 20th, 2009*

- The FSCP FRIAA application was successful for the continued monitoring in Nosehill and Pine Creek watersheds, as well as 4 additional watersheds. These data will be used to test the effects of multi stakeholder watershed level crossing remediation. In the long term we have received funding for 60% of the cost of a four year monitoring plan. The remaining 40% of required funds will be contributed by the FSCP members on a yearly basis. This year the fish population monitoring in the four additional watersheds will be conducted using a population sampling method developed by ASRD and the ACA which is currently being used by ASRD Fisheries Biologists for population

studies in the West Fraser FMA. The sampling for 2009 will be completed by September 30, 2009 and the resulting Fish Inventory Reports will be completed before 2010.

Stream Crossing Inspections – Ngaio Baril (20 days) – *Due December 20th, 2009*

- Stream crossing inspections will be completed for all the crossings located in the four additional watersheds as well as for the stream crossings belonging to new FSCP members. Stream Crossing Inspection Reports will be completed by December 20th; 2009. Re-inspection protocol is currently being designed to assess the success of individual remediation projects.

GRS Demonstration Project – Ngaio Baril (15 days), Jerry Bauer (5 days)
– Time-line has yet to be established

- A demonstration project highlighting new stream crossing technology is being coordinated through the FSCP. Partners include DFO, FP Innovations, ASRD, and West Fraser Mills. The FSCP is contributing in-kind support in the form of Ngaio Baril's time in the coordination of various agencies and grant writing to obtain funding for the resulting demonstration sign. FP Innovations will be responsible for all research and training opportunities which arise from the completed project. This project is still in the initial phases so a timeline is unavailable.

Wide spread adoption of the FSCP protocols – Ngaio Baril, Jerry Bauer – *(ongoing)*

- This is an ongoing objective that is actively pursued when opportunities arise. A new potential use for the FSCP database structure has been identified. Edson ASRD is planning on creating a stream crossing database. Discussions regarding the transfer of the FSCP database to Edson have begun. FSCP believes this to be a major step towards the province wide adoption of the FSCP inspection protocol. The next step is an assessment conducted by ASRD evaluating the feasibility of the database transfer. As this has very recently got underway, a timeline is not available at this time.

6. Objectives and Deliverables for Communications and Extension

The communications and extensions plan for the FSCP is not yet completed. The FSCP will work with Sean Kinney to explore avenues to promote the FSCP. Key objectives include;

- Demonstration signs will be prepared for the Pine Creek watershed after remediation is complete. Timing is dependent upon individual company's remediation plans
- Demonstration sign at the GRS stream crossing project location
- Quick notes describing the FSCP progress
- Continue to deliver the Foothills Stream Crossing Inspection Course developed in collaboration with the Woodlands Operators Learning Foundation (WOLF)
- Field tours to interested industrial, governmental and NGO parties of study area and accomplishments

7. Inter Program Links

Consider establishing a closer working relationship with the Foothills Land Management Forum (sharing map data or producing common maps, joint meetings, etc). Possibly combine an Operational Fish Inventory project with the Fish and Watershed Program.

8. Foothills Stream Crossing Budget for 2009/2010

2009/2010 Expenditures *CT140*

Item Description	Budget
Program Manager (contract)	$19,100
Program Coordinator (permanent full time)	$61,500
Professional Biologist (contract)	$5,400
Field staff (depending on field conditions)	$24,000
Travel (meetings, recruiting, promoting with regulators)	$12,000
Office/Rent/Utilities/Administration	$11,400
Vehicle (includes maintenance, insurance, and lease)	$16,850
GIS Support	$7,800
Field Supplies	$7,350
Employee Safety Training	$700
Contingency	$3,900
Total Budget	$170,000

2009/2010 Income *CT140*

Company or Grant Agency	Annual Dues ($ per year)	In – Kind Support	Membership Status
Talisman Energy Inc.	$18,750		Full Member
Petro Canada	$18,750		Full Member
ConocoPhillips Canada	$18,750		Full Member (co-chair)
West Fraser Mills	$18,750		Full Member (co-chair)
Suncor Energy	$18,750		Full Member
BP Canada Energy	$18,750		Full Member
CNRL	$18,750		Full Member
Devon Canada Corp.	$18,750		Full Member
Shell Canada	Pays per crossing inspection		Restricted Member (non voting)
FRIAA	$20,000		Fish monitoring support
Foothills Research Institute		$3,600	In-kind admin. support
Fisheries and Oceans Canada	$0		Non-voting Member
ASRD	$0		Non-voting Member
Alberta Environment	$0		Non-voting Member
Alberta Conservation Assoc.	$0		Non-voting Member
Infrastructure and Transportation	$0		Non-voting Member
Total Income	**$170,000**	**$3,600**	

9. Program/Project Key Members and Responsibilities

Program Manager Jerry Bauer – Monitors progress and ensures adherence to workplan. He is the main contact for industry members.
(780) 532 0851
jerrybauer@xplornet.com

Project Coordinator Ngaio Baril - Responsible for data management and the completion of field activities.
(780) 865 8381
Ngaio.baril@gov.ab.ca

Co chair Mark Schoenberger – Chairs committee meetings and meets with the FSCP regarding work plan and voting opportunities
(780) 865 8170
Mark.schoenberger@westfraser.com

Co chair Garth Davis - Chairs committee meetings and meets with the FSCP regarding work plan and voting opportunities
Garth.r.davis@conocophillips.com

10. Environmental/Occupational Health and Safety/Permits

A Fish Research License is required to sample fish in the FMA.

11. Appendices *(mid term and year end reports, references, review information publications, business case)*

Foothills Research Institute Annual Work Plan 2009 - 2010

150 Fish and Watershed Program

1. Prepared by

Richard McCleary
PO Box 2672,
Invermere, BC V0A 1K0
Ph: 250-342-0553
Email:richmccleary@shaw.ca
Project Manager: Richard McCleary

2. Sign off Sheet

Activity Team:

Board Liaison:

Rob Gibb, Talisman Energy

Other Members:

Dr. Rick Bonar, Hinton Wood Products

Mark Schoenberger, Hinton Wood Products

Dr. John Diiwu, ASRD – Forest Management Branch, Edmonton

Dr. Marwan Hassan, Associate Professor, UBC

Debbie Mucha, FRI – GIS

Tom Archibald – FRI GM

Sean Kinney – FRI Communications

3. Executive Summary

We have built a broad base of partners through successful research, stewardship and demonstration projects. As a result, we are well-positioned to continue to provide knowledge and tools for managers to use. Three challenges that managers face include: developing approaches to integrate multiple values into land management at a regional scale; addressing the increasing societal value of water resources; and addressing concerns over the status of individual aquatic species. In 2009/2010, we will focus on technology transfer, communication and expanding our partnerships. We plan to consolidate our position by ensuring that the knowledge and tools developed through our research projects are getting into the hands of those who can use them, and that these people are trained in the application of these tools. Field work will include pilot studies and work to complete existing projects. We will pursue opportunities to collaborate with other researchers, stakeholders and other FRI programs.

Our multi-year riparian research project will draw to a close in 2009 and we will focus on technology transfer and proposal development. The first step in proposal development will take place at a workshop early in 2009 for managers and researchers involved with FRI watershed research. The goals of the workshop are to determine how we can best integrate our new knowledge and to set the strategic direction of future research efforts. The workshop will be co-hosted by the Fish and Watershed Program and the Natural Disturbance Program. Participants will include land managers and scientists involved with the watershed and riparian area research within the FRI land base.

FRI is also a contributor to a new Hinton Wood Products' initiative – the NetMap project. NetMap is an existing GIS tool specifically design to integrate watershed science and resource management (Benda et al., 2007). FRI has one of the most comprehensive inventories of aquatic resources and stream crossing infrastructure. We will continue to work with the NetMap project leader to incorporate these databases into the new GIS tool. This will ensure that land managers have access to the best data possible when they are evaluating various management scenarios.

In terms of stewardship, the Hardisty Creek watershed restoration steering committee continues to celebrate successes and develop strategies to address new challenges. In 2009/2010, the steering committee are planning to undertake restoration projects including fish passage remediation and storm water quality assessment/remediation. Fish passage remediation work will include two new projects upstream from Highway 16 in the Thompson Lake subdivision and repairs to the project at Hardisty Avenue in Kinsmen Park. The arms-length scientific advice that FRI brings to the steering is valued and requested for another year.

At the provincial scale, there is a push for coarse filter approaches to land management and biodiversity conservation, such as those developed by the FRI Natural Disturbance Program. There is also an increasing emphasis on the conservation status of individual species (e.g., Athabasca rainbow trout, Arctic grayling and bull trout). FRI has developed knowledge of these species that will be important in conservation plans and time will be allocated to these important initiatives as opportunities arise.

4. Background Information

4.1 Contributions and accomplishments

This program has a history of helping our partners to apply and demonstrate innovative science and knowledge (Table 1).

Table 1. Recent examples of partners applying FRI knowledge/technology towards sustainable land management.

Project	Partners	Date	Improvement	Recognition / accomplishments
Hardisty Creek Watershed Restoration Project	• Town of Hinton	2008-2009	• Upgrading standards for erosion control plans in new developments to conserve water quality within water courses.	• Informing / influencing policy.
	• Fisheries and Oceans Canada • Hinton Wood Products • Town of Hinton • West Athabasca Watershed Bioregional Society	2008	• Evaluating performance of innovative fish passage remediation projects prior to undertaking additional projects.	• Sharing technology and improving benefits of future investments.
		2008	• Restoration of fish passage and habitat in Hardisty Creek.	• Profiled by AENV in Nov. 2008 during 5 Year Anniversary of Water for Life as one of three leading stewardship projects in Alberta. • Communities in Bloom Environmental Awareness Award (national).
		2004-2008	• Restoration of fish passage and habitat in Hardisty Creek.	• Habitat Canada National Stewardship Award • Communities in Bloom Environmental Effort Award (provincial). • Emerald Award Finalist
Fish probability distribution model	Hinton Wood Products	2008	• Road and stream crossing management.	• Published in Canadian Journal of Fisheries and Aquatic Sciences (McCleary and Hassan, 2008)
Stream Crossing Inspection Manual	Foothills Stream Crossing Association	2006-2008	• Road and stream crossing management.	Methodology adopted by industry partners and approved by DFO and ASRD.

4.2 Challenges for conducting innovative research

Innovation is defined as making changes or doing something new. There are three main challenges of conducting innovative research and we have developed strategies to address each one (Table 2).

Table 2. Summary of challenges and strategies for success in innovative research.

Challenge	Strategy
1. **Original work.** We are frequently undertaking tasks that nobody has done before and may not experience the benefits of efficiency gained from repeating the same procedure year after year. We develop methodologies based on the most applicable literature, but these procedures typically go through a period of adjustment until the outcomes are satisfactory. With the innovative and short-term nature of projects, it is often difficult to justify the purchase of expensive equipment designed for long-term use.	1. **Read, obtain review, document and communicate.** Access to the current scientific journals is essential to this type of work. These privileges are granted to university affiliates including graduate students, post-docs and professors. Our university affiliation also ensures peer and expert review at all stages of a research project. Our procedures are documented in manuals that are updated throughout the field season. We communicate our methods to other researchers and share equipment when season of study permit. We keep our partners informed of difficulties and changes in timelines.
2. **Datasets are large and complex.** LIDAR datasets are huge and water quality monitoring datasets and large and complex.	2. **Leverage external expertise.** The acquisition of LIDAR data for the entire East Slopes represents a significant advance in resource data. We are working with Earth Systems Institute Inc. (Mt. Shasta, CA) to process terrain and water resources data and with Geodessy (Cochrane, AB) to process vegetation resources data. We also invested in the StreamTrac database (Victoria, BC) to assist with storage and analysis of complex hydrological datasets.
3. **Management priorities change quickly.** When our multi-year riparian research project was approved in 2004, mountain pine beetle had not arrived in Alberta.	3. **Focus on improving our knowledge of basic processes with broad application.** The knowledge from our riparian research in headwater streams will apply to all small streams.

4.3 Basis for next phase of work

The program is in transition from a multiyear project and the program activity team has recommended that 2009/2010 be used to consolidate our program. We will complete the current project with an emphasis on publication, communication and extension. Our strategy will be to continue to execute one project at a time. In the next phase of this program, we will focus on two outcomes.

The first is to continue to develop knowledge of water resources and related ecosystem processes that can be affected by land management. To date, we have created a comprehensive geographic database of aquatic resources. We will continue to update this information and develop systems that will allow this database to evolve over time. At the time we initiated the sediment budget / wood budget project, very little research had been published on Foothills streams. Inputs of sediment and wood into streams from adjacent uplands are key linkages between terrestrial and aquatic ecosystems that are affected by land management activities. Our research focused on measuring these processes in pristine streams to improve predictions of changes to these processes in managed lands. Additional work is required to determine how such changes will affect native fish populations (Athabasca rainbow trout, Arctic grayling and bull trout). These fishes are a highly valued aquatic resource and can provide information on the overall health of our flowing water ecosystems.

The other focus of this program will be to integrate with other programs. Different approaches are required to integrate with social sciences and aboriginal program versus the natural sciences programs.

Other regional ecosystem-based management efforts have found that public perceptions of ecosystem status are different than those of the scientific community. For example, only 20% of residents were aware that the Puget Sound Ecosystem was not healthy, although the area hosts over 340 endangered species (McClure and Ruckelshaus, 2007). An important first step in FRI program integration could be to determine and compare public

perception and scientific evaluations of ecosystem status. To ensure integration with the aboriginal program, the public perception survey could include investigations of First Nations people's opinions. Science-based evaluations of aquatic ecosystem health in the Foothills have been prepared for individual fish species including the Arctic grayling (Walker, 2005) and bull trout (Post and Johnston, 2002). The Athabasca rainbow trout has been identified as a unique population (Taylor et al., 2006) and a status report is being prepared. However, integrating plans for individual fish and wildlife species is a complex process. An overall assessment of terrestrial and aquatic ecosystem state is an important component of management systems based on sound science (McClure and Ruckelshaus, 2007).

For the other natural science programs, linking geographic information developed among programs will be an important step in the integration. We are using an established GIS framework called NetMap (Benda et al., 2007) to house our aquatic resources data and also to model the movement of sediment and organic matter from adjacent uplands into and through stream networks. This tool is well-suited for linking models of natural disturbance, road development, forest harvest, and aquatic processes. It has potential to integrate information from other program areas into this framework.

5. Objectives

Four projects have been identified for the 2009/2010 fiscal year. These projects and their respective objectives have been linked to the FRI business strategy . The deliverables, forecast costs and timelines have been specified for each project (Table 4).

Table 3. ***Statement of objectives and linkages to FRI business strategy***

Project and Account Code	Objective	Link to FRI Business Strategy		
		FRI Vision	Values	Theme Areas
1. Sediment budget / wood budget project for riparian management (**Contribution 150.4)**	Communicate our new tools and knowledge to scientific, management and stewardship audiences	Developing innovative science and knowledge through diverse and engaged partnerships	1. Healthy landscapes 2. Sustainability and stewardship 3. Community 4. Working and engaged partnerships 5. Sound science 6. Collaboration through open communication 7. FRI human resources	• Water • Data, information and knowledge management
2. Stream channel spatial model applications and mapping **(Contribution 150)**	Improve digital maps (including fish distribution) and integrate products with other programs	Yes	4. Working and engaged partnerships 5. Sound science 6. Collaboration through open communication	• Water • Wildlife (fish) • Data, information and knowledge management
3. Hardisty Creek restoration project **(Contribution 150)**	Provide sound science to community based watershed stewardship group for projects including repairs to existing structures as well as two projects upstream from the CN crossing.	Yes	Involves all seven FRI values	• Landscape dynamics (indicators) • Wildlife (fish) • Water
4. Proposal development **(Contribution 150)**	Develop proposals to collaborate with FRI programs on a water-related initiative	Yes		• Landscape dynamics (indicators) • Wildlife (fish) • Water

Table 4. ***Statement of timelines and costs for each deliverable by project.***

Project	*Deliverable*	*Timelines*	*Costs*
1. Sediment budget / wood budget project communication (**Contribution 150.4)**	*1. Presentation at Canadian Geophysical Union – Hydrology Section Annual Meeting* *2. PhD dissertation and manuscripts for submission to scientific journal.* *3. Two Quick notes.* *4. Field tour to present FRI channel classification procedure to scientists and managers.*	*1. May 2009* *2. December 2009* *3. June and October* *4. June 2009*	*$35,450*
2. Stream channel spatial model applications and mapping (**Contribution 150)**	*1. Manuscript on channel origin locations for submission to scientific journal.* *2. Link with the ASRD wet areas mapping project (University of New Brunswick).* *3. Electrofishing at 25 sites to confirm fish model predictions.* *4. Pilot project to link with access management for grizzly bear conservation areas.* *5. Pilot project on native fish in 4-5th order streams.* *6. Collaborative proposal (FRI, ASRD, ACA, University) for long-term monitoring of native fish status in medium-sized Foothills watercourses.*	*Sampling strategy: May* *Field work: June – Aug.* *Analysis/write-up: Sept. – Feb.* *Collaborative proposal: Oct.*	*$122,500*
3. Hardisty Creek restoration project (**Contribution 150)**	*Report containing recommendations to steering committee to proceed with watershed restoration in Hardisty Creek*	*Meetings and reviewing consultants reports for steering committee.*	*$5,000*
4. Proposal development and program admin (**Contribution 150)**	*1. Proposal for social science survey of public perception of aquatic resources in Forested Foothills region.* *2. Proposal to work with other programs on watershed-related initiative.* *3. Proposal to complete watershed stewardship training for an aboriginal community.*	*October 2009: ready for grant application season.*	*$35,000*
TOTAL			***$197,950.00***

Planned training needs

1. *Advanced GPS/data logger training*
2. *NetMap GIS tool use and applications*
3. *Bear awareness*
4. *Emergency response field scenario*

6. Objectives and Deliverables for Communications and Extension

(A Program communication and Extension Plan has to be completed in the first year and this section will then reflect annual objectives/deliverables related to that plan)

****Note. The detailed communications plan will be completed by March 31, 2009, so this section highlights opportunities to be evaluated by the Fish and Watershed Program Activity Team. ****

Opportunity 1: Link existing demonstration sites into Eco Tour (Target Audience = Public or FRI tours)

The Fish and Watershed Program has employed a variety of communication techniques / tools that target specific audiences. For example, we have constructed two demonstration sites for a public audience and one site for a technical audience. We have previously proposed linking these sites together with the work undertaken by Alberta Transportation and Weyerhaeuser along the Trunk Road to Nordegg under a "Trout Highway" theme. This concept will be moved forward through a Communications Program "Eco Tour" initiative.

Opportunity 2: Convey new knowledge and tools (Target Audience = Resource Managers)

We will target this initiative to employees of the companies and government agencies that have supported our riparian research project. We will use reports, Quick Notes, presentations and workshops. These tasks are intended to promote two-way communication between researchers and resource managers so that managers may see opportunities to improve or adjust their practices and researchers will learn how their research questions can be adjusted to help the managers to meet their specific management challenges.

Opportunity 3: Obtain peer-review on science projects (Target Audience = Scientists)

Obtaining peer-review is an essential step in the knowledge development process that ensures that research efforts ultimately contribute to the collective knowledge base. Peer-review will be obtained by providing an opportunity for appropriate experts to evaluate research plans and draft manuscripts. Peer-review will also be sought through oral and poster presentations at appropriate conferences.

The following table will be completed along with the Communications Plan by March31, 2009.

Table 5. Resources allocated and plan for delivery of communications and extension by activity

Activity	Person	Hours	Financial resources

Formally planned communication opportunities:

1. Canadian Geophysical Union Hydrology Chapter Annual Meeting - Banff
2. Riparian research workshop

7. Inter Program Links *(Please describe or list projects that are linked or done in collaboration with other programs)*

Table 6. Summary of integration activities and outcomes

Integration activity	Strategy	Outcome	Forecast costs
1. **Social science** survey on perception of aquatic ecosystem health.	This opportunity requires discussion and approval from Fish and Watershed activity team and Social Science Program prior to initiation.	Improved understanding of public perceptions.	Unknown.
2. Joint proposal with **Natural Disturbance Program**	Identify opportunities to integrate current research.	Tools that build on collective knowledge.	Unknown. Proposal will target external support.
3. Ongoing communication with **Foothills Stream Crossing Program** (FSCP)	Continue to develop tools for FSCP members.	Improved economic and environmental effectiveness from any infrastructure investments.	Incorporated into work plan.
4. Pilot project integrating fish passage, water quality and **grizzly bear** core habitats into access management planning.	Complete pilot project within one watershed to show how information on grizzly bear core habitat and watershed values can be considered simultaneously in the access management planning process. Ideally will take place with one of the FSCP demo watersheds.	Demonstration of how existing map-based tools from **Grizzly Bear Program** and **Fish and Watershed Program** can be combined to help inform access managers.	Ideally this would be a combined effort between GBP, FSCP, and FWP. These programs will attempt to keep these costs to a minimum by focusing on small demonstration project. Discussion started on Dec. 8, 2008 and costs have not been detailed at this point.
5. Proposal for pilot workshop for improved **Aboriginal Involvement** in land management involving aquatic resources.	We will develop a proposal to work with one aboriginal community. Workshop would introduce community to tools and map-based knowledge which they could consider in referral process.	Improved resource management and increased partner effectiveness.	Discussion with Brad Young started on Dec. 8, 2008 and costs have not been detailed at this point.

8. Funding sources for this period

Fish and Watershed Program,

Contributing Organization (Incl. Requested from FRI)	Carry Forward	Cash Committed (Proposal stage only)	Total Confirmed Funding	In-kind Support	Comments (including in-kind descriptions)
1. Contribution 150.4					
FRIAA Open Funds			$17,950		Final payment for completion of sediment budget project.
Foothills Research Institute	-$12,500	$30,000		$20,100	In-kind includes: 24 GIS days at $450/day; 6 admin days at $300/day; 25 communications days at $300/day.
UBC				$20,000	In-kind includes time from Dr. Hassan and Dr. Moore for riparian project.
Cont 150.4 Subtotal	**-$12,500**	**$30,000**	**$17,950**	**$40,100**	**Total cash = $35,450**
2. Contribution 150					
Foothills Research Institute		$122,500		$20,100	In-kind includes: 24 GIS days at $450/day; 6 admin days at $300/day; 25 communications days at $300/day.
Alberta Conservation Association		$15,000			Proposal to improve native fish distribution model. Awards announced by March 20, 2009
ASRD-Strategic MPB funding		$25,000			Proposal solicited by ASRD-FMB, to be submitted Feb. 2009 for evaluation.
Cont 150 Subtotal	**0**	**$162,500**	**0**	**$20,100**	**Total cash = $162,500**
Totals	**-$12,500**	**$192,500**	**$17,950**	**$60,200**	**Total cash = $197,950**

9. Program/Project Key Members and Responsibilities

Program manager:
Richard McCleary (see contact info on first page). Managing program under contract (10 days per month). Partial support from FRI for Ph.D.

Riparian research project academic advisors:
Dr. Marwan Hassan, Associate Professor, Dept. of Geography, UBC mhassan@geog.ubc.ca 604-822-5894
Dr. Dan Moore, Associate Professor, Depts. of Geography and Forestry, UBC rdmoore@geog.ubc.ca

Activity team (as per page 1):
The team will review and approve the detailed plans for all projects prior to implementation.

Field work:
There are two options to complete the proposed field work. First would be to hire a full-time FRI employee to coordinate all local projects. Second option is to have all field projects completed by contractors. The two options will be discussed by the Fish and Watershed Activity Team to determine best course of action.

10. Environmental/Occupational Health and Safety/Permits

1. Fish collection permit issued by ASRD – FWD.
2. Research completed within William Switzer Provincial Park, research permit no longer required.

11. Appendices

Appendix 1. References:

Benda, L. et al., 2007. NetMap: a new tool in support of watershed science and resource management. Forest Science, 53(2): 206-219.

McCleary, R.J. and Hassan, M.A., 2008. Predictive modeling and spatial mapping of fish distributions in small streams of the Canadian Rocky Mountain foothills. Canadian Journal of Fisheries and Aquatic Sciences, 65: 319-333.

McClure, M. and Ruckelshaus, M., 2007. Collaborative science: moving ecosystem-based management forward in Puget Sound. Fisheries, 32(9): 458-461.

Post, J.R. and Johnston, F.D., 2002. Status of the bull trout (*Salvelinus confluentus*) in Alberta. Alberta Wildlife Status Report No. 39, Alberta Sustainable Resource Development, Fish and Wildlife Division, and Alberta Conservation Association, Edmonton, AB.

Taylor, E.B., Tamkee, P., Sterling, G.S. and Hughson, W., 2006. Microsatellite DNA analysis of rainbow trout (*Oncorhynchus mykiss*) from western Alberta, Canada: native status and evolutionary distinctiveness of "Athabasca" rainbow trout. Conservation Genetics, 8: 1-15.

Walker, J., 2005. Status of the Arctic grayling (*Thymallus arcticus*) in Alberta. Alberta Wildlife Status Report No. 57, Alberta Sustainable Resource Development, Fish and Wildlife Division, and Alberta Conservation Association, Edmonton, AB.

150 Fish & Watershed (update)

Table 1. Statement of timelines and costs for deliverables due by Sept. 30, 2009.

Project	Deliverable	Timelines	Costs
Part 1. Carry forward projects from 2008-2009			
1. Sediment budget / wood budget project communication.	1. PhD dissertation and manuscripts for submission to scientific journal.	Apr. - Sept.	Covered under 2008-2009 contract
2. Stream channel spatial model applications and mapping.	2. Manuscript on channel origin locations for submission to scientific journal based on 2008 sampling.	Apr. - Sept.	Covered under 2008-2009 contract
Part 2. New Projects for 1st half 2009-2010			
1. Hardisty Creek	1. Review consultant's reports and attend web-meetings.	Apr. – Sept.	$1,650
2. Electro-fishing at hanging culverts	2. 40+ sites to confirm fish model predictions.	May – Aug.	$47,970
3. Channel head sampling	3.1 300+ sites. 3.2 Field tour outlining channel classification system for land managers.	3.1 May – Sept. 3.2 June	$15,000
4. Navigable waters documentation	4. Field sampling at locations across FMA.	May – Sept.	$15,000
5. Arctic grayling pilot	5. Night snorkelling at order 4-5 streams in FMA.	July – Aug.	$15,000
6. Healthy landscapes proposal development	6. Proposal for watershed indicators for healthy landscapes pilot	Apr. – Sept.	$3,300
7. Program admin	7.1 Detailed work plan for second ½ of 2009/2010. 7.2 Recruiting field staff and directing program. 7.3 Regular program management duties.	Apr. – Sept.	$13,750
TOTAL			***$116,670***

Training and non-wage cost estimates:

1. *Bear awareness - $200*
2. *Emergency response field scenario (handled in house)*
3. *Electrofishing crew member (Field Crew Supervisor) $800*
4. *Swiftwater rescue (Arctic grayling pilot project crew)$1000*
5. *Night snorkelling surveys (Arctic grayling pilot project crew)$1500*

Foothills Research Institute Annual Work Plan 2009 – 2010

202.1 - Foothills Landscape Management Forum

1. Prepared By

Wayne Thorp, Activity Lead
Box 7352 Peace River, Alberta T8S 1S9
Ph: 780-625-1732 Fax: 780-624-3489
Email: wthorp@telus.net

2. Sign off Sheet

FLMF Co-chairs

This is to advise that I have read the 2009-2010 FLMF Work Plan and proposed budget and hereby endorse it as submitted.

Per_____ Co-chair Rob Gibb, Talisman Energy

Per _____Co-chair Rick Bonar, Hinton Wood Products

3. Executive Summary

This work plan is for the period April 1, 2009 to March 31, 2010 which represents the 5th year of the Foothills Landscape Management Forum's (FLMF) existence. The timing of this work plan development follows less than two months after the approval of the amended 2008-2009 work plan approved in October, 2008. Over the past two years, the FLMF concentrated much of its efforts in the engagement of industry in the development of the west central caribou plan. Once the West Central Plan was complete, the FLMF reviewed its goals and objectives for this fiscal year. For this reason, many of the objectives and outcomes in the 2009-2010 work plan remain the same as those in the amended and approved 2008-2009 work plan.

The FLMF currently represents 13 energy and forest industry companies and 1 aboriginal community in the foothills region of Alberta.

Objectives for the term of this plan will be to support the FRI vision and goals, provide ongoing support to its industrial partners, and to continue to support efforts of Sustainable Resource Development (SRD) and industry to recover caribou in the Little Smoky and A la Peche caribou ranges. Ongoing close collaboration with the SRD ILM department is intended to ensure that the work of the FLMF supports and/or complements existing projects. This plan is consistent with the 5 year work plan (2007-2012) submitted to FRI in August, 2007. Specific objectives are detailed in the work plan in the following areas:

- Provide and enhance business value to its members
- Integrated Land Management (ILM)
- FLMF Industrial Access Plans (IIAP)
- Provide support for other IIAP's (i.e. Kakwa Copton)
- Develop an adaptive management implementation plan

- Develop an Access Management Research program area
- Technology transfer and communication
- Support and coordination for member initiatives (i.e. Hinton Wood Products FMA ILM Plan)
- Cooperate with SRD

While the FLMF is self-funded, sustained FRI support is required for the continuation and ongoing evolution of the FLMF as an excellent Alberta ILM model supported by government. The value of the FLMF is that it has become a credible working example of landscape level ILM with a commitment to continuous improvement.

4. Background Information

The FLMF provides a forum for a group of progressive companies from the primary industrial sectors of energy and forestry who have recognized the importance of integrated management. Integration of the two industries in planning and operations is a first step in management of the industrial footprint that will provide valuable input into higher order plans such as the government's Land Use Framework (LUF).

In addition, integration of industrial footprint will be required for input into specific strategies such as watershed, grizzly bear, caribou and mountain pine beetle. It is hypothesised that with integration the industrial footprint will be less than past practises of "plan as you go". With good management and integration, the likelihood of land use decisions that could affect the industries ability to access resources will be lessened. In turn, this reduces the cumulative effects of industry activity on other resource values and contributes to resource conservation.

The FLMF Managing Director leads development of strategies and is an advocate for the membership. Specific companies will continue to produce plans to meet their regulatory requirements outlined in their dispositions, however, having a forum to develop common objectives and bring management to more of a landscape systems approach as opposed to one-off disposition by disposition will significantly improve the ability for effective management and mitigation of impacts on other values.

The FLMF originally was a partnership between forest and energy sector companies operating in the Little Smoky and A la Peche caribou ranges. However, since its inception in May of 2005, the FLMF evolved to include issues and plans in a broader landscape. For example, the FLMF provided a forum for industrial input into the development of the West Central Caribou Recovery Plan and has successfully established itself as a leader in the province in ILM work for the energy and forestry industrial sectors in the foothills region of Alberta. The government has supported many of the FLMF activities and, specifically, SRD Assistant Deputy Ministers (ADM's) have expressed a strong desire for the continuation of FLMF providing solutions and leadership.

The current members of the FLMF are:

- Foothills Forest Products Inc.
- Canfor (Canadian Forest Products Ltd.)
- Hinton Wood Products, a division of West Fraser Mills Ltd.
- ANC Timber Ltd.
- ConocoPhillips Canada Resources Ltd.
- Suncor Energy Inc.
- Encana Corporation
- TransCanada Pipelines Ltd.
- Devon Canada Corporation
- Talisman Energy Inc.
- Husky Energy Ltd.
- Canadian Natural Resources Ltd.
- Shell Canada
- Aseniwuche Winewak Nation of Canada (Grande Cache)

The FLMF role in provincial ILM is evolving and in the next business year, with the assistance of a government grant in late 2008, many projects will be initiated to further advance on-the-ground implementation of ILM. These projects will have started prior to the beginning of this work plan year and many will "carry over" into the 2009-2010 work plan year.

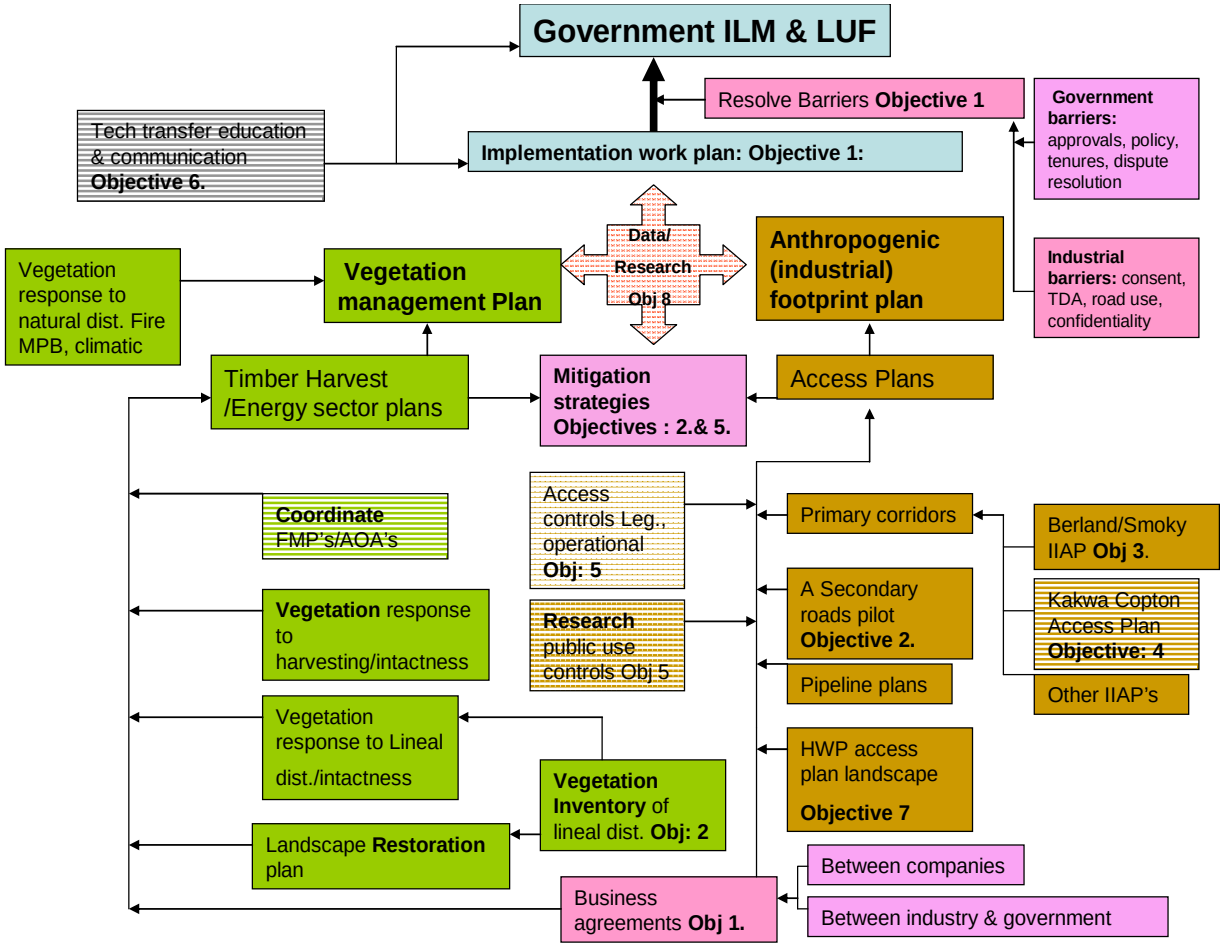
The most important aspect of the FLMF is the recognition of the value of relationships and communication to accomplish common goals. The industrial partners also agreed that there would be significant value in bringing Aboriginal participation into the FLMF.

5. Objectives

The FLMF has established itself as a credible forum to forward the cause of successful implementation of ILM and support for the government's LUF. Additional details on past accomplishments may be found in the Forest Resource Improvement Association of Alberta (FRIAA) Annual Report, submitted March 2008, titled Project FOOMOD-01-04.

While industry does not have specific authority or responsibility for land use and land management, there is a significant role and responsibility for industry to proactively manage its industrial footprint and vegetation dynamics over space and time specifically to reduce impacts on other values. Essentially the management of land use is a government responsibility and is a "top down" strategic planning system while much of the FLMF work is from the "bottom up" at the operational and tactical levels. The development and implementation of the two systems will eventually need to be merged, tested and validated. The detailed work plans attached in the appendices are designed specifically to fit together into an overall plan for management of industrial footprint and vegetation. There are many sub-components to successful management as shown in Figure 1.

Figure 1. Schematic of FLMF Implementation Work Plan.



The FLMF work plan for 2009-2010 provides a structured outline of how everything fits together to lead up to the development of a full implementation plan of adaptive management for industry. The 2009-2010 objectives are shown in the schematic above which illustrates how they are linked together as well as how they relate to the overall implementation plan. The list of primary FLMF objectives for the 2009-2010 work plan is as follows:

FLMF 2009-2010 Work Plan Objectives:

1 Provide and enhance business value to its members.
2 Advance provincial Integrated Land Management (ILM) with:
a) Identification of and resolution of barriers that impede successful delivery of ILM with a secondary road pilot project.
b) Collection of vegetation data on lineal and other disturbances.
c) Working with government to conduct an assessment of current mitigation strategies and develop new "effective" ones.
3. Improve on the Berland Smoky Access Plans (IIAP) annually through monitoring reports and maintaining an up-to-date inventory.
4. Provide support for the Kakwa Copton Access Plan.
5. Develop an Access Management Research program area and complete specific projects identified at the May, 2008 workshop.
6 Work with FRI to advance technology transfer and communication to meet the goals and objectives of FRI.
7. FLMF will provide support and coordination to assist in the development of the Hinton Wood Products Forest Management Area ILM Plan.
8. Support and provide expertise to the government to assemble the Grizzly Bear Access Layer.

Each of the objectives listed above are shown with corresponding numbers in Figure 1 to illustrate how they fit into the bigger picture of implementation. Many of the objectives complement other objectives with cross-over benefits for the future development of plans and continuous improvement when adaptive management is fully functional. It is for this reason that it is neither practical nor functional to segregate an individual objective. The following section is a brief explanation of each of the objectives.

FLMF Objective 1: Provide and enhance business value to its members.
Account Code FLMF 202.1

Objective 1 relates to all of the work undertaken by the FLMF activity lead with an overall goal of reductions of future industrial footprint through coordination and integration of development activities. As well, an important component of the FLMF is to provide a forum to resolve conflicts and remove barriers between and within industry sectors and government. This role will help to ensure successful implementation and provide business value to member companies.

The members have indicated that there are some key areas where the FLMF has provided business value such as having full access to an up-to-date digital access layer. In addition, the removal of barriers, collaboration and integration between companies and ease of approval of plans are essential to the continued existence of the FLMF. The July, 2008 approval of the Berland Smoky Access Plan was a significant improvement in providing clear direction when compared to past approvals of other access plans in the province. The Berland Smoky Access Plan should provide an expedited approval process for the primary corridors (See Appendix 1).

The work plan for 2009-2010 includes working with government to review and remove ineffective mitigation strategies that have high costs which would provide value and the ability to spend mitigation money on effective strategies. The first step in the review is to conduct a quantitative survey of mitigation to illustrate the significance of these expenditures. This survey will be completed by November, 2008 and follow-up work with SRD will be completed in 2009 (See Appendix 2).

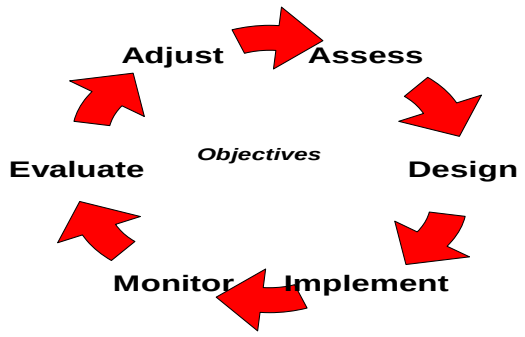
The resolution of common barriers between companies and between industry and government is needed to enhance plan approvals and provide opportunities for the development of mutually beneficial business arrangements. The work plan associated with meeting this objective is ongoing and is funded solely through annual dues paid by members.

FLMF Objective 2: Advance provincial ILM with:
a. Identification of and resolution of barriers that impede successful delivery of ILM with a secondary road pilot project.
b. Collection of vegetation data on lineal and other disturbances.
c. Working with government to conduct an assessment of current mitigation strategies and develop new "effective" ones.

Account Code: FLMF 202.5

It is becoming common practice, and, in most cases, a requirement, for a development plan to receive approval only after integration between and within industrial sectors has occurred. The FLMF, through the development of the Berland Smoky Access Plan, fulfilled that requirement for primary road corridors. The West Central Caribou Landscape Planning Team (WCCLPT) May, 2008 plan proceeded to a point where the process, with resulting recommendations, has been reasonably outlined. Understanding the cause and effect relationship among the habitat and predation variables can be addressed through an adaptive management program, in association with the systematic implementation of a range of recommendations.

Figure 2. Adaptive management process.



The implementation framework will initiate planning on a variety of topics specific to the completion of an integrated implementation package. The implementation framework will be finalized when the government officially responds to the WCCLPT plan and the Alberta Caribou Committee's recommendation on the West Central caribou recovery plan (May, 2008). The implementation framework should initiate projects that are the responsibility of government, the forest industry, and the oil and gas industry. In almost all cases, each project will require shared responsibility for planning and funding.

The role of the FLMF will to be to provide a mechanism for implementation of the recommendations that will come from the WCCLPT and an opportunity for industry to develop innovative solutions. FLMF will therefore take a lead role in design and implementation as shown in Figure 2. The FLMF will work with government in evaluating, monitoring, adjusting, and assessing. The 2008-2009 work plan and budget included the development of the next phase of integration for a pilot for secondary roads and inventory. The success/progress of the pilot projects by March 31, 2009, will have a direct bearing on the work plan for 2009-2010. Even though the government has not officially responded to the WCCLPT plan, there are many areas that the FLMF members believe should be investigated and worked on to fill information gaps and test and refine industrial ILM planning processes. The FLMF has identified the following projects that will be initiated in the winter of 2008 and will carry over into this work plan year.

Project 1: Pilot for Integrated Secondary Road Planning & Tactical Planning – Oil & Gas

Currently, primary roads have been identified and approved for two areas in the west central caribou range. These are found in the Kakwa Copton and the Berland Smoky Access Plans. In addition, a secondary road plan prototype should be initiated within the Berland Smoky planning area as an example for future implementation. The selection of a representative area of approximately 20 townships in the Little Smoky caribou range is the first step as per project 2 above. The secondary road plan prototype could also include corridor planning for pipelines and powerlines.

Currently, Caribou Protection Plans (CPP's), do not address caribou requirements adequately, nor are they integrated among companies, across spatial dimensions or include temporal requirements. This project as outlined in the draft Terms of Reference (TOR) (See Appendix 3) will include identification of recommendations to the current processes and to test modifications. SRD is presently reviewing the CPP and AOA processes and have intentions to modify and enhance them by the end of this fiscal year. This project would assist SRD in the implementation of the new process and identify barriers associated with oil and gases integrated planning and determine ways to make improvements to integration.

Methods:

The FLMF director will take a lead role in completing this project. The following steps will be undertaken:

1. Complete a detailed terms of reference for government approval.
2. Work with government to develop a steering committee and process to complete a secondary road plan.
3. Complete the plan.
4. Implement the plan.

Timelines:

The plan is to be complete by the fall of 2009.

Project 2: Pilot for Historical Lineal Disturbance Vegetation Inventory

Previous projects will set the stage for establishing restoration priorities. Restoration must consider current intact areas and amount, recruitment areas, spatial considerations, rotation using lower priority areas, early succession support for prey in surrounding areas and overall predation and habitat effects. A vegetation inventory should be completed for historical lineal disturbances in order to assess the current state of early succession and its projected state in order to maximize the opportunity and options for silviculture planning, road planning and oil and gas tactical planning.

The inventory project will commence in January, 2009 (See Appendix 4). However, because of the need to collect new aerial photography in May and June of 2009, the interpretations and loading of the digital files would not be completed until late fall 2009. The funding levels will also have to be addressed in this work plan timeframe.

Methods:

The FLMF director and technical staff at FRI will lead this project in the following steps:

1. Complete a project outline with a forestry inventory consultant (Greenlinks Forestry).
2. Design the key attributes with the Alberta Caribou Committee Research & Monitoring subcommittee.
3. Seek funding partners (received funding already from CAPP).
4. Secure photography.
5. Complete the inventory.

Timelines:

The project should be complete by the fall of 2009.

Project 3: Mitigation Guideline Workshop & Assessment

To date, mitigation guidelines have been developed in an adhoc fashion whenever a supposed need arose, with no validation of benefit to caribou or other values. The biggest problem is that, for the most part, operational mitigation strategies have never been accompanied with a monitoring program to determine their effectiveness. Many strategies have been developed over the years and are being questioned by industry and government. The intention of this project is to work with government to review, assess, and remove redundant operational mitigation strategies. This would also include the development of new ones if there are better ways to accomplish objectives.

Methods:

The FLMF director will lead this project in the following steps:

1. Conduct a survey of mitigation practises for the FLMF members. This will be completed by the end of November, 2008.
2. Review survey results with SRD executive.
3. Write a letter to initiate a collaborative review.
4. Review with SRD the "effectiveness" and recommend revisions or changes.

Timelines:

The survey was completed by December 31, 2008 and a letter was written and sent to SRD to conduct a review. Next steps such as validations as determined by the FLMF and SRD will be completed dependant upon the amount of monitoring required by summer 2009.

FLMF Objective 3: Improve on the Berland Smoky Access Plans (IIAP) annually through monitoring reports and maintaining an up-to-date inventory.
Account code: FLMF 202.1

Increasing road access in the ranges of the A la Peche and Little Smoky caribou herds is needed to support allocated resource extraction and associated economic and social benefits. While there will be more roads than currently exist because of resource allocations, the FLMF objective is to reduce the overall industrial footprint (roads) as compared to "plan as you go" as its primary mitigation strategy for other values. The first step in managing industrial footprint is to prepare an Integrated Industrial Access Plan (IIAP) for primary corridors. In previous plans it is anticipated that integration could result in an overall reduction of roads by as much as 40% (calculated by the Kakwa Copton planning team).

IIAP Status: The government endorsed the 2006 access plan as a guiding tool on June 23, 2006, and also reinforced the need to integrate and coordinate the access requirements of the forest and oil and gas sectors, and to develop a monitoring and reclamation plan. In the spring of 2008, the FLMF worked with government to officially establish the IIAP as the basis for access development with approval of primary corridors under an "Information Letter". As part of this process, the FLMF developed a condensed IIAP that only dealt with the corridors and not other key items such as monitoring, reclamation and ongoing reporting. On July 8, 2008 the government approved the condensed IIAP (Berland Smoky Access Plan) and issued Information Letter 2008-05.

Methods:

The desired outcome of the IIAP is to accomplish a reduced industrial footprint as compared to plan as you go. The only way to truly know whether this is successful is to have an ongoing monitoring and reporting system. The annual IIAP submission will now become a monitoring report on the change in access development in all categories as well as comparing the IIAP to hypothetical unplanned areas and townships fully developed to validate effectiveness in reduction of intensity of industrial access footprint over time. The latest IIAP submission of October, 2008 provides a detailed summary of monitoring and reporting. (See Appendix 5)

In the future, dependent upon the outcome of the secondary road pilot project under Objective 3.1, the FLMF intends to expand the IIAP into a primary and secondary corridor plan and, if possible, will include pipelines, power lines and other lineal disturbances.

The IIAP process for the Little Smoky and A La Peche caribou ranges is funded solely from FLMF annual membership dues. The annual submission to government and posting on the FRI website is updated each year in the fall.

Timelines:
Ongoing. Resubmitted to government and posted on the FRI website by October each year.

FLMF Objective 4: Provide support for the Kakwa Copton Access Plan.
Account code: FLMF 202.1

Many of the FLMF energy sector members were also involved in the preparation of the Kakwa Copton Access Plan over the past three years. This plan received SRD approval and a joint SRD and energy Information Letter (IL) in January of 2008. This planning area is situated in Weyerhaeuser's FMA who is not a member of the FLMF. However, Weyerhaeuser was directly involved in the development of the West Central Caribou recovery plan and participated in the FLMF adaptive management plan development.

Methods:
The energy sector indicated that they want the FLMF Director to coordinate their continued involvement and enhancement of the Kakwa Copton planning process. To this end, the FLMF will work with Weyerhaeuser on behalf of the energy sector to improve the Kakwa Copton Plan and adopt the principles contained in the Berland Smoky IL and approval letter. The FLMF will also work with the participants in the Kakwa Copton Plan, including government, to develop next steps such as monitoring reports for this area.

Timelines:
Ongoing. FLMF participation will be funded from annual membership dues which will be ongoing from year to year.

FLMF Objective 5: Develop an Access Management Research program area and complete specific projects identified at the May, 2008 workshop.
Account code: FLMF 203

The Foothills Energy Partners, many of whom are also FLMF members, in support of the Foothills Research Institute (FRI), recognize that the development of access to extract natural resources has impacts on other values both positively and negatively. To address this matter, the partners held a workshop to initiate and focus collaborative efforts regarding access management as a specific program with its own funding. The intention of the energy partners is that the initial funding would be used as "seed" money to develop collaborative partnerships in this important component of industry development.

The FRI board of directors also recognized that access management issues require a coordinated effort in order to be effective in dealing with the cumulative impacts of resource development on the landscape. Responsible and proactive management of access will complement existing programs such as the: Grizzly Bear, Foothills Stream Crossing Association, Foothills Landscape Management Forum, Mountain Pine Beetle Ecology, Natural Disturbance and delivery of the government's West Central Caribou recovery plan.

A workshop was held on May 29, 2008 to provide direction on how this would be managed and what the immediate priorities were. Several energy companies provided new financial resources to facilitate a new focus on access management. These partners wanted the "new money spent on new initiatives" with a focus on advancing access management practices. As a result, the group discussed what priorities should be acted on and selected four strategic areas of importance.

Methods and Timelines:
There were four specific projects identified for the 2008/-2009 work plan year as follows:

- Project 1: Review management tools for access management.
  Status: Led by the FLMF Director. Hired EoS Consulting out of Vancouver B.C. Project commenced in October, 2008 and is scheduled for completion by February, 2009.
- Project 2: Efficacies of management practises (for Rig Matting and Gates) for completion by February, 2009.
  Status: Underway. Rolled into FLMF Objective 2 Project 4: Quantitative Survey.
- Project 3: Pilot project access use.
  Status: Scoping out to commence immediately and work with government after Project 1 is complete.
- Project 4: Remove barriers from existing plans.
  Status: This is ongoing with the Berland Smoky and Kakwa Copton Access Plans.

The FLMF will utilize funds provided by the energy partners of FRI and directed funding from FLMF membership dues to complete these projects (See Table 3).

FLMF Objective 6: Work with FRI to advance Technology Transfer and Communication to meet the goals and objectives of FRI.
Account code: FLMF 202.1

The FLMF operates as an Association under the umbrella of the Foothills Research Institute which has a mandate of technology transfer and communications to improve management practises for the sustainability of forests. The FLMF will work with the FRI to provide updates and educate the government, public, and industry on the progress of the FLMF.

The FLMF will continue to provide communications to its members and government on activities planned and completed. The FLMF will also work with FRI for external communication including media relations as per FRI's strategic plans.

Methods:
The FLMF will maintain an up-to-date access layer dataset of the Little Smoky and A La Peche caribou ranges and serve it up via a web-based server to members and government. Quarterly, the FLMF will post on the FRI website a one/two page "Quicknote" highlighting significant accomplishments. All technology transfer and communications programs are funded by FRI and FLMF membership dues. The FLMF will also participate in FRI annual meetings and presentations to relevant groups in government and industry (such as Alberta Chamber of Resources).

FLMF Objective 7: FLMF will provide support and coordination to assist in the development of the Hinton Wood Products Forest Management Area ILM Plan.
Account code: FLMF 202.1

This project is to address issues related to ILM between the forest and energy sectors industrial activity with resource value conservation in the Hinton Wood Products (HWP) FMA. The goal is to integrate cumulative effects issues related to surface infrastructure development (primarily linear corridors and initially focused on LOC roads) from multiple companies and resource sectors. The scope is industrial surface footprint and related cumulative effects and does not include public use. Values to be assessed for cumulative effects include caribou, grizzly bear, trumpeter swan, fish, wetlands, and water quality (sediment). The project is designed to enable the assessment of additional values in the future.

The purpose of this project is to develop an ILM Plan for industrial surface footprint on the HWP FMA and to use the information to assist with planning and implementation of ILM. HWP is a founding partner of the FLMF and wishes to

utilize learnings and relationships developed by the FLMF to complete this work. Additionally, work completed by the FLMF will be used from FLMF Objectives 3.2, 3.5, and 3.6 which will assist HWP to bring ILM to a landscape scale.

Methods:
Details of the project outline can be acquired from HWP under their FRIAA project proposal. The role of the FLMF will be to assist in facilitation, provision of up-to-date data layers, lineal inventory and other information to assist in the development of this project. Funding is provided to the FLMF through its membership dues.

FLMF Objective 8: Support and provide expertise to the government to assemble the Grizzly Bear access layer.
Account code: FLMF 202.4

The access layer update and verification processes developed for the FLMF area (Little Smoky and A La Peche caribou ranges) was seen as valuable for SRD to get an up-to-date dataset for implementation of grizzly bear recovery plans. In addition, the two parties agreed that there is a mutual interest in sharing data to develop plans. In June of 2008, the FLMF and SRD outlined a memorandum of understating (MOU).

Methods:
The access data was compiled and verified and a significant portion of the work was complete by October, 2008. However, there are other areas that have been identified by SRD that will continue through the winter of 2008 and spring of 2009. There will be a need for ongoing maintenance and data distribution which will extend into this work plan year. In addition, the FLMF and SRD agreed to cooperate on collecting and verifying an access control layer. The resource technician of FRI (FLMF data management and support) will be completing this work by the spring of 2009 and will review progress and scope at that time.

6. FLMF Funding

6.1 Funding Sources

The Foothills Research Institute does not provide direct funding for the FLMF with the exception of the provision of services up to 5% in kind support for administrative, GIS and accounting. Any requirements for support beyond that of 5% support is paid out of FLMF dues. Other than that, the FLMF is self-funded from membership dues for its core funding and projects as they are identified and agreed to are funded via special requests or government grants from time to time. The membership dues are invoiced annually which provides funding for the management of the FLMF and associated projects.

The FLMF operates with three funding categories for 2009-2010: a) Core industrial funding from FLMF dues, b) Project funding as supported by industrial and/or government, and, c) A new government grant (Non-directed). The members represent all of the forest companies and a majority of the larger energy companies in the core target area. A local Aboriginal community is a member but doesn't provide funding. The funding sources for the 2009-2010 year for core, implementation and access management are shown below:

A) Core Industrial Funding FLMF Account code 202.1

Table 1. FLMF Sources of Core Industrial Funding 2009-2010

Company	Payment Required voting member	Annual Dues ($ per year)	Source of Funds
ANC	yes	$ 20,000.00	FRIAA
West Fraser	yes	$ 20,000.00	FRIAA
Canfor	yes	$ 20,000.00	FRIAA
* Foothills Forest	yes	$ 5,000	Operating
Suncor	yes	$ 20,000.00	Operating
ConocoPhillips	yes	$ 20,000.00	Operating
Husky	yes	$ 20,000.00	Operating
Talisman	yes	$ 20,000.00	Operating
Devon	yes	$ 20,000.00	Operating
CNRL	yes	$ 20,000.00	Operating
AWN	yes	n/a	n/a
Encana	yes	$ 20,000.00	Operating
TransCanada Pipelines	yes	** $ 10,000.00	Operating
Shell	yes	*** 0	Operating
SRD (GOA)	no	0	n/a
Energy (GOA)	no	0	n/a
Total	13	$215,000.00	

* Based on past support

* Foothills Forest Products do not have the capacity to pay for full dues in the 2008 fiscal year but will remain an active member with a contribution shown above. Full funding will take effect when conditions improve.

** TransCanada Pipelines wants to have 50% of their funding directed to the access management project

*** Shell requested their fee be directed to support the access management project.

Table 2. Projected FLMF In-Kind Support 2009-2010.

Company	# hours	Value
Suncor	80	$9,600.00
CNRL	80	$9,600.00
CANFOR	80	$8,000.00
Foothills Forest products	80	$8,000.00
Talisman	120	$11,520.00
AWN	30	$3,000.00
Devon	80	$9,600.00
ANC	80	$8,000.00
TransCanada Pipelines	80	$8,000.00
Encana	80	$8,000.00
Husky Energy	80	$8,000.00
AB Energy	40	$2,500.00
SRD	176	$11,000.00
ConocoPhillips	80	$9,600.00
Hinton Wood Products - West Fraser	120	$9,600.00
Shell Canada	80	$8,000.00
FRI GIS, Admin, Accounting, Communications	120	$12,000.00
Sub-total	1486.0	$144,020.00

B) Access Management Funding FLMF account code: 203 Objective 5

Table 3. Funding Sources for the Access Management Project.

Company	Funding	Comments
Encana	$25,000	FRI partner
Talisman	$25,000	FRI partner
ConocoPhillips	$25,000	FRI partner
Petro-Canada	$25,000	FRI partner
CNRL	$25,000	FRI Partner
Shell	$20,000	*FLMF dues directed
TransCanada Pipelines	$10,000	50% of FLMF dues directed to Access research
Total	$155,000	

C) Government Grant for implementation planning

It is not known at the time of writing whether there will be any additional government grant money provided to the FLMF.

6.2 Budget Summaries

Table 4. Combined 2008-2009 Expenditures and Projected Carryover.

Program account code	Approved budget 2008/09	Expenditures to Oct 31, 2008	Exp + Forecast to year end	Projected Carry over to 2009/10
202.1 FLMF General Objective 1, 3, 4, 6, & 7	$182,298.54	148,143.06	$182,298.54	0
202.3 Adaptive Mangmt	$115,500.00	$115,500	0	0
202.5 Gov't grant Implmt Objective 2	$200,000.00	$4,149.76	$125,000.00	$75,000.00
203 Access Mangmt Objective 5	$155,000.00	$29,000.47	$94,000.00	$61,000.00
202.4 Grizzly Bear (Grant) Objective 8	$50,000.00	$12,695.00	$20,000.00	$30,000.00
Total				$ 166,000

Table 5. 2009-2010 Budget Revenue Projections.

Contributing Organization	Carry Forward From 2008/09	Revenue 2009/10	Total Confirmed Funding	In-kind Support (Table 2)	Comments (including in-kind descriptions)
Membership dues "Core" 202.1	0	$215,000	$215,000		
Government Grant WCCLPT Implementation 202.5	$75,000	Unknown	$75,000		The FLMF will be lobbying for additional support from government and / or other sources in 2009-2010 to continue implementation
Access Management 203	$61,000	$155,000	$216,000		Additional programs will be developed as directed by the energy partners as per objectives
Grizzly bear 202.4	$30,000	Unknown			ASRD committing funds elsewhere? Review in spring
Totals	$166,000		$506,000		

Table 6. FLMF "Core" Expenditure Projection 2009-2010.

Activity	Annual Cost ($)
FLMF management and expenses	106,880
Administration FRI	4,000
GIS FRI (license fees, computer supplies)	7,120
FRI Data maintenance and expenses	48,000
FRI Communications	5,000
Projects (includes GIS support)	0
Total	$215,000

7. Integration with other programs

The FLMF work plan objectives have not been fully integrated with other FRI programs to date. Once the development of the implementation plan is underway there will be a need to improve the integration process and outcomes. It was suggested at a recent FRI workshop that the best way to ensure this happens is to have the various activities integrate at the work plan development stage, prior to submission to FRI. It expected that this will be done for the next work plan year.

8. Program/Project Key Members and Responsibilities

FLMF Managing Director: Wayne Thorp (Management Consultant)

Data Management and Support: Chantelle Bambrick

FRI Support:
General Manager: Tom Archibald
Communications and Extension: Sean Kinney
Financial: Denise Lebel
Data Maintenance & GIS Support: Chantelle Bambrick, Debbie Mucha, Melissa Pattison, and Katie Yalte
General Administration: Fran Hanington

Consultants:
EoS Management & Research – Access Project
Greenlinks Forestry – Historical Lineal Disturbance Vegetation Inventory

9. Environmental / Occupational Health and Safety / Permits

Not applicable.

10. Appendices

Appendix 1 – Berland Smoky Access Plan
Appendix 2 – Mitigation Strategy Survey
Appendix 3 – Draft TOR: Recommendations for Modification to CPP and AOA Processes
Appendix 4 – Pilot for Historical Lineal Disturbance Vegetation Inventory
Appendix 5 – IIAP (published in October, 2008)

Foothills Research Institute Annual Work Plan 2009-2010

FRI Grizzly Bear Program 204, 204.9

1. PREPARED BY:

Gordon Stenhouse, Grizzly Bear Program Manager
Foothills Research Institute
Box 6330 Hinton, AB T7V 1X6
Ph:(780) 865-8388 FAX:(780) 865-8331
Gordon.Stenhouse@gov.ab.ca

2. SIGN OFF SHEET:

This research program has over 50 funding partners that contribute to all aspects of this program, including funding, and as part of this program's communications and partner involvement strategy annual partners meetings occur once a year. Our last program partner meeting was held in June 2008 at the University of Calgary and our 2009 meeting is scheduled for the spring of 2009 at the University of Alberta. At these meetings a review of planned activities for 2009 will be presented along with status updates from the principle investigators. Our program has also now formed a formal activity team with a membership that represents a subset of the various agencies and group from our larger partner membership. The activity team is reviewing the planned activities for 2009 and will be assisting with the establishments of program priorities to align with realized budgets. Activity team members are now discussing sector needs with their peers and this will help in the establishment of 2009 work plan priorities. Activity Team Members include:

Gordon Court – SRD Fish and Wildlife Branch
Wendi Crosina – Weyerhaeuser
Mike Gibeau – Parks Canada
Jim Pissot – Defenders of Wildlife
Amit Saxena – Devon
John Stadt – SRD Forest Management Branch
Rob Staniland – CAPP
Gordon Stenhouse – FRI Program Leader
Jim Witiw – DMI

3. EXECUTIVE SUMMARY:

The 2009 program year will mark a major turning point for the Foothills Research Institute's (FRI) Grizzly Bear Program (GBP) and the next phase within this program.

We have completed a seamless map with accompanying attributes of grizzly bear habitat in Alberta. This remote sensing mapping effort was conducted by team researchers at the University of Saskatchewan and the University of Calgary. With the delivery of the final map products we have also provided new resource selection function maps, mortality risk and safe harbour surfaces, grizzly bear movement corridors and a Geographic Information System (GIS) application that allows program partners to evaluation grizzly bear habitat impacts resulting from current and future land use activities. In 2008 the research team began work to complete a food based Resource Selection Function (RSF) model for the area north of Grande Prairie. We believe that additional data collection for validation purposes would be beneficial and is seen as one of our program objectives in 2009.

Our program has developed new techniques and technologies to allow the evaluation of grizzly bear health. The final statistical analysis looking at grizzly bear health and landscape condition will be completed in 2009. We have the only benchmark of health data for grizzly bears in the province. We believe these laboratory techniques have application for many other wildlife species both in Canada and the world.

The 2009 field season will mark the third year of our work to investigate possible impacts of mountain pine beetle (MPB) on grizzly bear habitat use and movements in the Kakwa area. This work has involved building upon existing data sets gathered between 2005-2007 in the Kakwa area and will utilize new approaches our team has developed to monitor and measure landscape change. We plan to undertake a smaller capture program in this area in 2009 with a goal of keeping 10 collared bears on air for data collection. In conjunction with our work in the Kakwa area we plan to continue research on the possible relationships between grizzly bear denning behavior and environmental (weather) parameters.

Contingent on funding, we would like to embark on a study aimed at determining the grizzly bear carrying capacity. Findings from this research would link to the population status, landscape conditions and food supply and would be critical information needed for appropriate management decisions and setting population targets. This work will require the collection of new data sets, but relies heavily on existing data and does not require additional capture and collaring of bears.

We are embarking on the delivery of a training program (ENFORM/FRI) to improve the use and understanding of the program deliverables by end users. We expect that ENFORM will hold at least 4 training sessions for our partners in 2009. Ongoing communication and outreach work will continue with a focus on program presentations aimed at broadening our partner base and explaining research results to a wider cross section of Canadians. This will be achieved by working with various media outlets and fostering key contacts within these organizations. Scientific research publications remain the foundation for the dissemination of program findings to an international scientific audience.

4. BACKGROUND INFORMATION

What we have accomplished:

Through innovation and partnerships, the Foothills Research Institute's Grizzly Bear Program has made significant advances in improving our understanding of grizzly bears in Alberta (See Appendix 1). Some of this information has been used by ASRD to delineate grizzly bear management zones (core and secondary habitats) along the eastern slopes. This research program has also developed new tools and models to assist in sustainable forest management practices and decisions concerning the long-term conservation of grizzly bears. These accomplishments support the FRI vision, mission and business strategies of active partnerships, science based tools and knowledge and the dissemination of our knowledge for sustainable resource management. Our research products, tools and innovative techniques that we have developed over the past 10 years include:

- A satellite image classification and landscape classification protocol for large areas and the ability to standardize products with multiple temporal scales.
- Techniques which allow detailed examination of landscape condition and change on a regular basis with the linking of remote sensing data sets.
- Remote sensing tools to map and identify grizzly bear habitats and human use features at the landscape level. These maps are now available for all grizzly bear range in Alberta (Figure 1.)
- The use of resource selection function models (RSF) to predict probability of grizzly bear occurrence at the landscape level. These maps are available for the landscape between Grande Prairie and the Montana border. (Figure 1). In addition this RSF approach has generated new models to indicate areas of mortality risk and "safe harbours" for grizzly bears.
- The development of new GIS applications to assess grizzly bear response to forest harvesting, regeneration, and access development.

- Providing new provincial scale maps to identify high, medium and low probability of occurrence landscapes for grizzly bears. New research results (DNA provincial grizzly bear population census work 2004 - 2007) suggest that these new maps correlate well with actual bear occurrence on the landscape.
- The use of graph theory models to identify grizzly bear movement corridors at both the home range (watershed) and landscape level. These models also identify where current landscape conditions may make it more difficult to move between important habitat patches.
- A detailed understanding of grizzly bear habitat use in relation to current forest management practices and landscape conditions along the eastern slopes in Alberta.
- On behalf of SRD we have conducted extensive DNA inventory work which provides the first baseline population status data available for grizzly bears in Alberta. These data can play an important role in the testing and validation of existing research products and allow the creation of new approaches when linked to other research products.

A multi-disciplinary team of researchers from the Foothills Research Institute, University of Alberta, University of Calgary, University of Saskatchewan, and Wilfred Laurier University have developed these tools and models. With the support from our active program partners we have now updated all these products so that they are based on specific ecosystem units and recognized bear management areas within Alberta. These products are now in use by our program partners for forest and land management planning.

Our research program has ensured that our work represents peer reviewed science so it is available to researchers worldwide. We have: 49 journal papers and 12 theses for the period 1999-present, 9 Annual FRI Reports, 7 NSERC/CRD reports, 1 Final Program Report to Alberta Advanced Education and Technology and over32 papers presented at scientific conferences. This record represents an outstanding achievement of scientifically recognized applied research to guide the management of forested lands in Alberta.

With the exception of the Chinchaga/Clear Hills area north of Grande Prairie we have prepared RSF maps and models to indicate probability of grizzly bear use to correspond with the habitat base maps. In 2008, we embarked on the development of new food based RSF models for the Chinchaga/Clear Hills area. This work is on schedule and a first draft of this new product will be delivered to partners in the first quarter of 2009.

In 2006 the FRI Grizzly Bear Project was successful in securing funding from Alberta Advanced Education and Technology and NSERC/CRD to develop innovative techniques to measure and monitor long term stress in grizzly bears with an aim to understand possible linkages between grizzly bear health and landscape conditions. The University of Saskatchewan and University of Waterloo have carried out the laboratory components of this research effort. The University of Waterloo will complete the final laboratory work in 2009 using newly developed biomarkers of chronic stress. In concert with this health work, the remote sensing team is assembling annual landscape condition maps that will coincide with over 85% of our bear location data points. A major analysis to determine relationships between landscape/environmental conditions and grizzly bear health in three grizzly bear population units in Alberta will be completed in 2009. Strong interest in this work has been shown from a group of researchers in Scandinavia and we are looking at collaboration opportunities as stated in the FRI business plan.

Grizzly bear response to mountain pine beetles and associated management actions are currently not well understood as no research or monitoring of these relationships have occurred to date in either Alberta or British Columbia. Yet understanding the possible response and impacts of any new forest harvesting strategy on this important indicator species is a key component of sound sustainable forest management practices. Alberta Sustainable Resource Development has asked our research team to assist in learning more about grizzly bear response to mountain pine beetle outbreaks and management actions. The third year of this research initiative is planned for 2009 in the Kakwa area. Landscape change will be measured at a much finer resolution than ever before (every 2 weeks). SRD funding for this program was obtained in 2007. Should no new funding be available from SRD to support this work in 2009 this effort will need to be scaled back and many planned deliverables will not be achieved.

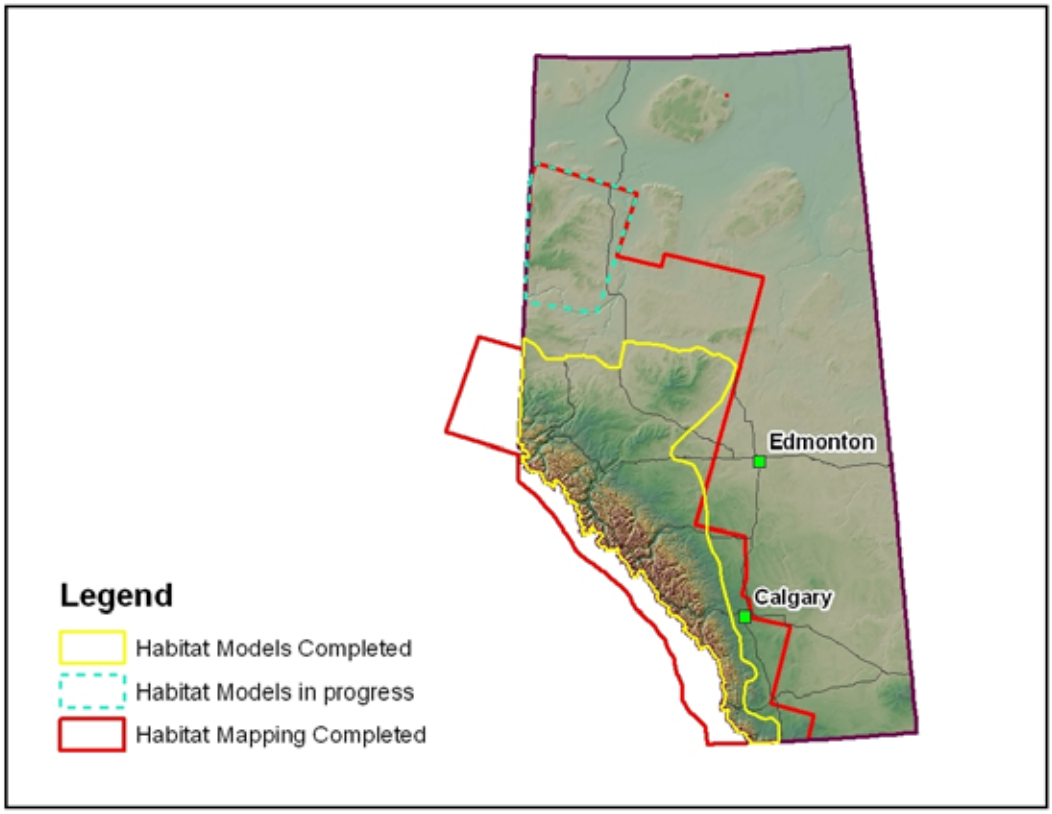


Figure 1. Map showing the area where grizzly bear habitat maps and models have been completed with respect to current FMA holders.

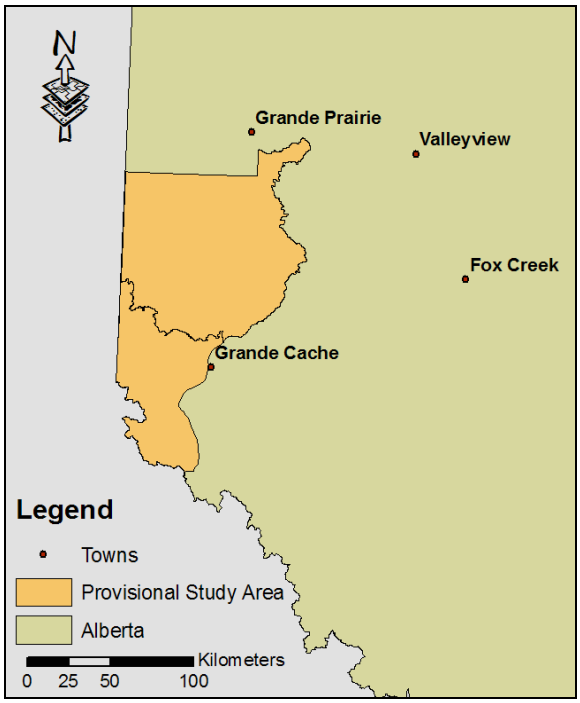


Figure 2. Study area for the mountain pine beetle work.

In 2006 we were successful with a 3 year NSERC/CRD application with the University of Calgary Geomatics Department and Elk Valley Coal to test and develop a new multi-sensor camera unit for the collection of detailed data on grizzly bear habitat use and movements. We completed the final year of this research grant which included work relating to data processing and device testing on captive bears. We believe data from these new systems will be extremely important in understanding underlying characteristics relating to grizzly bear movement and habitat selection. We have received interest from other researchers both in Canada and at an International level in the use of this new product. Trials with a small number of systems are now underway. Funding for pursuing this research topic remains a challenge and will be sought outside our research program in 2009.

In June 2008 our fourth set of program deliverables (Appendix 2) was sent out on DVD to program partners. It has become clear that few users have the background knowledge and expertise to properly use our products to their full extent. To address this problem we are providing a structured training program that will increase the user's understanding and allow more informed application of our products. During 2008 we worked with ENFORM and an educational consultant to prepare a structured two-day training program. This training program is now completed, and facilities are booked with the first courses to be delivered to in the spring of 2009.

The success of this program over the past 10 years has been based on tremendous partner support along with the formation of a team of specialized research scientists who work in a collaborative manner towards a common goal. To continue meeting program objectives new partnerships and scientific collaborative opportunities will be pursued both at the national and international level. The results of our research program have enabled the provincial government to move forward with management actions within grizzly bear habitat in Alberta and to have sound scientific data to support decisions on grizzly bear recovery.

New Forest and Land Management Challenges:

Recent findings (2004, 2005, 2006 and 2007) from intensive grizzly bear DNA census efforts, funded by ASRD, have found fewer grizzly bears in Alberta than previously suggested. These new grizzly bear population estimates (Highway 16- Montana = 239 bears) are serious cause for concern for both wildlife and forest management in this province. There is no doubt that successful and well thought out forest management will be a critical element in ensuring the long-term survival of provincial grizzly bear populations. ASRD has recently put forward a new grizzly bear management zone map which delineates core and secondary habitat for grizzly bears in Alberta. This action is part of the implementation of the Alberta Grizzly Bear Recovery Plan. In addition ASRD has recently (September 2008) established a Grizzly Bear Scientific Advisory Committee to provide advice to the department on research needs related to the implementation of the provincial grizzly bear recovery plan. Products and direction from this group will be reviewed by FRI GBP members in relation to program partner research requirements. We anticipate that the relationships between the FRI GBP and this new ASRD initiative will be clarified in the near future.

The task of forest management and planning in Alberta is challenging given market economies, regulatory requirements and societal/consumer values. Now with new information on provincial grizzly bear populations, the task of forest management has and will become even more demanding. It is extremely important that planning and management decisions are based on sound science and regionally appropriate data. This is a major challenge and one where our research program can provide valuable and important tools and information for these decisions.

These developments and the corresponding management challenges related to forest management and grizzly bear conservation in Alberta require additional information related to:

1. Forest and land managers in NW Alberta need new planning tools and models to assist with long range planning in this area. A preliminary spatially explicit grizzly bear food model for this area (FRIAA supported in 2008) will be completed in the first quarter of 2009, however a broad scale assessment and validation of this new product is required prior to implementation.

2. Forest, wildlife and land managers need to be set clear and measurable targets for understanding the success of new management strategies aimed at recovering grizzly bear populations. For the first time in the history of Alberta we have estimates of grizzly bear population size in most of the currently occupied provincial grizzly bear range. With this baseline information we need to determine the possible carrying capacity of the forested landscape to support grizzly bear populations. Understanding this carrying capacity will allow us to set achievable and measurable targets for reporting purposes. This will be accomplished by the study of grizzly bear energetics.
3. An understanding of the response of grizzly bears to mountain pine beetle occurrence and associated management responses. The influx of mountain pine beetle (MPB) in Alberta appears diminished in 2008, however MPB continues to pose a serious concern for FMA holders with pine stands on their FMA's. Our program (supported by FRIAA and other partners) is in a unique position to specifically address this management question since we have detailed grizzly bear habitat use information for a two year period prior to MPB occurrence and now for 2 years during the infestation period in NW Alberta. (this activity is ongoing and an additional year of field data collection from GPS collared grizzly bears is required in the study area)
4. Forest planners and land managers need to understand the relationships between grizzly bear population status/health and landscape conditions and change. Over the past two years our research team has developed new techniques at our program laboratories to allow the quantification of new measures of health (e.g. chronic stress), which we believe has a significant effect on individual and population health measures. These are the new non-invasive and less expensive ways to collect data to allow us to assess grizzly bear health status that were identified in our 2008 FRIAA proposal. This is a significant achievement and has broad implications for the monitoring of many species of risk or special concern. Understanding these relationships will allow planners the opportunity to incorporate this information to long term DFMP's. Additional analysis is required with current and new data sets to provide greater insights into preliminary results. (status: in progress with an interim report expected in the Spring of 2009)
5. We need to gather baseline data and an understanding of how grizzly bear denning and habitat selection may be affected by changing climatic conditions. This information and baseline data will have important implications for long term status assessments and will represent the only scientific data available to show how grizzly bears currently respond to forest management practices (seral stages) within the context of climate and other environmental variables.
6. Program partners require assistance in the use and interpretation of current research products and tools provided. PWe have now completed our training course in conjunction with ENFORM and courses are now being scheduled for delivery. One on one partner assistance will also be required on site with FMA holders.

5. OBJECTIVES

The FRI Grizzly Bear Program has a primary research goal of:

Providing new knowledge and tools to support land and resource management decisions to ensure the long term conservation of grizzly bears in Alberta.

This research goal provides both knowledge creation, knowledge transfer and policy support upon delivery to program partners. Our accomplishments to date support the FRI vision, mission and business strategies of active partnerships, science based tools and knowledge and the dissemination of our knowledge for sustainable resource management.

This work plan has six distinct program goals for 2009.

1. Testing new Food Models in NW Alberta: Use the new food based RSF model generated from our 2008 program to conduct targeted field assessments of model performance in NW Alberta. This will provide an additional innovative tool that land managers can use for sustainable forest management.

2. Develop Energy Budget Equation: To gain a better understanding of the energetics involved with food, habitat use and grizzly bear movement, we will construct energy budget models to understand and forecast the landscape's carrying capacity for grizzly bears. This information is critical for the Recovery Plan process of setting recovery population targets.
3. Impacts of Mountain Pine Beetle: Determine if accelerated forest harvesting will affect future habitat conditions for grizzly bears, and document current use of different age pine stands by grizzly bears for food and cover. We will continue data collection from radio collared bears in the Kakwa study area. This goal also requires intensive remote sensing work to allow linking bear data to current landscape conditions related to both MPB and other human activities. This is a good example of innovative collaboration and partnership.
4. Landscape Conditions and Health: Continue analysis of existing data sets to further understand the relationships between landscape condition/change and grizzly bear health and provide program partners with a status assessment of grizzly bears in their areas (FMA, and Bear Management Unit).
5. Denning and Climatic Conditions: Continue data collection and complete analysis of existing data to provide insights into grizzly bear habitat and den selection in relation to climatic variables. (this is incorporated with activities in #3).
6. Using Research Results (Training): Hold training sessions in conjunction with ENFORM and provide additional on site partner assistance with interpretation of research product output to assist with forest management planning.

Study Area

The study area for this proposal is found in two primary locations. Work related to testing and refining new food models will focus on NW Alberta in the Chinchaga and Clear Hills area. For activities related to the mountain pine beetle study the specific area includes the Kakwa area north of Grande Cache. This area covers portions of the Weyheauser and Canfor FMA's. The exact geographic boundary of this study area will evolve along with the most current mountain pine beetle data from SRD. Study sites will need to focus at multiple scales, including: stand scale, home range scale, FMA scale and Bear Management Unit. Sampling or bear capture site selection will also attempt to be integrated with other government sponsored mountain pine beetle research activities and will be coordinated with planned forestry operations with Weyheauser. Bear captures for radio collaring will be focused in the Kakwa area with the intent of maintaining 10 active collars. Additional non-invasive health sampling will take place whenever possible in both study areas.

Objective 1: Complete and test new seasonal RSF grizzly bear food model for NW Alberta.

We plan to complete and improve the current draft of the seasonal grizzly bear food model (in prep) with the collection of additional vegetation and diet information collected within the study area. In addition, we plan to gather new data on grizzly bear occupancy within the study area to test the final map products. These data will also be useful in determining the spatial pattern of both grizzly bear and black bear occupancy in this management unit.

Activities:

- Using the new (in prep with delivery scheduled for first quarter of 2009) grizzly bear food model for NW Alberta and existing draft probability of occurrence maps undertake a field program to:
    - Collect additional data on vegetation (bear foods) and diet (from scats) in predicted high use areas
    - Collect DNA samples (hair and scats) at sampling sites to understand grizzly and black bear occupancy across the landscape to test new and draft map products.
- With these data collected and analyzed undertake any improvements and modification of existing models to support forest management decisions and planning.
- Deliver these new products to FMA holders and forest managers in NW Alberta and explain their use.

Timeline:

- Prepare detailed sampling design for occupancy model field work, collect bait and materials and arrange field staff – January 2009- February 2009. This can only be undertaken once the 2008 draft food model maps are completed and evaluated (currently scheduled for December 2008).

- Field data collection May-August for both vegetation, scat, and hair.
- Laboratory analysis of samples August – October 2009
- Analysis and model evaluation November – January 2009-2010
- Final maps and report – March 2010

Objective 2: Energetics: Investigating Energy Budgets to Determine Carrying Capacity for Grizzly Bear populations in Alberta

We will undertake new work to determine the landscape carrying capacity of grizzly bear management units using an energetics approach of both bear foods and grizzly bear movement data. Our initial work will focus in areas where existing data is most plentiful for both our understanding of diet and movement of grizzly bears. The results of this work will aid in setting population targets for grizzly bears.

Activities:

- Collect grizzly bear foods in selected Bear Management Units on a seasonal basis to determine the amount of energy contained in the various food items and determine the total amount of energy available on the landscape by bear management unit by incorporating the caloric information into preexisting food models.
- Using our current GPS dataset on grizzly bear movements in each bear management unit and information from the literature on the expenditure of energy by grizzly bears under various activities, determine an average amount of energy required by a grizzly bear on a seasonal and yearly basis.
- Analysis to create an energy budget for grizzly bears in selected Bear Management Units of the province
- Using our food models and the energy budget determined above, determine the impact various landscape changes could have on grizzly bear carrying capacity

Timelines:

- Food samples will be collected on a seasonal basis and analyzed for nutrient content. Using the nutrient content results, preliminary calculation of energy available for grizzly bears on the landscape will be determined by spring 2010.
- An interim estimate of the amount of energy required by a grizzly bear will be completed by spring 2010.
- Using the information collected in 2009, an energy budget for grizzly bears in selected BMA's will be prepared.
- Analysis of these data will then determine possible carrying capacity for selected BMA's and aid in establishing possible population targets. (April 2010)
- Using the final energy budgets calculated above, the impact of various landscape changes on grizzly bear carrying capacity will begin.

Objective 3: MPB: Determining the short and long term implications of forest harvesting, MPB infestation, and timber salvage on grizzly bears and their habitat in western Alberta.

a) The remote sensing team will focus efforts on monitoring, tracking and mapping mountain pine beetle status and spread in the Kakwa area (see Figure 2) by using new procedures to document human use of the landscape over large areas. We are attempting to produce a series of monthly maps which identifies current land use activities and highlight any monthly changes to link with GPS bear data. The team will also complete annual landscape condition maps for the time period 2004-2009 to link with grizzly bear movement and health data for the Kakwa study area.

b) In 2009 we will try to maintain at least 10 active GPS collars in the Kakwa area (2007-2009; Figure 2) where research is ongoing to investigate the relationships between grizzly bear habitat use and mountain pine beetles, as well as monitoring health status. Currently we expect the need to capture and collar 5-6 grizzly bears in this area in the spring of 2009. This work will be primarily ground based to reduce program costs. Additional health samples will be collected from these bears for laboratory and statistical analysis.

Activities:

a) MPB Remote Sensing Work:

- Improve current base map products and generate new pine forest map for entire study area
- Mapping of MPB attack and mitigation activities from a series of remote sensing satellites
- Depiction of landscape level susceptibility to MPB with field validation
- Collection and integration of calibration and validation data
- Development of landscape recovery based upon actual and projected disturbances
- Create landscape change map products from dense time series synthetic images related to grizzly habitat use
- Test the robustness of the synthetic image data creation relative to plant phenology and bear foods.

b) Grizzly Bear GPS Habitat Use Data – in relation to MPB data

- Classify grizzly bear GPS locations into behavioural categories (foraging, movement, and resting) from field investigations of grizzly bears habitat use and fine scale movement information from pedometer technology.
- Develop RSF models from grizzly bear GPS locations and remote sensing habitat maps for each behavioural category and based on the seasonal availability of food resources.
- Identify habitats associated with foraging and determine if habitat selection follows environmental gradients (slope, aspect, elevation, solar radiation, compound topographic index, and canopy closure) known to influence grizzly bear food distributions.
- Create landscape-level grizzly bear food distribution and abundance models along environmental gradients through field vegetation sampling plots in pine forests and clearcuts.
- Generate a stochastic future scenarios model of grizzly bear habitat quality based on RSF and food models, and mortality risk.
- Quantify grizzly bear habitat quality over a 40 year period under two different scenarios that includes harvesting pine at the proposed accelerated rate versus harvesting pine under the previous harvest rates.

Timelines:

Activities listed above for this objective are ongoing throughout the project year. Field sampling will occur from May-October and analysis will be undertaken as data sets are compiled and available.

Objective 4: Grizzly Bear Health and Relationships with Landscape Condition and Change

We will continue to investigate the relationships between environmental conditions and landscape change in relation to grizzly bear health. This year we will be able to greatly expand our analysis with the inclusion of data sets from the Kakwa area where we will now be able to link bear health data (2004-present) with annual landscape condition maps. This understanding will aid in allowing us to better predict future trends and population status for these species as landscapes continue to change and human use of these landscapes evolves. With an increased understanding we hope to be able to provide spatial products to our program partners which details health status of grizzly bear populations in the province.

Activities

- Our animal health team will utilize the annual landscape condition maps provided by the remote sensing group for the area north of Highway 16- Grande Prairie (this includes the Kakwa MPB study area) to increase the sample size for analysis relating to possible relationships between health and landscape conditions. This work is utilizing newly developed measures of animal health the team has developed and validated over the past 2 years.
- Laboratory analysis will be conducted on all additional health samples collected during the 2009 field season. These results will then be combined with existing data for a meta-analysis.
- This baseline data will be important to speak to questions of forest management practices, sustainability, and future trends with stakeholders and customers worldwide.

Timeline

- Laboratory analysis of existing samples is ongoing and expected to be completed in the 1st quarter of 2009.
- Collection and analysis of 2009 samples will occur during the summer months of 2009.
- Final analysis of health/landscape conditions will take place in the 3rd quarter of 2009.

Objective 5: Grizzly bears and environmental factors (climate, weather)

a) We will determine important parameters associated with the timing of hibernation and the location of den sites to help us understand and predict grizzly bear den selection. Linked to #3 above with both data sets and field activities to reduce costs.

b) We will determine important meteorological variables associated with grizzly bear behaviour such as habitat selection, movement rates, and timing of activities. This work will lead to a greater understanding of why bears select specific habitats in each season. Linked to #3 above with both data sets and field activities to reduce costs.

Activities

a) Denning

- Obtain weather data at dens by installing weather stations within 500 m of denned grizzly bears.
- Collect berry abundance information to determine whether berry abundance (a surrogate for grizzly bear fall weight) is an important variable in den entry/exit dates.
- Use GPS collar locations to determine when bears entered and exited their dens and assess these dates with respect to the weather and berry data collected to look for potential associations.

b) Habitat Use

- Obtain weather data from different habitat types within the study area by installing weather stations based on known grizzly bear habitat use and existing habitat map products from this program.
- Examine the weather data with grizzly bear GPS location data to determine if there is any relationship with habitat types used by grizzly bears and weather data.

Timeline

a) Denning

- Weather stations will be installed at dens in December 2009 and retrieved once the bears leave the dens in the spring of 2010. This will be repeated with dens found in the fall of 2009.
- Permanent berry plots will be visited during the summer/fall of 2009.
- A preliminary analysis looking at data from 2000-2009 will be conducted to examine relationships between weather and berry data and den entry and exit dates.

b) Habitat Use

- During the summer these weather stations will be installed within different habitat types in west-central Alberta where collared grizzly bears occur. (May – installation of sites, data collection until denning occurs.)
- Preliminary analyses to determine relationships with grizzly bear habitat use and weather will be prepared for March 2010.

Objective 6: Provide training courses with ENFORM to explain the use of research products and tools.

Our program will launch province wide training courses in conjunction with ENFORM on the use and application of the program products we have provided to our partners. This will be augmented with more on site partner meetings and workshops as requested by our program partners.

Activities

- Our program will launch province wide training courses in conjunction with ENFORM on the use and application of the program products we have provided to our partners. Training workbooks detailing research techniques and methodologies will be provided to students.
- These directed courses will be augmented with more on site meetings and workshops as requested by our program partners.

Timeline

- FRI/ENFORM training courses will be piloted in January 2009 with additional courses being offered at least 3-4 times in 2009. ENFORM will provide details for all courses to program partners and their membership.
- The FRI Grizzly Bear Program continues to work with interested FMA holders in using the new research tools, products and knowledge from our program. This cooperative approach to applied research will continue in 2009.

Results And Key Deliverables

1. New tested and validated RSF food based habitat maps for NW Alberta.
2. Data on the spatial distribution of grizzly and black bears in NW Alberta.
3. Estimates of energy use, availability, and requirements for grizzly bears in selected BMA's.
4. Estimate of possible carrying capacity of selected BMA's for grizzly bears. (Population targets)
5. A new grizzly bear model which will incorporate food/behaviour/and movement, in relation to both the current distribution of pine stands and it will allow us to predict the possible responses of grizzly bear habitat use in relation to emergency mountain pine beetle harvest plans in the future.
6. A provincial assessment of the value of pine forests as habitat for grizzly bears.
7. New maps from the MPB RS team identifying pine forests, and MPB status.
8. A series of landscape level maps (BMA level) identifying landscape conditions and change to coincide with grizzly bear location data. An annual landscape condition map for the mountain pine beetle study area to document MPB spread and response as well as human use of this area.
9. An assessment of the possible relationships between grizzly bear health and landscape conditions for 3 separate BMA's where both annual health and landscape condition data has been compiled.
10. Additional GPS grizzly bear movement and habitat use data collected within the MPB study area. Additional baseline grizzly bear health data collected from each bear handled in 2009.
11. Analysis on the relationships between weather, berry biomass availability, and den entry/exit dates and habitat use.
12. Final products and reports will be available to the general public through the Foothills Research Institute's web page and through scientific journal publications.
13. Ongoing delivery of a two-day training workshop with ENFORM with 3-4 planned for 2009. We will continue to provide partner specific workshops and one on one site assistance designed to introduce the tools and models to land and resource planners in both government and industry.

Program Evaluation

The models and outputs from this work will be evaluated using statistical procedures to determine the degree of fit with test data sets. New habitat map products will be evaluated using standard GIS remote sensing mapping evaluation schemes. The use of these new tools will be tracked through the government and industry planning process. Final products will be evaluated by industry and government land managers in terms of applicability and ease of use. Evaluation of this program will also occur through the peer review process with scientific journal publications submitted by the research team. New results related to landscape carrying capacity for grizzly bears will be provided to Forestry and Wildlife Managers to assist in provincial recovery planning.

6. OBJECTIVES AND DELIVERABLES FOR COMMUNICATION AND EXTENSION

The FRI grizzly bear program has both an internal and external communication structure.

Externally, and as part of our program's NSERC/CRD 5 year research grant the scientific team, of which the FRI Grizzly Bear Program is a part, has in place a communication group that coordinates communication activities among the various research institutions. The formation of this communication team was a requirement under the NSERC/CRD program. Currently the representation on this communication group includes the University of Saskatchewan, the University of Calgary, the University of Waterloo and the Foothills Research Institute. The new FRI communications manager has been asked to join this communication group to replace Lisa Jones who previously worked with this group. This primary aim of this group is to communicate and disseminate research results and conclusions from the different research teams to support the current NSERC/CRD grant.

The internal component of our communication efforts within the FRI GBP includes communications and extension needs that are specific to the goals of the FRI and link to broader communication efforts. As the communication manager has just recently joined the FRI it is anticipated that within the first quarter of 2009 and before the 2009 program begins in April we will develop a communication and extension plan for FRI needs within this program. As our program has now received both national and international recognition, and we are embarking on a new international research collaboration effort, our communication for 2009 will be focused at these levels. In addition, a primary extension focus of this program for 2009 will be the implementation and ongoing improvement of our training program with ENFORM, along with additional peer reviewed publications in the scientific literature. Our communication tools for the dissemination of new research results and findings will include:

- the publication of 2 program quicknotes
- the publication of at least 1 article on the program in the popular media (Canadian Geographic, etc.)
- the completion and distribution of annual program reports
- updates to completed ENFORM/FRI training program – new materials for course instruction
- ongoing presentation on program results to program partners, advisory groups, and the general public
- both oral and poster presentations at 2 scientific conferences in 2009
- the publication of at least 3 scientific research papers in peer reviewed journals.

7. INTER PROGRAM LINKS

At the time of preparing this work plan it has not been possible to review planned activities within other Foothills Research Institute research programs for 2009. Once these other program work plans are prepared and distributed the FRI Grizzly Bear work plan will be amended to identify possible areas of inter program linkages. Discussions with appropriate program leads are necessary before these linkages can be identified. No additional funding has been identified to move these linkages forward.
The following list will be updated and/or modified as this information becomes available.

Internal FRI Programs

- Natural Disturbance Program – possible linkage with remote sensing mapping efforts and with mountain pine beetle harvesting efforts related to grizzly bear response.
- Fish and Aquatics Program – possible linkage with remote sensing mapping of landscape change and landscape metrics calculations.
- Fire Ecology –Mountain Pine Beetle (See Appendix 3) – there are possible linkages with the collection of habitat response to beetle outbreaks in various study areas in the province. This information would be useful in understanding and predicting grizzly bear food impacts associated with mountain pine beetles.
- LMA - possible linkage with remote sensing mapping efforts.

External Research Programs

- Caribou/Wolf Predation Study – University of Montana, University of Calgary, and Jasper National Park. – We are currently working with this research team with sharing habitat mapping information as well as field logistics. This program is expected to be 5 years in length.
- Scandinavian Brown Bear Project - A formal research collaboration (MOU) is now in place with the Scandinavian Brown Bear Project. A planning meeting is scheduled for the first quarter of 2009 at which time a 2 year work plan will be prepared among the research scientists involved. One area of interest is to compare the health results of their long term study with our own data over a shorter time period, as well as the area of climate change impacts of this boreal forest species. This collaboration is hoped to fit under the new Circum-Boreal Forest Initiative.
- Polar Bear Health Status – In conjunction with research scientists with the Canadian Wildlife Service and the Minister of Natural Resources in Ontario our research team will be analyzing biological samples taken from polar bears to evaluate long-term stress levels in different arctic populations of polar bears. This work started in 2008 and is ongoing through 2009.

8. FUNDING

At this time it is not possible to determine what activities will be completed in 2009 as research funding has not been secured. In addition to the objectives listed above, there are potentially additional tasks requested from ASRD for 2009 related to data and research needs with Recovery Plan implementation. Once funding levels have been determine a revised work plan will be provided. We anticipate that, working with our activity team, we will need to prioritize the planned activities to secured funding. Table 1 provides a draft listing of a possible priority list. Expenditures by category are listed in Table 2 and funding for the research projects within the FRI Grizzly Bear Program are listed in Table 3 & 4. Funding allocation priorities are shown in Table 5

Table 1. Draft listing of program activity priorities

Activity	Status	Expected Completion Date	Priority
1. Complete and test new seasonal RSF grizzly bear food model for NW Alberta.	New	Spring 2010 – 1 year	2
2. Investigating Energy Budgets to Determine Carrying Capacity for Grizzly Bear populations in Alberta	New	Spring 2011 – 2/3 years	2
3. MPB: Determining the short and long term implications of forest harvesting, MPB infestation, and timber salvage on grizzly bears and their habitat in western Alberta.	Ongoing – final year	Spring 2010 – final year MSc student	1
4. Grizzly Bear Health and Relationships with Landscape Condition and Change	Ongoing – year 4 of 5	NSERC/CRD commitment	1A.
5a. Denning and climatic conditions	Ongoing – final year	Spring 2010 – final year MSc student	1.
5b. Habitat selection and climate change	Ongoing – data collection	Spring 2011 – PhD student	2.
6. Provide training courses with ENFORM to explain the use of research products and tools	Ongoing	Ongoing	3. (limited funding required)

Table 2. Operating Plan for the period April 1, 2009 to March 31, 2010.*
(*this represents cost estimates for all program components, this may be modified based on fiscal resources as per table 5 below)

Item	Cost	Delivery
1) Northwest Alberta Food Model Testing and Validation		
Helicopter and Fuel	95,000.00	FRI
Food/Accommodation	8,000.00	FRI
Field Crews (4 people)	10,000.00	FRI
Lab costs	30,000.00	contract
Statistical Analysis	10,000.00	contract (John Boulanger)
Subtotal	**153,000.00**	
2) Carrying Capacity / Energetics		
2 MSc. Student stipend	42,000.00	UofA
2 Field Assistants (4 months @ $2600/month)	10,400.00	FRI
2 Truck Rentals (4 months @ 1500/month)	6,000.00	FRI
Fuel for 2 trucks	10,000.00	FRI
Food/Accommodation for 4 people	6,000.00	FRI
Field Gear	3,000.00	FRI
Computer lease	2,000.00	FRI
Lab analysis	15,000.00	contract
Statistical analysis (model development)	15,000.00	contract
Air craft support	12,000.00	FRI
Subtotal	**121,400.00**	
3) Mountain Pine Beetle / Grizzly Bear Response **a) Remote Sensing Team Activities *(a more detailed work plan for RS team is available upon request)**		
Staffing UBC – remote sensing lab (student –PhD)	$30,000.00	UBC
Staffing CFS – remote sensing tech and student	$40,000.00	CFS
Staffing UofC – remote sensing tech and field crews for ground work	$32,000.00	UofC
Materials (Imagery, processing software, plotter paper and cartridges, miscellaneous field gear)	$35,000.00	UofC/UBC/CFS
Assembly of GIS data sets for RS team	$8,000.00	FMF
Travel – research team meetings (2/year) and 1 conference	$15,000.00	UofC/UBC/CFS
Subtotal	**$160,000.00**	
b) MPB Grizzly Bear Data		
Field assistant ($120/day; 50 days x 1)	6,000.00	FRI
Meals ($20/day; 50 days x 2)	2,000.00	FRI
Msc Student Stipend	22,000.00	FRI
Truck rental ($1200/month x 5months)	6,000.00	FRI
Truck fuel	4,000.00	FRI
Field equipment	1,500.00	FRI
GPS Collars (New and Refurbs) & ear tag transmitters	25,000.00	FRI
Veterinarian Support	15,000.00	contract
Accommodation/Meals (4 months field staff)	25,000.00	FRI
Helicopter/Fuel (50 hrs)	60,000.00	FRI
Capture truck costs (2 months)	4,500.00	FRI
Capture crew costs (6 weeks)	30,000.00	FRI
Data collection/Telemetry Fights	50,000.00	FRI
Drugs and Vet Supplies	7,000.00	FRI
Subtotal	**258,000.00**	

4) Animal Health and Landscape Conditions (NSERC – CRD)		
Landscape Change Detection Mapping	35,000.00	UofC
Lab Costs (Sample and Processing)	6,000.00	FRI
Sample Shipping	4,000.00	FRI
Field Equipment	4,000.00	FRI
Statistical Consulting	15,000.00	contract (John Boulanger)
Travel Costs (Research team meetings/accommodations/meals)	6,000.00	FRI
Lab Technician/Summer Student	50,000.00	Uof Sask
Subtotal	**120,000.00**	
5) Grizzly Bear Denning/Habitat Use - Climate/Environment		
MSc Stipend	22,000.00	Laval University
1 Assistant (4 months @ $2600/month)	10,400.00	FRI
Weather Stations	8,000.00	FRI
Truck Lease (4 months @ 900/month) & maintenance	4,000.00	FRI
Fuel (4 months)	6,500.00	FRI
Meals for two people for 4 months	4,000.00	FRI
Snow Pack Monitoring	4,000.00	FRI
Subtotal	**58,900.00**	
6) Training and Product Delivery		
Map production/report preparation and DVD delivery to partners	$3,000.00	FRI
Costs for ENFORM training program	$5,000.00	FRI
Subtotal	**$8,000.00**	
7) Program Operating Costs		
GIS staff support	$25,000.00	contract
Biological Technician	$30,000.00	FRI
Research Biologist	$60,000.00	FRI
Research Biologist	$30,000.00	FRI
Statistical Consultant	$25,000.00	contract
Software and hardware for GIS applications	$20,000.00	FRI
Travel and meeting costs with program partners	$19,000.00	FRI
Administration Support (position vacant)	$20,000.00	FRI
Office supplies, photocopies and phone	$5,000.00	FRI
Office Rent	$3840.00	FRI
Shipping	$3000.00	FRI
Subtotal	**$260,840.00**	
TOTAL	**1,140,140.00**	

Funding sources for this period

Table 3

Grizzly Bear Research Project 204

Contributing Organization (Incl. Requested from FRI)	Carry Forward	Cash Committed	Total Confirmed Funding	In-kind Support	Comments (including in-kind descriptions)
Canadian Cooperative Wildlife Health Centre				40,000	Veterinarian
NSERC - CRD				120,000	Confirmed pending industry match (health & remote sensing)
Alberta Sustainable Resource Development (ASRD) secondment funds				60,000	in kind for project leader
ASRD Policy and Planning					Requested 50,000
Foothills Research Institute				10,000 (GIS and Adm)	Requested 50,000
Forest Research Improvement Association of Alberta (FRIAA)					Requested $300,000
Weyerhaeuser					Confirmed $15,000
West Fraser					Requested $10,000
BP Canada					Requested $25,000
CAPP –ERAC (AB Upstream Petroleum Research Fund))					Requested $75,000
CNRL		20,000	20,000		Confirmed
Shell					Requested $10,000
Oil and gas sector (estimated from current partners)					80,000 requested
TOTALS		**20,000**	**20,000**	**220,000**	**615,000**

Note: Other research proposal submissions for additional funding are underway at the time of preparing this submission. It is expected that not all these funding applications will be successful.

Table 4

NSERC Cont 204.9

Contributing Organization	Carry Forward	Cash Committed	Total Confirmed Funding	In-kind Support	Comments (including in-kind descriptions)
Alberta Newsprint Co		15,000			
CANFOR		15,000			
Conoco Phillips		10,000			
Daishowa-Marubeni International Ltd. (DMI)		25,000			
Petro-Canada		25,000			
Shell Canada		5,000			
Sundance Forest		5,000			
Talisman Energy		15,000			
TransCanada		15,000			
NSERC matching contribution					Matching Contribution of $120,000
Totals		130,000			$240,000

** We require a match of 120,000 to meet NSERC obligations*

Table 5. Draft Priorities and Options for Incoming Funds

Activity	Status	Expected Completion Date	Priority	Option 1	Option 2	Option 3
1. Complete and test new seasonal RSF grizzly bear food model for NW Alberta.	New	Spring 2010 – 1 year	2	153,000.00		
2. Investigating Energy Budgets to Determine Carrying Capacity for Grizzly Bear populations in Alberta	New	Spring 2011 – 2/3 years	2	121,400.00		
3. MPB: Determining the short and long term implications of forest harvesting, MPB infestation, and timber salvage on grizzly bears and their habitat in western Alberta.	Ongoing – final year	Spring 2010 – final year Remote sensing	1	$160,000.00	$160,000.00	80,000
	Ongoing – final year	Spring 2010 – final year MSc Student	1	258,000.00	258,000.00	200,000
4. Grizzly Bear Health and Relationships with Landscape Condition and Change	Ongoing – year 4 of 5	NSERC/CRD commitment	1A.	120,000.00	120,000.00	120,000.00
5a. Denning and climatic conditions	Ongoing – final year	MSc student	1	58,900.00	58,900.00	58,900.00
5b. Habitat selection and climate change	Ongoing – data collection	Spring 2011 – PhD student	2			
6. Provide training courses with ENFORM to explain the use of research products and tools	Ongoing	Ongoing	3	$47,000.00	$47,000.00	$47,000.00
Operating Costs				$221,840.00	$221,840.00	132,000.00
TOTAL				**1,140,140.00**	**865,740.00**	**637,900.00**

9. PROGRAM KEY MEMBERS AND RESPONSIBILITIES

The Foothills Research Institute Grizzly Bear Project has a strong track record of proven delivery of data, reports and products over the past 10 years. The tools and knowledge generated from this research effort has and continues to influence both forest and wildlife management policy in the province. Each year our research team enters into MOU agreements with the various academic institutions for fund allocations based on approved budgets. These MOU's have their own payment schedules along with product delivery deadlines. To date this management structure and a strong integrated team has worked very well and all products have been delivered on time and budget.

The products and tools currently in the hands of FMA holders is the best measure of our program's achievements. Numerous scientific publications from this work have been completed and research funding has continued to be awarded based on this level of achievement and production. The outside funding currently identified in this submission (NSERC, SRD, and confirmed project partners) are examples of this past performance. Gordon Stenhouse will continue to be the project manager for this work and will ensure that all program collaborators meet stated deadlines. Mr. Stenhouse is also the past chairman of the provincial grizzly bear Recovery Team and has structured this research effort to support the conservation and land management needs of grizzly bears while ensuring sustainable forest management. It is important to emphasize the multi-disciplinary nature of this project proposal. Work of this nature and extent is not possible without a fully integrated research team comprised of specialists from many disciplines. This work is a collaborative effort between remote sensing experts, resource selection modeling experts, entomologists, geographical/mathematical modeling specialists, and wildlife biologists. All team members are dependent on data and products from other collaborators.

1.	Gordon Stenhouse –	FRI Grizzly Bear Program Leader, responsible for funding, partner liaison, program team direction and final product delivery.
2.	Dr. Marc Cattet –	University of Saskatchewan, Canadian Cooperative Wildlife Health Centre, leader of the animal health group and research coordinator within the animal health laboratories.
3.	Dr. Steven Franklin -	University of Saskatchewan, Vice President Research, leader of the remote sensing group for land cover mapping program. Supervises 2 graduate students on this component of the research program.
4.	Dr. Greg McDermid -	University of Calgary, Geography, responsible for product quality and delivery for remote sensing technicians and program graduate students (2). Greg also works on the mountain pine beetle remote sensing effort.
5.	Dr. David Janz -	University of Saskatchewan, responsible for the development of stress protein chips and associated laboratory activities. Supervises PhD student and laboratory technician within this program on the topic of long-term stress.
6.	Dr. Matt Vijayan-	University of Waterloo, responsible for the establishment of new laboratory techniques on blood serum to measure and assess long-term stress. Supervises 1 graduate student and a laboratory technician on this program.
7.	Dr. Nasir El-Sheimy -	University of Calgary, Geomatics Engineering, project leader for the multi-sensor camera systems and Principle Investigator for NSERC/CRD.
8.	Dr. Andrew Hunter -	University of Calgary, Geomatics Engineering, lead researcher and engineer for construction, development and testing of multi-sensor camera systems. Responsible for data handling and software development.
9.	Dr. Scott Nielsen -	University of Alberta. Responsible for RSF model development and food based modeling work.
10.	Ms. Barb Schwab -	Wilfred Laurier University, PhD candidate, responsible for the development of graph theory based movement corridor analysis and analysis of spatial movement data.
11.	Dr. Mike Wulder -	National Research Centre, Canadian Forest Service, Victoria, responsible for remote sensing mapping efforts associated with mountain pine beetle work. Supervises 1 program technician on this program.

12. Dr. Nicholas Coops - University of British Columbia, Remote Sensing Chair, Vancouver, working with Dr.Wulder on production of remote sensing map products for mountain pine beetle work. Supervises one graduate student on this program.
13. John Boulanger - Integrated Ecological Research, Nelson B.C., project bio-statistician, responsible for assigned data analysis, statistical advice and reviews.
14. Jerome Cranston - Arctos Ecological Consulting , project GIS analyst, responsible for data handling, storage, dissemination along with the development and testing of new GIS applications for product use. Jerome is also the lead researcher on the pilot project for habitat enhancement.

Scientific Advisors for Mountain Pine Beetle Project

1. Dr. Sunil Ranasignhe, Provincial Forest Entomologist, ASRD, Edmonton
2. Mr. John Stadt, Forest Ecology Specialist, ASRD, Edmonton
3. Mr. Robert Stokes, Manager Forest Planning Section, ASRD, Edmonton

Foothills Research Institute Grizzly Bear Project Staff - Hinton

1. Karen Graham – Biologist
2. Vacant – Biologist
3. Vacant – Project Administration Coordinator
4. Vacant – Project Veterinarian

10. ENVIRONMENTAL/OCCUPATIONAL HEATH AND SAFETY/PERMITS

Three provincial permits and 1 federal permit are required. These permits have been obtained on an annual basis for the last 10 years. These permits are:

Animal Care Committee Approvals	This approval certificate is needed for handling protocols
Provincial Capture Permit	This permit allows capturing and handling of grizzly bears.
Provincial Research Permit	This permit allows telemetry research.
Provincial Export Permit	This permit allows the export of blood and tooth samples to the U.S. for analysis.
Federal Export Permit	This permit allows the export of blood and tooth samples to U.S. laboratories for analysis.
Authorizations	The research team will work closely with, and communicate with all FMA holders where research activities will occur.

Appendix 1: Published Papers and Theses Resulting from the FRIGBP.

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APPENDIX 2 - Deliverables

1. **Landcover Maps**: these maps are raster-based GIS layers, in ESRI grid format, identifying land cover classes derived from remote sensing imagery (Landsat) at 30m resolution (pixel size). Associated maps include leaf area index (LAI for 3 seasons), leading species (percent conifer/broadleaf), and crown closure (CC). When combined, these data layers provide a powerful tool to understand landscape configuration and plant phenology over time.

2. **Resource Selection Function Maps (RSF)**: these are raster-based maps, at 30m resolution, showing the relative probability of grizzly bear occurrence on the landscape. They are derived from grizzly bear location data collected by GPS radio collars, combined with landcover and other GIS maps, and have been tested and validated with at least 2 years worth of GPS data. Models are developed for three seasons (spring, summer and fall)

3. **Mortality Risk Map**: using spatial and temporal data on grizzly bear mortalities, we have produced a raster-based grizzly bear mortality risk map, which predicts the probability of human-caused grizzly bear mortality over the landscape. This map is based on the most current data for open, motorized linear access structures including roads and rights-of-way.
4. **Safe Harbours and Attractive Sinks**: from the work of Dr. Scott Nielsen (research team member) we have combined the RSF maps which show where bears are likely to occur, with the mortality risk map to create two additional map layers. Safe harbour maps indicate areas of high RSF scores and low mortality risk, while the attractive sink maps show areas of high probability of occurrence and high mortality risk. These map products are designed to be used together to provided a clearer understanding of the landscape conditions for grizzly bears.

5. **Grizzly Bear Movement Corridors**: Graph Theory has been applied to the RSF maps to indicate the location of grizzly bear movement corridors on the landscape. These maps also provide a ranking of the relative importance of movement corridors and are tested and validated using GPS grizzly bear location data.

6. **GIS applications**: Python geoprocessing scripts, and associated GIS input layers, allow the user to predict changes to grizzly bear habitat caused by industrial development. Planned development features (roads, cutblocks, wellsites, pipelines) are incorporated into the landscape variables, and the RSF and mortality risk models are then regenerated. These scripts require ESRI ArcGIS 9x with Spatial Analyst extension. GIS layers include:
   - terrain grids:

     DEM, Compound Topographic Index, Terrain Ruggedness Index, topographic class, solar radiation, distance to water features
   - vegetation grids:forest age, landcover, greenness, Leaf Area Index, Crown Closure.

APPENDIX 3: FRI MPB- Grizzly Bear Program Linkages - MPB

Based upon the 5-year study plan (from Nov 2008 documentation), priority activities for the FRI related to Mountain Pine Beetle include;

- Natural disturbance and stand dynamics research, which includes the relation ship of fire, pine beetle and the eventual community impacts, and
- Understanding forest management implications and options associated with pine beetle infestations

From our existing and on-going research partnership we address the identified information needs closely. Our proposed research work includes the capture of natural disturbance and stand dynamics research and goals to better understand the long-term implications of forest management decisions upon current and future forest conditions. In the table attached below, our main research themes are identified as are the key activities within each theme. The activities in the table are sequential in nature, with the outcomes from one year/project acting as an input to the next activity.

While our research is largely focused upon capture of mountain pine beetle impacts, we are characterizing all change events present. Short-term we are refining methods for mapping of mountain pine beetle, automatically labeling change events, and implementing these approaches over increasingly large areas. Typically with remote sensing mapping approaches, there is a trade-off between spatial detail and temporal density, that is how often a location is characterized. We have undertaken to develop data fusion approaches, under the citatory of "*Improving the temporal resolution of base map products*" that allow us to combine detailed imagery (Landsat) with frequent imagery (MODIS). As a result, we have developed protocols that enable frequent mapping and capture of changes on a frequent (near weekly) basis. As a component of this project element, we are also investigating vegetation phenology; while we are currently focused upon habitat related considerations, we will also glean insights regarding regeneration and post-beetle successional strategies. Regarding the FRI MPB Ecology Program, our Grizzly Bear focus assures a strong link to considerations of habitat and species impacts that can arise due to infestation mitigation and salvage.

Mountain pine beetle susceptibility maps typically require inputs of pine location. Forest inventory data sets provide information on pine. Yet, non-merchantable or inoperable areas, parks, or private lands, as examples, may not have inventory information thereby precluding a wall-to-wall coverage of this important attribute for modeling. As a result, we have a research theme on "*Mapping the distribution of pinus*." We will also apply spatial analysis and remote sensing techniques, through the "Monitoring MPB attack and mitigation activities" theme to capture current infestation status. All pine species, including whitebark and limber pine, are of interest.

Capturing the impacts and implications of forest management decisions undertaken to mitigate impacts, or to salvage infested timber, figure prominently into our research activities and largely comprises the research activities of research theme "*Monitoring landscape-level MPB susceptibility*." Using our knowledge of mountain pine beetle susceptibility mapping and integration of remotely sensed and other spatial data, we undertake to produce wide-area, wall-to-wall susceptibility surfaces. Based upon this information we can in-turn apply various mitigation and salvage scenarios in a modeling context.

Combining the above outputs, we can being to model scenarios based upon the currently landscape status, differing infestation conditions, differing mitigation and salvage strategies, and a wide-array of differing temporal and spatial considerations (i.e., size, frequency, and location) of the disturbances. We will also couple this work with modeling to characterize the recovery post-disturbance, through the "*Projecting landscape recovery and change*" theme. We are able to include climate change considerations in our projections and modeling. Differing regeneration rates and characteristics can also be incorporated into our forward modeling efforts.

This research package provides a multi-year integrated plan. We also have a ground data collection theme (*Ongoing Monitoring of MPB Infestation and Collection of Ground Validation Data*) for calibrating our work and to ensure the quality of the outcomes.

MPB	
Improving the temporal resolution of base map products	Establishment of software foundation for blending MODIS and Landsat data to reflectance
Improving the temporal resolution of base map products	Develop methods to extract base products from synthetic MODIS images (Investigation of the capacity / ability to classify synthetic imagery using previously classified data as a training base)
Improving the temporal resolution of base map products	PAPER (I): Possible approaches derivation of 30m reflectance from 250 m data using data blending
Improving the temporal resolution of base map products	PAPER (II) : Methodology for production of MODIS / Landsat data blending for within year reflectance products

Improving the temporal resolution of base map products	PAPER (III) Detecting and validating change using synthetic Landsat 25m 16 day time series
Improving the temporal resolution of base map products	Proof of concept over prototype study area
Improving the temporal resolution of base map products	PAPER (V): Attribution of Change
Improving the temporal resolution of base map products	Attributed change, phenological layers 2005/06/07/08
Improving the temporal resolution of base map products	Develop and validate over the full Grizzly Bear study area
Improving the temporal resolution of base map products	PAPER (IV) . Changes in vegetation greenness as estimated from synthetic Landsat for supporting habitat modeling
Improving the temporal resolution of base map products	Role of understorey as a driver of conifer canopy spectral reflectance, influence on capture of phenology
Improving the temporal resolution of base map products	Disturbance related changes in crown closure captured and characterized
Improving the temporal resolution of base map products	Landsat Alternatives: Cross-sensor STAARCH (Landsat-AWIFS as base for change and synthetic Landsat development from MODIS)
Mapping the Distribution of Pinus	PAPER (VI): modeling approaches to predict % pine using remotely sensed and other data (eg. Spectral and topographic).
Mapping the Distribution of Pinus	Preliminary maps of Pinus using existing ground, spatial (GIS), and image data
Mapping the Distribution of *Pinus*	Develop model over prototype study area 46/22, test, validate,
Mapping the Distribution of *Pinus*	Redevelop over full study area
Mapping the Distribution of Pinus	apply and refine
Monitoring MPB Attack and Mitigation Activities	Exploratory EWDI maps of MPB attack and mitigation activities in prototype study area
Monitoring MPB Attack and Mitigation Activities	PAPER (VII): Spectral trajectories approach upon synthetic Landsat data predict likelihood of RA within year
Monitoring MPB Attack and Mitigation Activities	Infestation Maps over MPB study Area: PAPER (VIII): Assessment of Impacts of MPB and GB home ranges in the Alberta foothills
Monitoring MPB Attack and Mitigation Activities	Develop MPB Infestation maps over full Grizzly Bear study area
Monitoring MPB Attack and Mitigation Activities	Linking change modeling (STAARCH) and MPB detection approaches
Monitoring MPB Attack and Mitigation Activities	Apply over Entire Grizzly Bear study area
Mapping Landscape-level MPB Susceptibility	Preliminary models of tree height, and density from existing field and LiDAR data
Mapping Landscape-level MPB Susceptibility	PAPER (X): methods to predict susceptibility variables of MPB using lidar and other spatial data sets
Mapping Landscape-level MPB Susceptibility	PAPER (XI): Review of critical susceptibility indicators and their potential to be accurately mapped over the landscape
Mapping Landscape-level MPB Susceptibility	Validate extraction of key variables with new field data
Mapping Landscape-level MPB Susceptibility	Proof of concept over prototype study area
Mapping Landscape-level MPB Susceptibility	develop over full study area - new Lidar considerations
Ongoing Monitoring of MPB Infestation and Collection of Ground Validation Data	A sampling strategy and data grid that will guide the use of field- and airborne sampling activities in subsequent years
Ongoing Monitoring of MPB Infestation and Collection of Ground	Field program: Mensuration (Pine, Red Attack, DBH, Age) over prototype area; airborne data over full study area

Validation Data	
Ongoing Monitoring of MPB Infestation and Collection of Ground Validation Data	Development of Ongoing Airborne and field program to collect MPB, growth and species data
Projecting landscape recovery and change	Scenario-based modeling approach which combines information on land cover change with forest growth and forest recovery growth rates.
Projecting landscape recovery and change	PAPER (XII): Review of options for combining remotely sensed data and spatial data layers to project landscape recovery and change
Projecting landscape recovery and change	Develop methods over prototype study area, base level simulations
Projecting landscape recovery and change	PAPER (XIII) Using 3PG to predict attributes and compare to Landsat
Projecting landscape recovery and change	Integrate outcomes with other outputs: Landscape 2020 (post-harvest with projected MPB mitigation / spread reduction rates)
Projecting landscape recovery and change	PAPER (XIV): Integration of physiological predictions of growth into harvest-based planning

226 CircumBoreal Model Forest Initiative

Opportunities for the Foothills Research Institute

Background

In February 2008 a Concept Paper was released that detailed the essence of a new initiative of the International Model Forest Network (IMFN) entitled the Circumboreal Model Forest Initiative (CBFMI). The focus of this new initiative stems from the realization that the Boreal Forests worldwide are under stress due to industrialization and greater demands placed upon them by people. Moreover, climate change has placed Boreal Forest in peril, functionally and structurally. The International Model forest Network is uniquely positioned to address management issues germane to the sustainability of boreal forest. Working together towards a common goal is a basic tenet of the organization.

Activities to date of the CRMFI have focused on the formation of a working group and encouraging commitment amongst prospective members. Apart from the concept paper the working group has developed a penultimate draft of priority areas[1] that in a broad sense are a concern to all member of working group countries.

Proposed Directions for the Foothills Research Institute

The challenge that the Foothills Research Institute faces with respect to the Circumboreal Model Forest Initiative is that as it is finalizing priorities and solidifying membership and commitment, Foothills Research Institute is prepare now to act on two proposed projects. These projects are briefly described below:

a) Brown Bear Project

The Scandinavian Brown bear Project has been in place for nearly 20 year and is currently under the leadership of Dr. Jon Swenson. A prime objective of the project is recovery of bear populations. Gord Stenhouse and his grizzly bear research team have engaged the Brown Bear research team to discuss opportunities for collaboration. Discussions have been very fruitful to the point where a working MOU is in development. This MOU will stand within a higher order MOU that will be signed with the Vilhelmina Model Forest. A workplan for this project is in an early stage of development. An excursion of the core grizzly bear research team will be made to Sweden to meet with Dr. Jon Svenson to accomplish two tasks: 1) finalize and sign the working MOU, and 2) to develop a workplan that will identify collaborative work. The expected outcomes of this collaboration will significantly benefit the management and conservation of the grizzly bear (i.e. North American grizzly bear and the Scandinavian brown bear. it is anticipated that there will be a significant social aspect to the work carried out in Alberta. Immediate benefits will be derived from this collaborative project through the sharing of information, data and best practices.

Estimated costs: $25,000

[1] Anon. 2008. CircumBoreal Initiative: Summary of Priorities: Opportunities for Collaboration.

Source: Alberta Forest Research Institute

Completion date of workplan: March – April 2009

b) Climate Change

Climate change is noted as a priority by the Circumboreal Model Forest Initiative. This topic is widely recognized as major source of concern for the well being of the earth. At a local scale, we are concerned about change to the landscape wrought by increased incidence of fire, invasive species, extirpation of fauna and flora, and shifts in forest species composition forest. Moreover, change in the landscape ultimately affects the ability of it to provide environmental goods and services. The impact of this relationship is largely unknown, but is expected to be significant and hence, will have a significant impact on forest based communities.

Initially, the climate change project was intended to be directed by the outcomes of a workshop held in January 2008; however, a workplan failed to materialize. Fortuitously, the Circumboreal Model Forest Initiative identified climate change as a priority and in connection with environmental goods and services. Efforts have begun to develop a Request for Proposals for the development of a research program addressing climate change within the context of environmental goods and services.

Estimated costs:

1. Development of program and workplan: $25,000
2. Delivery of Research Program: $75,000 per year for 2 years

Source of funds: Alberta Forest Research Institute

Summary Comments

The descriptions of the two projects above are deliberately brief. Both projects are in an early development stage. Nevertheless, they represent aggressive action on the part of the Foothills Research Institute on Circumboreal Model Forest Initiative. Collectively these projects are well aligned with the broad goals and objectives of the Institute and are supportive of the provinces priorities and are socially aligned to deal with issues of immediate concern: species conservation and the environment.

Prepared by:

Keith McClain (780-644-4657)
January 9, 2009

Foothills Research Institute Annual Work Plan

228 - Water for Life Program – Landscape-Water DSS

1. Prepared by

Dr. David Andison
3828 West 22nd Ave, Vancouver, BC, V6S 1J7
Phone: (604) 225-5669 Fax: (604) 225-5668
Email: andison@bandaloop.ca

2. Sign off

Rick Bonar, Hinton Wood Products Ltd.	_____
Greg Branton, Alberta Newsprint Company	_____
Tom Archibald, FRI	_____
David Smith, Jasper National Park	_____
Herman Stegehuis, Alberta SRD	_____
John Stadt, Alberta SRD	_____

3. Executive Summary

The ND Program has for many years been promoting, and developing knowledge and tools to support the idea of using Mother Nature as a guide for forest management activities. However, the concept need not be limited to either land, or forest management. The recent swell of support for robust water management systems in Alberta provides another opportunity to demonstrate and test the idea of using Mother Nature as a guide. Furthermore, when linked to existing FRI projects on LWD, sediment, and stream morphology, we have the ability to link disturbance activities directly to water-related impacts. The critical step is bundling this knowledge into a decision-support tool that can provide an NRV backdrop for some key water metrics in addition to the already developed terrestrial pattern ones.

4. Background Information

This is the inaugural project of the new FRI Water for Life Program. In 2009/10, the funds will be used to develop a detailed research / modelling / outreach proposal, develop partnerships and collaborative research agreements, apply for funding, and identify a willing management partnership.

5. Objectives

Objective #1: Complete a detailed, interagency project proposal.

Objective #2: Identify a viable landscape and management partnership on / with which to work.

Objective #3: Apply for funding to internal and external agencies.

6. Objectives and Deliverables for Communications and Extension

C&E Objective #1: Give at least one presentation to potential partners.

7. Links

Intra-Program Links:
New program.

Inter-Program Links:
This project (and the Program) is intimately tied to the ongoing work of both the FRI Fish and Watershed Program and the Natural Disturbance Program. Rich McCleary is the co-leader on this initiative.

External Program Links:
This potentially has links to the needs of local water councils (WPAC's) across Alberta. We currently have Alberta SRD, Alberta Environment, University of Alberta, University of BC, Hinton Wood Products, and several consultants involved in this project.

8. Funding sources for this period (228)

Funding for this project is split between the Water, Natural Disturbance, and Fish and Watershed Programs. It is our intention that these funds are development and seed funds only. The full project will ultimately require significant resources.

Contributing Organization (Incl. Requested from FRI	Carry Forward 08 / 09	Cash Committed 09 / 19	Total Confirmed Funding	In-kind Support	Comments
Cash from Mar 31, 09	18,000		18,000		Remaining
FRI Water Program		35,000	35,000		
ND (base)		10,000	10,000		
F&W Program				10,000	Time and travel for Program Lead
Totals	18000	45,000	63,000	10,000	

9. Program/Project Key Members and Responsibilities

Dr. David Andison, Bandaloop -	ND Program lead
Rich McCleary	FRI F&W Program Lead

10. Environmental/Occupational Health and Safety/Permits

None.

11. Appendices

None.

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1. Work Plan Prepared By

Richard Briand
756 Switzer Drive, Hinton, AB T7V 0A2
Ph: (780) 865-8181
Fax:(780) 865-8164
Email: Richard.Briand@WestFraser.com

Interim Project Manager:
Willi Fast
Suite 101 – 11710 Kingsway Avenue, Edmonton, AB, T5G 0X5
Ph: (780) 452-5878
Fax:(780) 453-3986
Email: Willi_Fast@forcorp.com

2. Sign off (Steering Committee)

Name	Affiliation	Signature
Noel Roberts	Ainsworth Lumber Co. Ltd	
Gitte Grover	Alberta Pacific Forest Industries Inc	
Terry Kristoff	Alberta Plywood/Slave Lake Pulp	
Brian Davies	Blue Ridge Lumber Inc	
Gord Whitmore	Daishowa-Marubeni International Ltd	
Richard Briand	Hinton Wood Products	
Tim McCready	Millar Western Forest Products Ltd	
Greg Neale	Sundre Forest Products	
Jeremy Beal	Tolko Industries Ltd	
Kevin Kuhn	Vanderwell Contractors (1971) Ltd.	
Bruce Macmillan	Weyerhaeuser Company	
Tom Archibald	Foothills Research Institute	

3. Background Information

Forest growth and yield research in Alberta is currently undertaken and supported by a number of agencies including forest companies, growth and yield co-operatives, Alberta Sustainable Resource Development and University of Alberta. To date, research projects have not been prioritised at a provincial scale, and long-term research funding has historically been volatile and subject to the ability of supporting agencies to justify expenditures on growth and yield in the face of demands for discretionary spending from competing interests (*i.e.* silviculture, tree improvement and other operational research).

Members of the Alberta forest industry have identified a need for coordinating and securing long-term funding for growth and yield research. Demonstration of sustainable forest management, however, is a top priority and the failure to make the obvious connection between the rates of forest growth and sustainable harvest is troubling.

In the face of climate change and the rising importance of carbon budgeting, accounting and trading, all of Alberta's resource management sectors (forestry, agriculture, oil and gas, electricity, water, mining) will begin to rely on the estimation of forest yield and forecasting of forest growth to assist in achieving and demonstrating long-term environmental sustainability.

Proceedings from the Post-Harvest Stand Development Conference (Edmonton, January 2006) identified two major challenges for Alberta's forest growth and yield community:

1. Alberta's growth and yield co-operatives should pursue increased co-operation and program alignment to maximize efficiency of resources, and

2. Alberta's growth and yield and forest genetics/tree improvement communities should work closely, with a view to incorporating the effect of genetic gains into growth projection models.

To date, some progress has been achieved for each of these challenges. Much more could be achieved through increases in focus of effort and collaboration.

To achieve the goals of co-ordinating and funding forest growth and yield in Alberta, the following principles must be understood and subscribed to at the senior-management level in industry and government (*i.e.* Vice Presidents, Chief Foresters and Woods Managers in forest companies, their equivalents in other resource industries, and Ministers, Deputy Ministers, Assistant Deputy Ministers and Directors in government):

1. High profile emerging issues that affect all resource management industries in Alberta cannot be addressed effectively without credible growth and yield forecasts. These issues include:

    - climate change,
    - carbon emissions trading,
    - economic and ecological sustainability,
    - water quality/quantity,
    - genetic diversity,
    - tree improvement/forest genetics, and
    - population growth.

2. Advanced technologies and growth and yield expertise exist in various agencies in Alberta but need to be improved and expanded as fundamental underpinnings without which any resolution of the issues identified in (1) above will be difficult and improbable.

3. The current *state-of-the-art* in Alberta for growth and yield forecasting, and appropriate application of current and emerging technologies will become critical for Alberta's forest (and other) industries to gain recognition and credit (AAC, carbon credits) for incremental forest management practices that include:

    - Intensive reforestation practices,
    - Early and mid-rotation silvicultural interventions,
    - Tree improvement programs, and
    - Improved utilization.

4. A collaborative approach such as that planned by the Institute will help define the specifics of further research that is required to even more effectively address the forest growth and yield requirements of Alberta's resource-based industries, including:

    - Forestry,
    - Agriculture,
    - Energy (oil and gas),
    - Mining, and
    - Electrical power generation.

Raising the profile for forest growth and yield, securing long-term sustainable funding, and ensuring the efficiency and applicability of research in Alberta requires the creation of a new co-ordinating and funding agency to address these needs.

4. Objectives:

Mandate:
The mandate of the Alberta Forest Growth Organization is to expedite and co-ordinate the development of a recognized, secure and well-funded forest growth sector in Alberta that operates effectively and efficiently to address emerging issues in all of Alberta's natural resource management sectors that require forest growth knowledge and expertise for solutions.

Goal:
The Goal of the Alberta Forest Growth Organization is to further establish a credible foundation for understanding and forecasting the growth of Alberta's forests.

Specific Objectives to be achieved by the Alberta Forest Growth Organization include:

1. Emerging Issues
    - Be recognized, and act as, the Alberta authority to address the technical forest growth aspects of emerging issues at the provincial, national and international level that Alberta companies and regulators will be held accountable for (sustainability, climate change, carbon emissions, water quality, genetic diversity, population growth, etc.).
2. Communications
    - Ensure that senior government officials and corporate executives (in all resource management sectors) are aware of the expertise that exists in Alberta's forest growth sector.
    - Initiate and maintain dialogue with senior executives in Alberta's resource management sectors (agriculture, oil and gas, electricity, water, mining) to identify and prioritize issues that will require forest growth expertise.
    - Communicate to Alberta's resource management sectors the forest growth expertise and technologies available from the Institute and other agencies, and how those can be used to maximum advantage to address their high priority issues.

- Communicate the high priority issues facing Alberta's resource management sectors to Alberta's forest growth and yield community.

3. Research
    - Co-ordinate research efforts among existing growth and yield agencies, programs and initiatives to focus efforts on high priority issues identified in (2) above.
    - Solicit and secure funding to initiate or continue required research and development programs.
    - Co-ordinate funding and allocation of resources to research agencies and programs so as to maximize efficiency and efficacy of required research.
    - Initiate and undertake directed research to address identified gaps among existing growth and yield agencies and programs.
4. Provincial Policy Recommendations
    - Provide recommendations for additions or changes to provincial policy based on sound science and economic efficiency.
5. Forecasting Systems
    - Support the development, enhancement and validation of existing and new forest growth models for use in Alberta.

5. 2009 Deliverables

The deliverables for 2009 include:

1. Create and establish the Alberta Forest Growth Organization.
2. Hire an Executive Director, for an initial three-year term, to direct and manage the operation of the Alberta Forest Growth Organization.
3. Develop a Communications Plan to effectively engage two-way communication among Alberta's regulators, companies and forest growth and yield researchers.
4. Engage Alberta's resource management sectors to identify and prioritize the most urgent emerging issues requiring forest growth and yield expertise and technology.
5. Undertake detailed planning for implementing the Carbon Emissions and Climate Change: The Role of Forests in Alberta conference planned for 2010.
6. Create a Provincial Growth and Yield Needs and Opportunities Assessment to identify and prioritise the current gaps and requirements in growth and yield, and to detail the opportunities for further developing Alberta's growth and yield capacities.
7. Create a Provincial Forest Growth and Yield Framework to direct and co-ordinate Alberta's forest growth and yield research and development programs.
8. Solicit and secure funding from all potential agencies and sources to support required new and relevant existing programs identified in the Provincial Growth and Yield Framework.

6. Objectives and Deliverables for Communications and Extension

If FRI resources are available, the C&E Program could assist in the planning and implementation of the Carbon Emissions and Climate Change: The Role of Forests in Alberta conference planned for 2010.

Assistance from the C&E Program would also be requested to make reports and other related deliverables accessible to interested parties by posting them on the FRI web site. The creation of an Alberta Forest Growth Organization page on the web site would greatly facilitate this task.

7. Inter Program Links

Although the Alberta Forest Growth Organization is still in its formative stage, potential links with the following FRI Programs will be explored in the first year of the program:

- Climate Change:
    - Explore opportunities to have the Climate Change Program as a co-sponsor of the Carbon Emissions and Climate Change: The Role of Forests in Alberta conference.
    - Quantifying carbon stored in Alberta's forests
    - Understanding the impact of changing climates on tree species distribution and health
- Water / Fish and Watershed:
    - Understanding and communicating the importance of healthy forests in the maintenance of healthy watersheds
- Mountain Pine Beetle / Foothills Growth and Yield Association:
    - Research to support the role of non-pine species, in forests which are currently pine dominated, after a significant mountain pine beetle outbreak or a changing climate.
- Natural Disturbance:
    - Understanding and communicating the importance of healthy forests in the maintenance of healthy landscapes
- Grizzly Bear:
    - Potentially providing tools which can directly link forest growth information into grizzly bear habitat models.

8. Funding

Funding sources

Task Description	2009	2010	2011	Total
FRIAA Open Funds	$100,000	$100,000	$100,000	$300,000
Mixedwood Management Association	$10,000	$20,000	$20,000	$10,000
Hinton Wood Products – FRIP	$10,000			$10,000
Sundre Forest Products – FRIP	$10,000			$10,000
Blue Ridge Lumber – FRIP	$10,000			$10,000
Total	$140,000	$120,000	$120,000	$380,000

Expenses

Task Description	2009	2010	2011	Total
Hire Executive Director	100,000	100,000	100,000	300,000
Organize Conference: *Carbon Emissions and Climate Change: The Role of Forests in Alberta*	20,000			20,000
Provincial Growth and Yield Needs and Opportunities Assessment	10,000			10,000
Provincial Growth and Yield Framework	10,000			10,000
Initiate Growth and Yield Research as Required		20,000	20,000	40,000
Total	$140,000	$120,000	$120,000	$380,000

9. Program/Project Key Members and Responsibilities

Name	Affiliation	Responsibility
Gitte Grover	Alberta Pacific Forest Industries Inc	Interim Co-Chair
Richard Briand	Hinton Wood Products	Interim Co-Chair
Willi Fast	The Forestry Corp	Interim Project Manager
Noel Roberts	Ainsworth Lumber Co. Ltd	Steering Committee
Terry Kristoff	Alberta Plywood/Slave Lake Pulp	Steering Committee
Brian Davies	Blue Ridge Lumber Inc	Steering Committee
Gord Whitman	Daishowa-Marubeni International Ltd	Steering Committee
Tim McCready	Millar Western Forest Products Ltd	Steering Committee
Greg Neale	Sundre Forest Products	Steering Committee
Jeremy Beal	Tolko Industries Ltd	Steering Committee
Kevin Kuhn	Vanderwell Contractors (1971) Ltd.	Steering Committee
Bruce Macmillan	Weyerhaeuser Company	Steering Committee
Tom Archibald	Foothills Research Institute	Steering Committee

10. Environmental/Occupational Health and Safety/Permits

None.

11. Appendices

None.

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235 – Foothills Growth and Yield Association

1. Prepared by:

Sharon Meredith, R.P.F.
and R.W. Udell, RPF
384 Collinge Road, Hinton, Alberta, T7V 1L2
Ph: 780 865 4532 Fax: 780 865 4497
Email: udellconsulting@shaw.ca
Project Manager: R.W. Udell, RPF

2. Sign off Sheet

Workplan approvals will be obtained from the FGYA Steering Committee when the work plan, along with an updated business plan are reviewed and approved by the FGYA Steering Committee at its annual meeting in March, 2009.

The table below lists the members of the FGYA Steering Committee who will approve the workplan and business plan.

Steering Committee:		
ANC Timber	Greg	Branton
Alberta Sustainable Resource Development	Doug	Sklar
Blue Ridge Lumber	Murray	Summers
Canfor	Dwight	Weeks
Foothills Research Institute Board	Murray	Summers
Millar Western Forest Products	Tim	McCready
Spray Lakes Sawmills	Ed	Kulcsar
Sundance Forest Industries	John	Huey
Sundre Forest Products	Bob	Held
Hinton Wood Products	Richard	Briand
Weyerhaeuser Canada	Greg	Behuniak

3. Executive Summary

The Foothills Growth and Yield Association (FGYA) is a research cooperative administered by the Foothills Research Institute (FRI) on behalf of 9 industrial sponsoring members. It is also a sub-program of the FRI's Landscape Dynamics program. The mission of the FGYA is to continually improve the assessment of lodgepole pine growth and yield in managed stands, including responses to silvicultural treatments. This is currently being achieved through implementation of a business plan covering 7 approved and funded projects. The plan is updated annually. The Association and program are governed by a Steering Committee consisting of voting representatives from the 9 member organizations funding the core program, as well as non-voting representatives of ASRD and FRI.

The work plan provides background information, summarizes project objectives, and lists deliverables scheduled for 2009. Links to FRI communications and extension objectives and to other programs are highlighted. Funding and funding sources are itemized. Program participants and their responsibilities are identified. The 2008/09 mid-year progress report is appended.

The main fieldwork and related deliverables planned for 2009/10 are scheduled re-measurements of the *Regenerated Lodgepole Pine, Historic Research Trials*, and *Regeneration Management in a Mountain Pine Beetle Environment* project. The main analytical tasks and deliverables (already scheduled or under consideration) are:

- Continue and expand analysis of the linkage of regeneration growth and mortality to climatic factors (March 31, 2010);
- Expanded regeneration model development, including incorporation of climate variables, projection to performance survey age, and (subject to availability of co-operators and funding) inclusion of other coniferous species;
- Analyses of the yield differences between fire-origin and managed stands implied by measurements of the Gregg spacing trial (September 30, 2009);
- Complete analyses and report of the *Enhanced Management of Lodgepole Pine Nutrition and Density Management* trial (March 31, 2010);
- Measurement of 91 baseline plots for the *Regeneration Management in a Mountain Pine Beetle Environment* project, analyses and projections using these data and those collected in 2008, and collaborative design of a decision-support system (joint FGYA/ FRI Project managed under FRI's Mountain Pine Beetle Ecology Program) (September 30, 2009).

Funds have been identified to cover direct expenditures totalling $234,300 in 2009, plus provide a positive balance forward to 2010. In-kind contributions totalling over $145,000 have also been identified. See Table 1 Below and on P 8. The work plan, budget and current and proposed organizational arrangements are subject to reviews by the FGYA membership and approval by the FGYA Steering Committee

Table 1: Proposed Income and Expenditures 2009/10

Project (Accounting Code)	Contributing Organization	Carry Forward	Cash Committed	Total Funding[1]	In-kind Support	Comments
Project 1 FGYA (235)	Members	31,650	166,500	198,150		Member fees
Project 2 - RLP	Members				145,700	Fieldwork
Project 4 - HRT (235.1)	Members	10,000	24,000	34,000		Historic research trials
Project 6 - EMLP (235.2)	FRIAA Open Funds OF-02-16	5,000		5,000		Enhanced management of lodgepole pine
Project 7 – MPB	FRI and FRIAA Open Funds					Reported under FRI's MPBEP
Total FGYA		46,650	199,500	246,150		
2009/10 Budget				243,300		
Carry Forward to 2010				2,850		

[1] Updated from 2008/09 Business and Work Plan rev Aug 2008

4. Background Information

The Foothills Research Institute (FRI) facilitates collaboration among 9 holders of Forest Management Agreements on the Eastern Slopes by administering the Foothills Growth and Yield Association (FGYA) for co-operative forecasting and monitoring of managed stand growth and yield. As well, the FRI directly oversees the funding and activities of the Mountain Pine Beetle research project. A memorandum of agreement (appended in Section 11.1) between 9 sponsoring members, the Land and Forest Service and the FRI has been in effect since April 1, 2000.

The Association is governed by a Steering Committee composed of voting members. The Alberta Department of Sustainable Resource Development (ASRD) and the FRI participate as non-voting members, with the FRI acting as the coordinating agency.

In March 2002 the Steering Committee approved 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 funded and are in various stages of completion. The plan is updated annually to include the next 5 years. It was most recently revised in July 2008, and now includes 7 approved and funded projects.

5. Objectives

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.

Objectives (plus methods and budgets) for each of the 6 projects approved and funded to date are detailed in the Business Plan. The following is a list and description by project of those deliverables proposed or already scheduled for 2009.

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;
- Project plans, designs, reports and publications;
- Information exchange meetings, field tours and technical sessions (minimum of 1 meeting per year);
- Active publicly-accessible web site;
- Mid-year and annual progress and financial reports;
- Steering committee meeting minutes.

Project 2 - Lodgepole Pine Regeneration

- Scheduled status checks (74 installations) and full measurements (28 installations) – October 31, 2009;
- Updated digital database – December 31, 2009;
- Audit and work verification reports – January 31, 2010;
- Crop performance report (8 growing seasons) and Project (Phase 2) final report (March 31, 2010);
- Continue and expand analysis of the linkage of growth and mortality to climatic factors, utilizing regional and local climate records and spatial interpolation techniques (March 31, 2010);
- Expanded regeneration model development, including incorporation of climate variables, projection to performance survey age, and (subject to availability of co-operators and funding) inclusion of other coniferous species (March 31, 2010).

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

Follow-up work to results previously reported for this project will be conducted and reported under Project 4 (see Section 5.4 below). A *Dialogues* initiative led by FRI Communications and Extension Program as an outcome of the *Post-harvest Stand Development Conference* held in 2006 has been concluded. Some activities arising from this initiative are ongoing. Work undertaken in 2008 under Project 4 to compare historical trial data with growth and yield model projections, and analyses of the Gregg spacing trial, will be consolidated to produce an information report or scientific paper on implied yield differences between fire-origin and managed stands.

Project 4 - Cooperative Management of Historic Research Trials

Re-measurements are tentatively scheduled for the following CFS trials:

- McCardle fertilization& thinning 1984
- Gregg spacing 1984 medium site
- Gregg Spacing 1984 low/high sites (low priority)

Further testing of trial data against GYPSY and TASS will be conducted subject to the release of new versions of these models. This includes analyses of the yield differences between fire-origin and managed stands implied by measurements of the Gregg spacing trial (Sept. 30, 2009)

Project 5 - Regional Yield Estimators

No deliverables are currently scheduled for 2009.

Project 6 - Enhanced Management of Lodgepole Pine

Analytical work on the 3rd-year foliage analysis will be carried over to 2009. Remaining analyses and projections for the 2 trials established under this Project will be undertaken in cooperation with the University of Alberta during the 2009-10 year as required for completion of the final Project Report by June 30, 2010.

Project 7 – Regeneration Management in a Mountain Pine Beetle Environment

(Note: Funding for this project was acquired through FRIAA and FRI. Work began in 2008. FRI's Mountain Pine Beetle Ecology Program partially funds this project and is responsible for funds and project management, while the FGYA's Research and Development Associate is responsible for technical and analytical elements of the project.)

- Up to 91 additional baseline plots may be required, along with MPB status checks in 2009. Funding for this will be sought by the MPBEP and FGYA if required, with completion of field measures by September 30, 2009;
- Existing and supplementary data for supplementary plots will be compiled and combined with data collected in 2008 to produce a consolidated baseline database and baseline assessment report (December 31, 2009);
- Projections and a prototype decision-support tool will be made utilizing the combined baseline data and the latest available models (March 31, 2010);
- An expert-systems workshop will be held with project participants and co-operators to design the decision-support system (June 2009).

6. Objectives and Deliverables for Communications and Extension

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 within the new FRI website;
- 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 . The following activities are proposed for 2009/10:

- Field Tour and Technical Session providing an update of FGYA results to date (in conjunction with the 2009 AGM);
- Website updates;
- Technical information reports for projects 2 (Regenerated Lodgepole Pine), 3 (Pre- and Post-harvest Stand Development) and 4 (Historic Research Trials) and 7 (Mountain Pine Beetle Decision Support). Discussion will include policy implications.
- Two *Quicknotes* providing non-technical summaries of project results and / or program activities, with discussion of the implications of research to forest policy.

7. 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 management and safe storage of the Association's data. In 2008/09 Sundre Forest Products is managing and upgrading the RLP database for the FGYA.
- 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.
- Climate change: The FGYA maintains an interest in the FRI Climate Change sub-program and, subject to funding, will work linking analysis of climate impacts on lodgepole pine regeneration to climate change. Work has begun with U of A on examining the RLP data to determine relationships between growth, yield and mortality and climate change.
- Regenerated Lodgepole Pine: 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. 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 by ASRD.
- 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 participated in the design, and is participating on the analysis of this project under a research collaboration agreement with the FGYA.
- Regeneration Management in a Mountain Pine Beetle Environment: this is a joint project with FRI, whereby FRI oversees the budgetary, contractual and field elements of the program and the FGYA's Research and Development Associate oversees research design and reporting as well as the technical and analytical elements of the program.

8. Funding sources for this period

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 membership fee of $21,000 (Proposing $18,500 in 2009/10);
- 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.

Project 1, *Development of the Association* is supported by the membership fees of the nine member companies and includes the management and field coordination of the FGYA programs as well as the research development, design and technical services of the Research and Development Associate.

Project 2, *Regenerated Lodgepole Pine* is supported by in-kind services of the membership (plot measurement) as well as the annual membership fees paid.

Project 4, *Historic Research Trials* is supported by annual membership contributions pro-rated based on the proportional representation of lodgepole pine stands within individual FMAs compared to the total lodgepole pine stand area in the cumulative member FMAs.
Project 6, *Enhanced Management of Lodgepole Pine*, is supported with FRIAA Open Funds.

Project 7, *Regeneration Management in a Mountain Pine Beetle Environment* is supported with FRIAA Open Funds, with funding from FRI's MPBEP and with in-kind support from SRD and the FGYA.

Table 1 summarizes funding sources for 2009. Commitments are subject to confirmation at the annual Steering Committee meeting to be held in March 2009.

Table 1. Proposed Income and Expenditures 2009/10

Project (Accounting Code)	Contributing Organization	Carry Forward	Cash Committed	Total Funding[2]	In-kind Support	Comments
Project 1 FGYA (235)	Members	31,650	166,500	198,150		Member fees
Project 2 - RLP	Members				145,700	Fieldwork
Project 4 - HRT (235.1)	Members	10,000	24,000	34,000		Historic research trials
Project 6 - EMLP (235.2)	FRIAA Open Funds OF-02-16	5,000		5,000		Enhanced management of lodgepole pine
Project 7 – MPB	FRI and FRIAA Open Funds					Reported under FRI's MPBEP
Total FGYA		46,650	190,500	237,150	145,700	
2009/10 Budget				234,300	145,700	
Carry Forward				2,850		

[2] Updated from 2008/09 Business and Work Plan rev Aug 2008

Table 2 provides additional detail on funding sources for project 1 – the Development and Management of the Association. This includes the costs of the core program of the Association, i.e. the Regenerated Lodgepole Pine Project which evaluates the effects of alternative silvicultural strategies and initial regenerations spacings on the survival, growth and yield of regenerated Lodgepole pine.

Table 2.
Income and expenditure details for Project 1 -Development and Management of the Association

Income / Expenditure	2008-9 (forecast)	2009-10	2010-11	2011-12	2012-13
Membership fee (per voting member)	15,000[3]	18,500	21,000	21,000	21,000
Income					
Prior year balance forward	114,450	31,650	2,850	-4,550	-10,850
Membership fees - FRIP (FRIAA contract)	97,500	129,500	147,000	147,000	147,000
Membership fees - non-FRIP	30,000	37,000	42,000	42,000	42,000
Total income	241,950	198,150	191,850	184,450	178,150
Expenditures					
Director and Field Coordinator	71,500	66,500	66,500	66,500	66,500
Field Coordinator	25,000	20,000	20,000	20,000	20,000
Research and Development Associate	80,000	75,000	75,000	75,000	75,000
GIS and misc. services	15,000	15,000	15,000	15,000	15,000
Office and field supplies	2,500	2,500	2,500	2,500	2,500
Meetings and tours	7,000	7,000	7,000	7,000	7,000
Contingency (5%)	9,300	9,300	9,300	9,300	9,300
Total expenses	210,300	195,300	195,300	195,300	195,300
Ending Balance	31,650	2,850	-4,550	-10,850	-17,150

9. Program/Project Key Members and Responsibilities

The FGYA Business Plan and Memorandum of Agreement between members specify the responsibilities of voting members, ASRD and the Foothills Research Institute.

Responsibilities of the voting members 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;
- Appointment of a representative to a Steering Committee with authority to vote and represent the Member's strategic and financial interests;
- Assignment of a representative to a 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.

[3] Sundre Forest Products' membership fee is $7500 for 2008-9 in recognition of Bob Held's contribution in maintaining and updating the Regenerated Lodgepole Pine Trial database.

Key program members and representatives (current organizational status) are listed in Table 3.

Overall control of management of the FGYA is vested in the Steering Committee.

The Land and Forest Division (LFD) 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 advisor, knowledgeable in forest planning and yield forecasting, to the Technical Committee.

Table 3. Foothills Growth and Yield Association Representatives and Contacts

Role / Affiliation	First Name	Last Name	Telephone
Chairman	Dwight	Weeks	(780) 538-7745
Management:			
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			(780) 865-4499
Steering Committee:			
ANC Timber	Greg	Branton	(780) 778-7012
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
Technical Committee:			
ANC Timber	Greg	Branton	(780) 778-7012
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

The FRI, as Coordinating Agency for the FGYA, has a number of responsibilities, including:

- Financial 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;
- Retention of a Director and other staff or contractors as required to manage the Association, undertake research and development, and coordinate fieldwork;
- Procurement of equipment and supplies required by the Association;
- Provide and manage a secure repository for all FGYA data.

Commencing in 2007, the key functions of program management and research were split between two contracts or positions: a Director (or Program Manager) and a Research and Development Associate (or Technical Director). The allocation of responsibilities between the 2 positions is as follows.

Program Manager (Director of Operations):

- Preparation of an annual work plan and budget, and annual updating of the 5-year business plan;
- Chairing of the Technical Committee;
- Ensuring that projects are developed, implemented and reported in a timely manner consistent with approved program and project plans and quality standards;
- Consultation with the Technical Committee regarding the selection, establishment and measurement of field trials;
- Direction or undertaking of the planning, supervision and quality control of field measurements and research activities, including supervision, training, orientation and coordination of contractors and technical representatives;
- Arrange dissemination to FGYA members of relevant information, including a minimum of one educational meeting or field trip per year;
- Provide progress reports to the Coordinating Agency every six months, and annual program and project reports to the Steering Committee and FRIAA,
- Collaboration and cooperation with other agencies as appropriate and necessary to further the interests of the Association.

Research and Development Associate (Technical Director):

- Selection and development of analytical and modeling techniques for predicting the establishment, early crop performance, growth and yield of lodgepole pine in managed stands;
- Analysis of data from FGYA field trials;
- Reporting of technical results of projects to FGYA members;
- Development and testing of decision-support tools for application by Association members;
- Preparation and authorship (or co-authorship) 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.

10. Environmental/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.

11. Appendices

(See following pages.)

a. App. 1: Memorandum of Agreement for the Foothills Growth and Yield Association (2000)
b. App. 2: Mid Year Progress Report (September 30, 2008)

Appendix 1.
Memorandum of Agreement among Members of the Foothills Growth and yield Association (2000)

WHEREAS:

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

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

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

IT IS AGREED:

DEFINITIONS

"Association" means the Foothills Growth and Yield Association.

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

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

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

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

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

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

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

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

1. VOTING MEMBERS

Voting Members are responsible for:

1. Installation and measurement of growth and yield trials on their tenured lands;
2. Provision of error-free data, in a format defined by the Coordinating Agency and the Technical Committee, from these trials to the Coordinating Agency;

3. Participation in the affairs of the Association at their own cost;
4. Application, as the Members deem appropriate, of results from Association projects to their own tenures, including local calibration of models; incorporation of results in financial models, timber supply analyses, and other corporate decision-support systems; and seeking approval of yield forecasts used in forest management plans.

Each Voting Member shall:

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

2. STEERING COMMITTEE

T he Steering Committee shall:

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

At any meeting of the Steering Committee:

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

3. TECHNICAL COMMITTEE

The Technical Committee shall:

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

4. COORDINATING AGENCY

The Coordinating Agency is responsible for:

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

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

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

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

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

5. LAND AND FOREST SERVICE

The Land and Forest Service shall:

1. Assign the Director of the Land and Forest Service Forest Management Division, or an equivalent senior official, to participate on the Steering Committee in a non-voting advisory capacity;
2. Assign a technical expert, or experts, knowledgeable in forest planning and yield forecasting, to the Technical Committee to provide advice on matters pertaining to project planning, experimental design, quality control, data acquisition, model development and validation, project evaluation, and regulatory requirements for yield forecasting and validation.

6. DIRECTOR

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

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

7. PROJECTS

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

8. PROTECTION OF RIGHTS AND PRIVILEGES

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

9. ESTABLISHMENT, TERMINATION AND AMENDMENT

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

IN WITNESS WHEREOF the undersigned party has executed this Agreement.

Member _____

Signature of authorized representative

Per: _____

Print name: _____

Date _____

Appendix 2. Mid-year Progress Report 2008/09

Project/Activity	Approved Budget for Year	Expended to September 30	Progress to Date (September 30)
Foothills Growth and Yield Association (FGYA) Project 1: *Development and Management of the Association* - FtMF Project 235 - FRIAA Project FOOMOD-01-03	$195,300 (FRIP and member funded)	$71,642	Planning *and Funding Approvals:* 1. Work plan and budgets for all projects updated and approved. 2. Strategic priorities for FGYA have been updated *Meetings and tours*: Technical committee and contractor meeting held June 23 in Edson; *Publications*: 1. Annual Report 2007-08 2. Regenerated Lodgepole Pine Trial, ANALYSIS OF CROP PERFORMANCE Five Growing Seasons After Planting – April 4, 2008 (FRIAA Project FOOMOD-01-03) 3. *Quicknote #10.* Effects of Juvenile Spacing on Lodgepole Pine Stand Height – April 2008 (Historic Research Trials. FRIAA Project FOOMOD-01-02) 4. *Quicknote #11.* Effects of trembling aspen on lodgepole pine growth August 2008 (Subproject 2, pine/aspen – FRIAA Project OF-02-16) *Agreements:* 1. The Cooperative Research Agreement between the FGYA and the University of Alberta (FRIAA Project OF-02-16) was revised in July to accommodate a proposed new project by U of A – Reducing Mountain pine beetle impact by managing stand vigour to increase tree defences and resistance 2. The Letter of Agreement for the Historic Research Trials (FRIAA Project FOOMOD-01-02) between FGYA, the Canadian Fibre Centre, Canadian Forest Service and Sustainable Resource Development was updated to 2013 and signed in June.
FGYA Project 2: *Lodgepole Pine Regeneration*	Estimated value $256,050 (in-kind fieldwork contribution by members)	Estimated 90% complete = $230,450 (in-kind)	Planning: Schedules finalized and approved for full measurements (300 plots), status checks (108 plots) and tending treatments (5 plots). *Fieldwork*: 1. Quality Control procedures adjusted following a field visit by a forest disease specialist, who identified significant errors in field mortality calls. 2. Scheduled work nearing completion; verification and QC audits in progress. *Analysis and reporting*: 1. 5 year results analyzed and reported. 2008 plans include analysis of seven year results. Database is being maintained by Bob Held at Sundre Forest Products. 2. Work underway to extend mortality and ingress results to later ages using data from other studies, e.g. Ives and Rentz data, FGYA pine-aspen results etc. 3. A preliminary assessment is underway relating RLP mortality and growth to climate factors using an updated version of the ClimateAB program provided by Dr. Andreas Hamann of U of A is underway. Correlation appears strong and points to a more detailed project.

Project/Activity	Approved Budget for Year	Expended to September 30	Progress to Date (September 30)
FGYA Project 3: *Post-harvest Stand Development*	-	-	Several projects are linked to this initiative; a proposed paper is delayed pending completion of the new GYPSY model, now proposed for March 2009. *Follow-up to PHSD Conference*: Three Dialogues arising from the PHSD Conference have been suspended until the Chairs indicate a need to meet again.
FGYA Project 4: *Historic Research Trials* -FtMF Project 235.1 -FRIAA Project FOOMOD-01-02	$42,000 (FRIP and member funded)	$0	Fieldwork: A contract was let for 2008 fieldwork and two trials will be measured in October – MacKay and Teepee Creek plots. *Analysis and Reporting*: 1. Analysis done on effect of spacing on juvenile height growth for the Gregg Trials. 2. Work continues on the Gregg and MacKay Trials projecting stand development under different stocking regimes using the existing GYPSY and MGM models.
FGYA Project 5: *Regional Yield Estimators*	-	-	Complete, no further work planned.
FGYA Project 6: *Enhanced Management of Lodgepole Pine* - FtMF Project 235.2 - FRIAA Project OF-02-16	$47,069 (project funded under FRIAA Open Funds Program, augmented by members)	$0	*Sub*-project *1 (Nutrition):* Work planned for 2008 (3 year foliage analysis, 3 year growth response, information report) has not begun. *Sub-project 2 (Pine-aspen Density):* A Quicknote and internal technical report have been produced, proposed scientific paper not yet done.
FGYA Project 7 Monitoring and Decision Support for Forest Management in a Mountain Pine Beetle Environment FRIAA Project OF-07-P019 Reported under MPBEP of Foothills Research Institute	Project funded under FRI's MPBEP	Reported under FRI's MPBEP	Project is managed under FRI's Mountain Pine Beetle Program, and reported by Program Manager Don Podlubny. Highlights include: 1. Selection and pre-compilation of 240 candidate PSP's for baseline assessment and monitoring completed; 2. Protocols developed for supplementary baseline assessment; 3. Baseline assessment of 150 PSP's nearing completion; 4. Dendrochronological field sampling completed for a sub-sample of 16 PSPs in 12 stands .
FGYA Total 2008-09	$284,369 direct $256,050 In Kind	$71,642 $230,450 In Kind	

Foothills Research Institute Annual Work Plan 2009-2010

245 - Mountain Legacy Project

1. EXECUTIVE SUMMARY

1.1. Program Title

Mountain Legacy Project

1.2. Contact

Name: Dr. Eric Higgs
Address: School of Environmental Studies, University of Victoria (or UVic)
Phone: 250 721-7354
Fax: 250 721-8985
Email: ehiggs@uvic.ca

1.3. Program Partners

Other organizations involved:

- Library and Archives Canada (or LAC; collaborating organization)
- University of Alberta (collaborating organization)
- Alberta Sustainable Resource Development (collaborating organization)
- Alberta Conservation Association (collaborating organization)
- Parks Canada (collaborating organization)

1.4. Project Goals

The Mountain Legacy Project is an ambitious interdisciplinary research project based on the largest systematic historical collection of mountain photographs in the world, over 70,000 glass plate negatives from dozens of different surveys. We aim to advance understanding of cultural and ecological changes, patterns and processes on the mountain landscapes of the Canadian West through three interrelated activities:

1. Archival research, conservation, digital reproduction, secure storage and public access of the archival images and survey data;
2. Repeat photography on selected surveys from this collection;
3. Interdisciplinary research utilizing the historical and repeat photographic collection, including research on landscape change dynamics, mountain hazards and development, cultural use and impacts on landscapes, and understanding how Canadians view Rocky Mountain landscapes.

In this phase of the project, the RMRPP aims to:

- Digitally reproduce and process several hundred glass plate photographs associated with the 1913/14 Crowsnest Forest Reserve and 1915 Interprovincial Boundary Survey
- Ensure secure storage and current metadata at LAC and UVic
- Expand and update an intuitive, robust and web-accessible database of images and associated metadata at UVic

1.5. Budget

Promised cash contributions	$40,000
Total cash	$40,000
In-kind promised contributions	$40,000
Total	$40,000

1.6. List of Deliverables

Digitally reproduce and process selected glass plate photographs associated with the 1915 Interprovincial Boundary Survey, the McArthur 1888-92 Survey, the Nichols 1915-16 Survey, the Bridgeland 1917 Survey and the 1898-99 Irrigation Survey. Ensure secure storage and current metadata at Library and Archives Canada and UVic. Expand and update an intuitive, robust and web-accessible database of images and associated metadata at UVic. Work to be conducted at UVic lab.
Support field work related to repeat phtography of the above photographs. Purchase of equipment related to the field component of the project. Present a workshop in late summer for updating FRI and SRD staff.

The following products and services are scheduled for availability/delivery by the date indicated:

1. Access to existing web-served digital collections and associated metadata at UVic and U of A – on request.
2. Access to archival images from the Crowsnest Pass and surrounding regions (Bridgland Map Sheets 3, 4, and 5)
3. Access to repeat images from the 2009 field season (Crowsnest Pass and Lost Creek Fire) –
4. Final report detailing project methodologies, access to digital collections, and database metadata – December 2009

2. DETAILED PLAN

2.1. Prepared by:

Name: Dr. Eric Higgs
Address: School of Environmental Studies, University of Victoria
Phone: 250 721-7354
Fax: 250 721-8985
Email: ehiggs@uvic.ca

2.2. Introduction

The Mountain Legacy Project is an ambitious interdisciplinary research project based on the largest systematic historical collection of mountain photographs in the world, over 70, 000 glass plate negatives from dozens of different surveys. We aim to advance understanding of cultural and ecological changes, patterns and processes on the mountain landscapes of the Canadian West through three interrelated activities:

1. Archival research, conservation, digital reproduction, secure storage and public access of the archival images and survey data;
2. Repeat photography on selected surveys from this collection;
3. Interdisciplinary research utilizing the historical and repeat photographic collection, including research on landscape change dynamics, mountain hazards and development, cultural use and impacts on landscapes, and understanding how Canadians view Rocky Mountain landscapes.

2.3. Background Information and Program Objectives

This work plan outlines the digital reproduction and processing of several hundred historical glass plate photographs associated with the 1913/14 photographic survey ("Crowsnest Forest Reserve") and the 1914/1915 Interprovincial Boundary Survey. These images form part of the largest collection of systematic mountain photographs in the world, which have recently come to light through research efforts by the Project Completion of this digital collection would provide an unprecedented historical view of the entire mountain landscape of south western Alberta and permit systematic repeat photographic studies to study changes in this area of critical management concern.

The historical photographs were taken as part of a nation-wide effort to map the topography of Canada. The mountains posed distinctive problems for surveyors, and in Canada the adaptation and perfection of French photographic surveying techniques led to rapid, accurate surveys that cost an order of magnitude less than conventional survey techniques in mountainous regions. Surveyors, who were also mountaineers, would ascend promontories, usually mountaintops, to take panoramic photographs and transit measurements. These data would be used to create the superb topographic maps that characterized the mountain regions in the early part of the 20th century and upon which much development, settlement and recreational activity was based.

The surveyors left a legacy of photographs that provide a *systematic and comprehensive* portrait of the landscape as it existed almost a century ago. What is especially remarkable is that most of these photographs were based on glass plate negatives that stood the test of time. Mostly forgotten and without catalogue reference, the entire collection of 70,000 glass plates surfaced three years ago as a result of research investigations.. A partnership with Library and Archives Canada has begun the transfer of the collections to the LAC (mostly from NRCan), digital conversion of the images, and proper accession (cataloguing) of the collection.

Members of the RMRPP have been unearthing the collection, determining protocols for digital processing and secure storage, and most prominently the repeating of the historic surveys to provide a comparative view of the landscape.

The repeat images offer powerful visual cues of landscape changes, that have immediate qualitative benefits for land managers and the public. We are also working on computer-based techniques for quantitative comparison.

Work began in Jasper in 1998 and 1999 with the complete re-survey of the 1915 photographic survey of Morrison Bridgland. The entire collection of 735 historical photographs and their repeats (a total of 1470) are available from <bridgland.sunsite.ualberta.ca>. A variety of research and communications deliverables have come from this work, including Eric Higgs' book, *Nature By Design: People, Natural Process and Ecological Restoration* (MIT Press, 2003), the forthcoming book by Ian MacLaren, *Mapper of Mountains: the Life and Times of M.P. Bridgland* (University of Alberta Press) and year-long exhibit at the National Library, *Rockies Through the Lens of Time*.

Since 2002 attention has turned to southern Alberta. Beginning with a re-survey of Waterton Lakes National Park, work is proceeding north along the eastern slopes. In the 2005 field season, we took several hundred repeat images from dozens of survey stations in the Castle-Crown Special Management area.

Our work in southern Alberta so far—there are several surveys covering other parts of western Alberta that will be the subject of future work--is based on two topographic surveys. The first, led by M.P. Bridgland in 1913 and 1914, produced the first topographic maps of the Crowsnest Forest Reserve, roughly the area east of the Continental Divide from the Canadian-US border north to the southern end of present-day Kananaskis Country. The collection comprises 1447 glass plate negatives. The second survey, led by A.O. Wheeler, mapped the boundary between Alberta and BC in 1913-1915. We do not have complete indexes to these images, but estimate the boundary photographs in the Crowsnest region to total approximately 300 images.

Perhaps the easiest way to envisage the extent of the surveys is in terms of *map sheets*. Bridgland's 1913/14 survey resulted in five maps running along the Continental Divide. Map Sheet 1 is at the northernmost reach of the surveyed area while Waterton Lakes National Park is covered by Map Sheet 5 at the southern end.

Funding from the Social Sciences and Humanities Research Council of Canada (SSHRC), Waterton Lakes National Park, and the Alberta Conservation Association has allowed us to obtain digital images from Map Sheets 3, 4 and 5, as well as almost 100 images from the 1915 Interprovincial Boundary Survey (IPBS). These funds have also permitted repeat photography of Map Sheet 5 and most of Map Sheet 4. *The digital image processing, cataloguing and secure storage of images from Map Sheets 1, 2 and 3 as well as remaining IPBS images was carried out with the Phase 1 FRI funding contract.*

2.4. Project Objectives

- Digitally reproduce and process several hundred glass plate photographs associated with the 1913/14 Crowsnest Forest Reserve and 1915 Interprovincial Boundary Survey
- Ensure secure storage and current metadata at LAC and Uvic
- Expand and update an intuitive, robust and web-accessible database of images and associated metadata at UVic

2.5. Abstract of Methodology

The following is a brief description the main components of the RMRPP program.

2.5.1. Archival Research, Digital Reproduction and Processing of Glass Plate Negatives

Researchers identify and investigate geographical location, extent, and photographic content of historical surveys, and work with LAC and other archives to locate the collections of glass plates associated with these surveys. In consultation with collaborating agencies the RMRPP identifies priority plates for scanning, and the LAC carries out the scanning as per the MOU between LAC and protocols the Project has developed for scanning, processing, and

secure storage. The electronic copies are delivered to UVic for digital post-processing, entry in the Project research database and electronic distribution to project partners and collaborators. The following steps are required for each glass plate:

1. Cleaning, resleeving and initial conservation of glass plates received from NRCan;

2. Scanning of glass plates, which involves the use of ultra high resolution scanners at LAC's state-of-the-art Gatineau Preservation Facility;

3. Creation of raw digital files (each one is approximately 200 megabytes), conversion to various formats and resolutions, transfer of images to RMRPP and Photographic Division of LAC;

4. Creation of file metadata and secure storage at LAC;

5. Item-level description of each plate and entry of the plate information into the LAC catalogue (archivia.net);

6. Reboxing of glass plates and placement in permanent collection;

7. Entry of digital data into web-served database, which is completed at the University of Victoria upon receipt of raw digital files from LAC; this critical step creates the base for the research and management database, including the capacity to print historical images and make these available to a wider public.

Each plate costs $30.00 to process through the seven steps described above. The LAC requires $23 and the remaining $7 covers direct costs at the University of Victoria.

2.5.2. Repeat Photography

Over eleven years of experience, the project has developed rigorous methods for the precise re-location (objective of 1m accuracy) and re-photography of survey station locations and views. Methodology includes using maps, GIS, historical photographs, and expert advice to determine the station locations, using photograph edge-matching to iteratively refine station location, geo-referencing and documentation of photograph location, and confirmation of location and view accuracy using digital image overlays. Repeat photography activities in 2006 focused on camera locations in the Crowsnest Pass and the northern portion of the Castle-Crown Special Management Area.

2.5.3. Dissemination of Electronic Archives and Research Results

Access to digital collections of archival and repeat photographs from Waterton Lakes National Park and Forest Management Unit C5, as well as the RMRPP Research Database, are available over the internet through the University of Victoria , and digital collections from Jasper National Park are available over the internet through the University of Alberta (http://bridgland.sunsite.ualberta.ca/).

2.5.4. Landscape Research Utilizing Historical and Repeat Photographs

Ongoing academic and management-oriented research include using the repeat photography database includes investigating landscape vegetation dynamics in the Subalpine, Montane, and Foothills Parkland Ecoregions, treeline change in Kootenay National Park, geomorphic hazards in the mountain parks, and historical, cultural, and archival research.

2.6. Deliverables

Digitally reproduce and process selected glass plate photographs associated with the 1915 Interprovincial Boundary Survey, the McArthur 1888-92 Survey, the Nichols 1915-16 Survey, the Bridgeland 1917 Survey and the 1898-99 Irrigation Survey. Ensure secure storage and current metadata at Library and Archives Canada and UVic. Expand and update an intuitive, robust and web-accessible database of images and associated metadata at UVic. Work to be conducted at UVic lab.
Support field work related to repeat phtography of the above photographs. Purchase of equipment related to the field component of the project. Present a workshop in late summer for updating FRI and SRD staff.

Final report detailing project methodologies, digitgal image listing and access information and database megtadata. Workshop date, location and agenda to be finalized by August, 2009.

The fo llowing products and services are scheduled for availability/delivery by the date indicated:

1. Access to existing web-served digital collections and associated metadata at UVic and U of A – on request.
2. Access to archival images from the Crowsnest Pass and surrounding regions (Bridgland Map Sheets 3, 4, and 5) – on request
3. Access to repeat images from the 2006-2008 field season (Crowsnest Pass and Lost Creek Fire) –

2.7. Timelines

Task	2009									2010		
	A	M	J	J	A	S	O	N	D	J	F	M
Principal Investigator (person days)												
LAC Scanning & accessioning	C		C		C		C		C			
Digital Image Processing (person days)												
Data management services (person days)												
Web site redevelopment								X	X			
Planning		X	X									
Progress reports (annual and mid-year)									X			

X = task undertaken primarily by Project,
C = task undertaken or led by collaborating organization,

2.8. Site Information

The scanning, accessioning, digital image processing and data management will be carried out at the Library and Archives Canada and the University of Victoria.

2.9. Improvements to Management in Forest Ecosystems

The program will improve the management of forest ecosystems through:

- increased knowledge about historical forest conditions and disturbance regimes through access to archival survey photographs;
- support for community protection from wildfire using FireSmart principles
- improved coordination and cooperation between university researchers, Library and Archives Canada, and forest management agencies;

- landscape-level data sources providing the basis for assessing impacts of forest management practices on ecological patterns and processes.

2.10. Amount of Money Requested from the Lost Creek Fire Advisory Committee

A total of $40,000 is requested for 2009, with other cash and in-kind contributions detailed as follows.

2.11. Partner Contributions

Contributions and costs estimates are subject to refinement by the Project.

Partner / Project	Cash ($)			In-kind ($)	
	Current Funding	Promised Contributions	Funding Pending	Current Funding	Promised Contributions
University of Victoria					
University of Alberta					
FRI		$0,000			40,000
Total					

2.12. Proposed Payment Schedule

An immediate payment of $20,000 followed by a final payment of $20,000 at completion of the project.

2.13. Project Management

Project management is carried out by the Principal Investigator, Eric Higgs, with supervision at Library and Archives Canada under Eric Boudreau.

Foothills Research Institute Annual Work Plan 2009-2010

246 - Mountain Pine Beetle Ecology Program

1. Prepared by

Don Podlubny, Program Lead
Foothills Research Institute
Box 6330 Hinton, AB T7V 1X6
Ph: (780)865-7190 Fax: (780)865-7190
Cell: (780) 817-0200
Email: donpod@telus.net

2. Activity Team Approval:

This work plan after review and discussions was approved by MPBEP Activity Team on the December 11, 2008 conference call meeting.

Activity Team Members

Don Podlubny
Bob Udell
Dennis Quintilio
John Stadt
Richard Briand
Pat Wearmouth
Joyce Gould (Kyle Clifford)
Steve Otway
Daniel Lux (Anina Hundsdoerfer)
Rob Gibb
Ray Ault
George Hamilton
Keith Ebbs
Chris Stockdale

3. Executive Summary

The report on the work plan activities for 2008-09 is appendix 3.

For the Mountain Pine Beetle Ecology Program (MPBEP) for 2009-10 we will continue with the two projects started in 2008-09 plus an additional two projects and an approved collaboration. The first two projects are related to the affects of mountain pine beetle infestation on ground water hydrology and vegetation changes to affected stands respectively. This work will include the development of common data standards and formats where feasible and appropriate. Data standards and formats for new research will be required to comply with existing FRI GIS formats, to ensure compatibility and accessibility to program areas where needed.

The third project to be added to the program will be regarding Social Science and will look at "Public and Expert Understandings of MPB in Alberta". This project will be over a two year period and will look at four layers of the public; government, resource managers, researchers and the general public. This study will examine media content and public attitudes, information needs, and management preferences, and it will examine views of scientific experts and decision-makers involved in managing the MPB.

The fourth project will be development of the "Alberta MPB Research Strategy", utilizing existing knowledge of research and providing a synthesis of that information to be used in a work shop/symposium to produce an Alberta driven MPB research strategy. This project is in the first stages of negotiation and planning but once finalized it will be implemented in a very short time frame.

The collaboration is with the FRI Grizzly Bear Program's project on grizzly bear and MPB interaction.

The MPBEP is presently funded by ASRD and AFRI and has project contributions from Open FRIAA and in kind from other project partners and proponents. For this next year the program will be seeking and acquiring additional partners and funding. The MPBEP is not asking for any core funds from the Foothills Research Institute for this fiscal year.

4. Background Information

The Foothills Research Institute Mountain Pine Beetle Ecology Program was born out of a Wild land Fire Research Program proposal, submitted for funding in March of 2007. The concept of the proposal was to carry out focused research and investigations in regards to forest ecology as related to mountain pine beetle infestations. Established under the Landscape Dynamics Program Theme of the Foothills Research Institute Business Strategy, the research conducted by this Program will examine current and emerging aspects of the affects of mountain pine beetle on the ecology and wild land fire management in the foothills and mountainous areas of Alberta.

A major concern lending urgency to this research imperative is the emerging infestation of mountain pine beetle. Much uncertainty surrounds the potential impacts of mountain pine beetle on forest ecology and the related implications. Some areas of concern are; fire intensity and frequency, vegetation change in unsalvaged infested stands, affects on the growth and yield of lodgepole pine, affects on ground water hydrology.

Mountain pine beetle and climate change together will have implications for forest ecology and silviculture strategies, including for example, dealing with predicted increases in wildfire risk, intensity and severity. Will stands from such unprecedented fires replace themselves naturally as they have in the past or would intervention be required? How will the ecology of forest stands in these new circumstances affect decisions on silviculture strategies including the choice of species for reforestation? These questions are being asked today, and the information and data is required to populate forest management planning models. Unfortunately, little is known at this time, except that business as usual will not be the norm.

The Activity team has identified four objectives for the program that will guide us project prioritization and selection, by seeking to;

1) Maximize the ecological integrity of the affected forest landscape
2) Adjust practices to minimize disturbance factors affecting the landscape
3) Understand and mitigate related disturbance factors such as; wildfire occurrence and intensity, hydrology changes
4) Plan for resource management knowing the changes to the forest ecology and landscape

5. Projects and Program Areas

For the MPBEP for 2009-10 we will continue with the two projects started in 2008-09 plus an additional two projects and an approved collaboration. The first two projects are related to the affects of mountain pine beetle infestation on ground water hydrology and vegetation changes to affected stands respectively. This work will include the development of common data standards and formats where feasible and appropriate. Data standards and formats for new research will be required to comply with existing FRI GIS formats, to ensure compatibility and accessibility to program areas where needed.

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The fourth project will be development of the "Alberta MPB Research Strategy", utilizing existing knowledge of research and providing a synthesis of that information to be used in a work shop/symposium to produce an Alberta driven MPB research strategy. This project is in the first stages of negotiation and planning but once finalized it will be implemented in a very short time frame.

The collaboration is with the FRI Grizzly Bear Program's project on grizzly bear and MPB interaction.

5.1 Effects of Mountain Pine Beetle attack on hydrology and post-attack vegetation and hydrologic recovery in lodgepole pine forests in Alberta.

Led by Uldis Silins of the University of Alberta this project will provide information on the impacts of MPB on stand hydrology and ecology to improve post-beetle understandings and management strategies.

Project research objectives include:

1) Determine initial effects of variable intensity of "red attack" on stand water balance including rain/snow interception, forest floor evaporation, soil moisture storage, groundwater recharge, water table response, and understory light regimes & micro-climate.
2) Explore relationships between MPB driven changes in understory micro-climate and moisture regimes with initial understory vegetation response (recruitment, growth, leaf area) including opportunities for natural regeneration and early performance of under planting with several tree species.
3) Explore relationships between initial understory vegetation response and below-ground processes including microbial community biomass and biochemical activity, nutrient availability, and decomposition.
4) Incorporate new relationships from 1) and 2) into existing forest water balance models developed lodgepole pine for broad landscape scaling of hydrologic effects of MPB attack along several hydro-climatically distinct eastern slopes forested regions in Alberta.

Work Plan – 2009-10

1) Pre-treatment snowpack survey – Feb. 2009
2) 2nd half of the pre-treatment hydrologic measurements [transpiration measurements (whole tree sap flow), duff water holding capacity, rainfall interception, distributed soil moisture (0-60 cm depth), groundwater, & below rooting zone percolation, understory evaporative demand] will run from April-June 2009.
3) Glyphosate treatment application to simulate MPB attack (50% kill – 4.5 ha total in 3 units; 100 % kill – 4.5 ha total in 3 units + salvage harvest – 4.5 ha total in 3 units) July 1-15, 2009
4) Post treatment measurements (stand hydrology, vegetation response, below-ground processes) July 15 – Oct 31 2009 (1st half of post-treatment year #1)

Note: This project is located just east of the Hamlet of Robb Alberta, in West Fraser's FMA. To emulate the mountain pine beetle attach the researchers will be working with West Fraser Mills Ltd, Hinton Wood Products in chemical treatment of the plots. A map of the site is provided in Appendix I.

Code 246.1

Work	Budget	Contractor	Comments
Snow Pack Survey	$ 20,000	U of A	This work is scheduled in the 2008-09 season but may be carried out in 2009-10
2nd half of the pre-treatment hydrologic measurements	$ 65,000	U of A	This work is to be carried out during the summer of 2009
Glyphosate treatment application	$ 25,000	U of A	There is window for this work to be done in July
Post treatment Measurements	$ 30,000	U of A	
Totals	$140,000		

Objectives and Deliverables for Communications and Extension

1. FRI Quick note – early pre-treatment summary (stand water balance, understory veg) – summer 2009

5.2 Monitoring and Decision Support for Regeneration Management in a Mountain Pine Beetle Environment.

This project is co managed by Dr. Dick Dempster of the Foothills Growth and Yield Association (scientific and technical elements) and Don Podlubny (budgets, timelines and deliverables), the project will provide a decision support tool that will assist managers to make quick and rationale decisions in a complex and fast-changing situation.

The objectives of the project include:
1) Quantitative stand-level projections for predominant post-attack conditions and management intervention alternatives, that planners can incorporate quickly into landscape-level and timber supply forecasts;
2) Silvicultural guidelines for mitigating negative impacts on mid and long-term timber and cover supply.
3) Feed-back from ongoing monitoring to continually improve initial projections and guidelines.

Project Deliverables

Deliverables are listed below for each of the main project activities.

1. Baseline assessment
- Database for selected plots
- Baseline report including basic stand descriptions and reconstructed histories

2. Projection
- Preliminary projections of stand development following lodgepole pine mortality by strata
- Detailed projections of stand development under range of post attack conditions

3. Monitoring
- Network of monitoring plots established throughout study region
- Associated database
- Periodic status reports

4. Synthesis
- Decision support tool (information report and computer program)
    - First release (limited distribution)
    - Second release

Note: this project encompasses the complete range of lodgepole pine in Alberta to the USA boarder. Appendix 2 shows the project area from within which 240 plots will be selected for assessment across the range of lodgepole pine.

Work Plan – 2009-10

1. Initiate Data synthesis and analysis, April 2009
2. Complete field work on data acquisition from additional plots*, Aug. 2009 and remeasurment of identified plots from 2008.
3. Data entry and compilation for 2009 field work, Oct. 2009
4. Decision Support Tool development, Mar. 2010.
5. Field tour in collaboration with the FG&YA for the summer of 2009.

Code 246.2

Work	Budget	Contractor	Comments
Data synthesis, analysis	$ 10,000	See note	The main contractor for this years work has not been finalized.
Field work	$ 100,300		This amount is for the re-measurement of 50 plots. There may be an additional 90 plots pending review of 2008 data
Data entry and compilation	$ 41,150		
Decision Support Tool development	$ 8,000		The MPBEP has acquired 5 days of donated time from TFC under their agreement with FRI
Field tour			Budgeted under the Communications and Extension area
Project Administration	$ 4,100		This will be an in-kind from the MPBEP
Totals	$ 163,550		

Note: Additional plots for 2009 will be dependent on 1) the results of the 2008 field data analysis and 2) funding for the field work. If 90 additional plots are measured an additional maximum of $114,000 is required. These funds will be raised via the FG&YA and the MPBEP; if necessary a revised work plan concerning this will be submitted.

Objectives and Deliverables for Communications and Extension

1. FRI quick note outlining project status Oct. 2009
2. Technical work shop to develop the DSS with resource managers and technicians.

5.3 Public and Expert Understandings of MPB in Alberta

The MPBEP in collaboration with ASRD and the Provincial Strategic Directions Committee on MPB have noticed a disconnect between the real issues and scientific studies on MPB related to the knowledge of the public, including the politicians and resource managers as perpetrated by the media. This media information and public knowledge was of keen interest from the May 2008 MPB work shop. The MPBEP has initiated this project hoping to develop that understanding so as to enhance knowledge and information transfer between the public, resource managers, researchers and the media.

Led by Dr. Bonita McFarlane of the Northern Forestry Centre, Canadian Forest Service, this project will examine media content and public attitudes, information needs, and management preferences it will also examine views of scientific experts and decision-makers involved in managing the MPB in Alberta. This information will be of value to

resource mangers, governments and researchers in ensuring a consistent understanding of the MPB problem in Alberta and the actions required to mitigate that infestation.

The information to be gathered will provide a basis for interaction with the Alberta public regarding MPB activities in the Province of Alberta. Further it will set a base line to evaluate the publics' understanding of those activities over time.

Project Deliverables

1. Identify MPB messages which have been communicated to the public via the media.
2. Provide a survey of three areas in Alberta examining the various public groups' opinions and positions on MPB.
3. Present preliminary findings in early 2010
4. Final report on the study for Dec. 2010

Code 246.4

Work	Budget	Contractor	Comments
Media Search and report	$ 10,075	Consultant	Major portion of this work was commenced in 2008-09
Survey	$ 36,175	CFS, Northern	
Materials and supplies	$ 20,750		to cover cost of printing of surveys, mailing etc.
Totals	$ 67,000		

5.4 Alberta MPB Research Strategy

The MPBEP initially looked at hosting a symposium on MPB research in western Canada. After discussions with the activity Team and our partners further direction was added to the symposium to provide a much needed research strategy for Alberta. The MPBEP working in collaboration with the Alberta Forest Research Institute will utilize the research compendium information to provide groupings of mpb research by theme. The themes will be synthesised and used in a work shop/symposium to identify the strategy for mpb research in Alberta. This project has been approved by the MPBEP Activity Team pending the discussions and support with AFRI.

Project Deliverables

1. Mountain pine beetle literature grouped according to priority information areas identified by the Mountain Pine Beetle Ecology Program team
2. Development of synthesis papers based on these priority areas
3. Convening of a workshop for the presentation of the synthesis papers and discussion. Flowing out of the discussion will be the identification of outstanding strategic research, and
4. Development of the Alberta research strategy.

Code 246.5

Work	Budget	Contractor	Comments
Synthesis Papers	$ 30,000	FOREXX	
Work shop/ Symposium	$ 80,000		This will run at a cost recovery, no contractors have been lined up
Report and Strategy Development	$ 40,000	MPBEP & ASRD	
Totals	$150,000		

5.5 Partner and Funding Acquisition

At present fund contributions to the MPBEP come from Alberta Sustainable Resource Development and the Alberta Forest Research Institute. An ongoing goal of the MPBEP is to seek out and secure additional funding and partners either to the program as a whole or as to specific projects. The Program has developed a funding strategy and will be implementing this over the period of the program's life.

Code 246

Work	Budget	Contractor	Comments
Presentation	$10,000	Program Lead	Funds for time and travel for the Program lead.
Totals	$10,000		

5.6 Collaboration

During this period the MPBEP will be seeking collaboration with Dr. David Andison the lead of the new FRI Water Program. Dr. Andison has submitted a proposal for funding to develop a comprehensive research program under Alberta Environment's Water for Life Program. If funding is granted for this, the MPBEP Program will collaborate in the drafting and submission of the final detailed proposal. The MPBEP will also be working with the FRI Natural Disturbance program on a fire mountain pine beetle related project, which is in the conceptual stages at this time. The Grizzly Bear Program has made a request from the MPBEP for financial support for $25,000 per year for two years.

Code 246

Work	Budget	Contractor	Comments (including in-kind descriptions)
Review potential outside projects	$ 15,000		Funds for time and travel for the Program Lead
FRIGBP request	$ 25,000		Once details are finalized this will be moved into a separate project.
Totals	$ 40,000		

5.7 Communication and Extension

i. The program will implement the communication and extension plan submitted to FRI in 2008. The plan will be rewritten in the just recently provided new format.
ii. Follow through on the deliverables of the May 2008 work shop.

The deliverables for that work shop are;

1) Reporting on potential related research projects in a web based compendium

2) Create a document providing a gap analysis
3) A report on the priorities and direction for the long term of the MPBEP

iii. The MPBEP will collaborate with the Foothills Growth and Yield Association in putting on a joint field trip on the MPB issue in the Grande Prairie region for the summer of 2009 (see note in 5.2).

Code 246

Work	Budget	Contractor	Comments
General communications	$ 20,000	MPBEP Program Lead	Web up date, quick notes, compendium up date,
MPB tour	$ 10,000		Organization costs, support to travel
Totals	$ 30,000	$30,000	

5.8 Development and Management of the Program (Program Administration)

A number of tasks and activities are required to maintain and advance the work of the program. These include:

- Annually update 5-year business plan and annual work plan, with budgets by year for each project; to be submitted to the Activity Team by November 30, 2010.
- Annual reports to FRIAA, April 2009
- Produce and or review project plans, designs, reports and publications;
- Information exchange meetings, field tours and technical sessions (minimum of 1 meeting per year);
- Publicly-accessible web site, to be up dated on a quarterly basis.
- Mid-year and annual progress and financial reports;
- Steering committee meeting minutes.
- Seek out and identify partners for funds and /or collaboration
- Implement the project review process for committee review by September 15, 2010 and Activity Team approval by November 30, 2010

Code 246

Work	Budget	Contractor	Comments
Program operational activities	$23,000	MPBEP Program Lead	Funds for time and travel for the Program Lead as per duties: - Annually updated 5-year business plan and annual work plan, with budgets by year for each project; - Project plans, designs, reports and publications; - Information exchange meetings, field tours and technical sessions (minimum of 1 meeting per year); - Active publicly-accessible web site; - Mid-year and annual progress and financial reports; - Steering committee meeting minutes.
Totals	$23,000		

Project Objective/Deliverable Summary Table

Project	Objective/ Deliverable	Funding	Completion Date	Status %	Comments
246.1 Hydrology	Snow Pack survey	$ 20,000	04/15/09		Much of the work may be done prior to the end of 2008-09
	Pre treatment H20 measurements	$ 65,000	06/30/09		
	Glyphosate treatment application	$ 25,000	07/15/09		
	Post Treatment Measurements	$ 30,000	10/31/09		
246.2 FG&Y DSS	Data synthesis, analysis	$ 10,000	03/31/10		
	Field work	$100,300	10/31/09		
	Data entry and compilation	$ 41,150	12/31/09		
	Decision Support Tool development	$ 8,000	03/31-10		
	Field tour				Budgeted under the Communications and Extension area
	Project Administration	$ 4,100	03/31/10		In-kind from the MPBEP
246.4 Public and Expert Understandings	Media Search and report	$ 10,075	05/30/09		This activity commenced in 2008-09
	Survey	$ 36,175	12/31/09		
	Materials and supplies	$ 20,750	03/31/10		Project to be completed in 2010-11
246.5 Alberta MPB Research Strategy	Synthesis Papers	$ 30,000	04/30/09		
	Work shop/ Symposium	$ 80,000	02/28/10		
	Report and Strategy Development	$ 40,000	03/31/10		
246 MPBEP	Partner funding & acquisition	$ 10,000	03/31/10		
	Collaboration	$ 15,000	03/31/10		
	Collaboration FRI GBP	$ 25,000	03/31/10		
	Communications	$ 20,000	03/31/10		
	Communications MPB Tour	$ 10,000	07/30/09		
	Program Administration	$ 23,000	03/31/10		
TOTAL		$623,550			

6. Inter Program Links

For this work plan year (2009-10) the MPBEP will be linked to three FRI Programs:

1) Foothills Growth and Yield Association through the project listed under 5.2
2) Foothills Fish and Water Program through the project listed under 5.1 and 5.6
3) Foothills Grizzly Bear Program, through their own MPB affects on GB habitat research and through both 5.1 and 5.2
4) FRI Natural Disturbance program and linkages between wild fire and MPB infestations.

7. Funding Sources for this period

Summary – All Program Areas

Program Areas 246	Funds carried forward	MPBEP funds	Other funds	Total Funds	In-kind	Comments
5.1 MPB Hydrology Project		$ 70,000	$ 70,000 (FRIAA)	$140,000	$46,375	Project started in 2007-08, other funds are FRIAA, and in-kind is the U of A
5.2 Decision Support Tools		$ 23,000	$140,550 (FIAAA)	$163,550	$31,500	Project started in 2007-08, other funds is FRIAA and in-kind is the FG&YA and MPBEP
5.3 Public and Expert Understandings of MPB in Alberta		$ 37,000	$ 30,000 (AFRI)	$ 67,000	$ 92,000	Project commenced in 2008-09, other funding is from AFRI, in kind from CFS Northern and U of A
5.4 Alberta MPB Research Strategy		$100,000	$ 50,000 (AFRI)	$150,000		This project will be done in collaboration AFRI. who will be the contributor of the other funds
5.5 Partner and funding acquisition		$ 10,000		$ 10,000		Will be talking to energy and funding organizations
5.6 Collaboration		$ 40,000		$ 40,000		Seed funds for new projects and collaboration contributions
5.7 Communication & Extension			$ 30,000 (AFRI)	$ 30,000		Main expense will be the work shop any surplus funds will go to 5.4
5.8 Program administration		$ 23,000		$ 23,000		
Total		$303,000	$320,550	$623,550	$169,875	

Revenue for 2009-10

Finding Org.	Amount	Comments
MPBEP carry forward	$ 285,900	Projected as of Nov. 6, 2008
ASRD	$ 300,000	Last year of approved grant
AFRI	$ 100,000	Second year of three year grant
FRIAA	$ 210,550	
TOTAL	$ 896,450	Uncommitted funds for 2009-10 $272,900

8. Program/Project Key Members and Responsibilities

Don Podlubny
Program Lead
(780) 865-8332 after April 2008 (780) 865-7190
Don.podlubny@gov.ab.ca after April 2008 donpod@telus.net
Responsible for over all program delivery and will work with the two projects as administration delivery.

Dr. Dick Dempster
Research and Development Associate, FGYA
(780) 424-5980
dick_dem@telusplanet.net
Principal Investigator for the MPB PSP monitoring project, Dick will coordinate the work to be done on PSP review, data acquisition, analysis and technical reports.

Mr. Bob Udell
Program Director for the Foothills Growth and Yield Association
(780) 865-4532
udellconsulting@shaw.ca
Main contact with the FG&YA for Decision Support project

Uldis Silins, Ph.D., RPF
Associate Professor - Forest Hydrology
751 - General Services Building
Dept. of Renewable Resources,
University of Alberta Edmonton,
Alberta, CANADA. T6G 2H1
Tel: (780) 492-9083 Fax: (780) 492-4323
E-Mail: uldis.silins@ualberta.ca
Principal Investigator for the MPB Hydrology project, Uldis will coordinator the project in the field and work with other researchers. He will provide analysis and reports on the project.

Dr. Ellen MacDonald
Professor
Department of Renewable Resources
University of Alberta
Edmonton Alberta, T6G 2H1
Ph; (780) 492-3070
Fax: (780) 492-4323
Ellen.macdonald@ualberta.ca
Lead vegetation researcher, working in collaboration with Dr. Silins on the hydrology project and is associated with the vegetation assessment for the FG&Y a Decision Support System project.

Dr. Bonnie McFarlane
Senior Human Dimensions Specialist
Natural Resources Canada
Canadian Forest Service, Northern Centre
Edmonton Alberta
Ph: (780) 435-7383
Fax: (780) 435-7359
bmcfarla@nrcan.gc.ca
Lead researcher for the social science project, Public and Expert Understandings of MPB in Alberta. Bonnie will coordinate the project with fellow researchers.

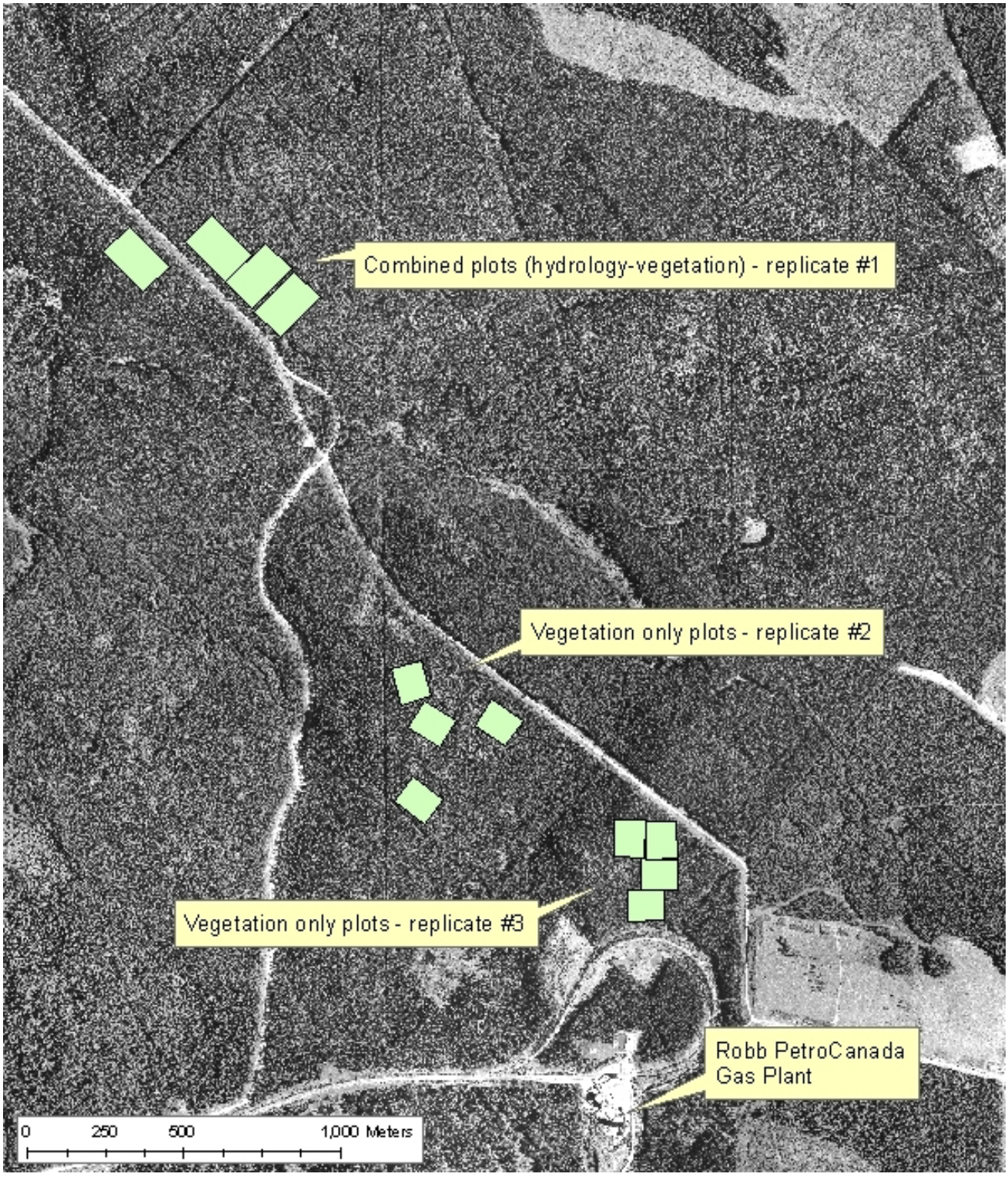
Dr. John Parkins
Associate Professor
Department Rural Economy
University of Alberta
Edmonton, Alberta T6G 2H1
Ph: (780) 492-3610
Fax: (780) 492-0268
jparkins@ualberta.ca
Collaborative researcher on the social science project, Public and Expert Understandings of MPB in Alberta.

9. Environmental/Occupational Safety Permits

The herbicide work in 246.1 "Effects of Mountain Pine Beetle attack on hydrology and post-attack vegetation and hydrologic recovery in lodgepole pine forests in Alberta" will require an herbicide application permit and will be applied with the assistance of West Fraser Mills Ltd. Hinton Wood Products Division.

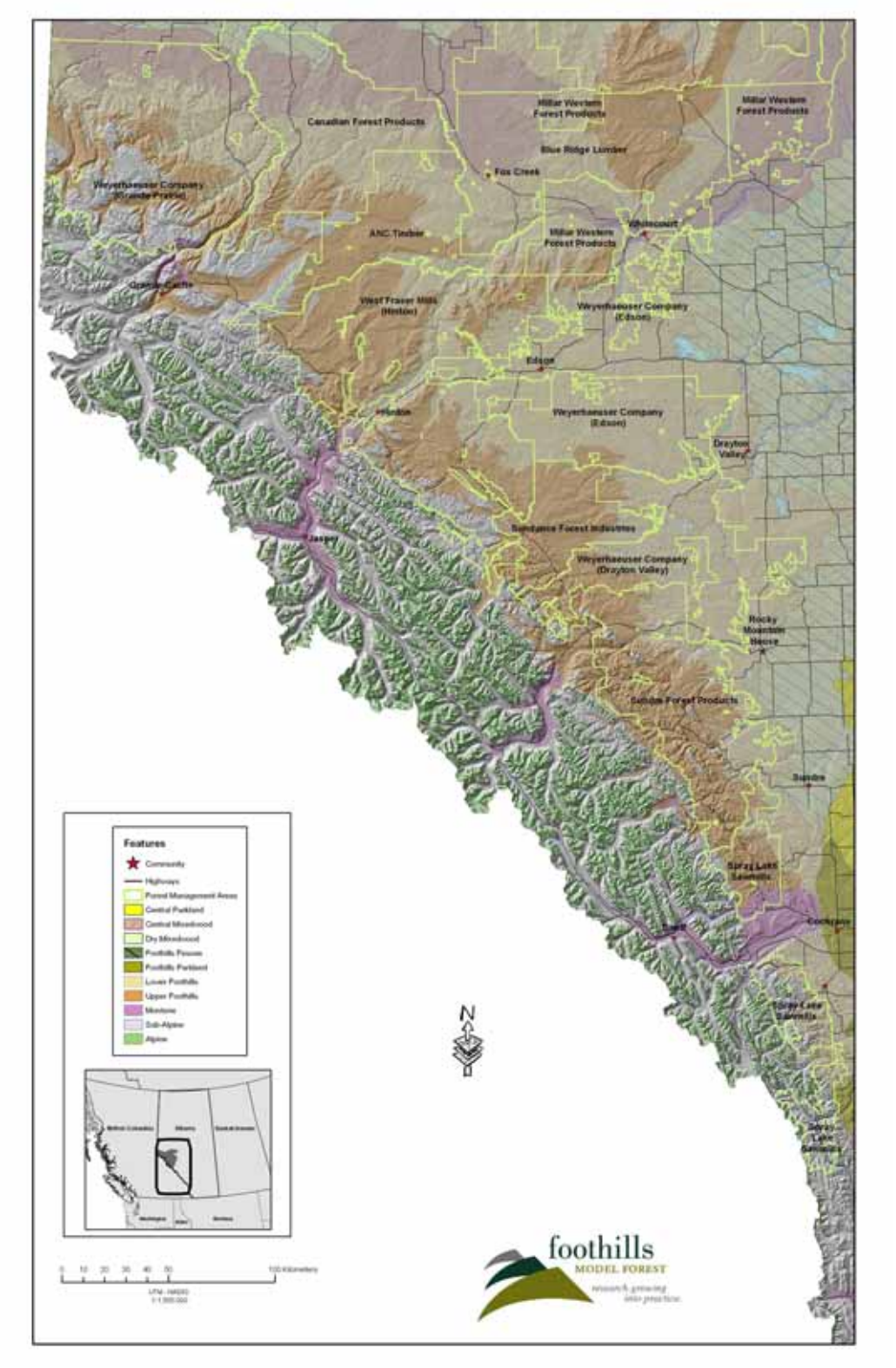
10. Appendices (year end reports, references, review information publications, business case)

Appendix I
Map of MPB Hydrology Project Area78



Appendix 2

Map Showing Project Area, from within Which 240 PSPs will be selected for Assessment in FGYA Decision Support Project



Appendix 3

Foothills Research Institute Annual Work Plan Report
2008-2009

Mountain Pine Beetle Ecology Program 246

This report will summarize the work done in 2008-09 by project. Over all the MPBEP has completed the work set out in its 2008-2009 work plan and has advanced knowledge and understanding of the mpb situation in Alberta.

The Activity Team has change in the last year with the following individuals dropping off; Mark Storie of ASRD, Dave Andison of the FRI natural Disturbance program. We also gained active members; Dan Lux from alternate to full member for ASRD, Keith Ebbs representing the communities through Grande Alberta Economic Region, Keith McClain as the appointed Board Liaison and Anina Hundsdoerfer ASRD alternative.

5.1 Effects of Mountain Pine Beetle attack on hydrology and post-attack vegetation and hydrologic recovery in lodgepole pine forests in Alberta.

1. Site selection / stand reconnaissance (vegetation / site classification) – July-Aug 2007 – U of A cash/in-kind (Status - Completed Aug 2007)
2. Plot design (GIS) – Aug-Sept 2007, U of A cash/in-kind (Status - Completed Aug 2007)
3. Plot surveying / layout – Oct-Nov 2007, U of A cash/FMF cash (Status - Completed Nov 2007)
4. Meteorological tower/instrumentation installation – Oct-Nov 2007, FMF cash, U of A in-kind (Status - Completed Dec 2007)
5. Preliminary groundwater well drilling/installation – Oct-Nov 2007? FMF cash, U of A in-kind (Status - Completed Sept 2008) ** Note: two sub-surface hardpan layers exist on these sites (1 at 5-8 ft & the 2nd at 9-15 ft. depth). Piezometer nests were established at each sub-surface layer. During 2008, no water table was present at any of these depths on any site. If possible, deeper groundwater wells will be attempted in 2009. Perched water tables are expected to be present in spring 2009 and after treatment applications.
6. Plot stand inventory (over storey stand characterization) – Nine 0.02-ha over story plots per study unit; tagged tree measurements included species, dbh, live status, crown condition (live), decay class(dead), subset of heights and crown lengths. (Status - Completed Sept 2008)
7. Preliminary field testing of glyphosate applications using "hack & squirt" & "EZ Ject" cartridge application with lances was performed in Sept & Oct 2008
8. 1st half of pre-treatment transpiration measurements (whole tree sap flow), rainfall interception, distributed soil moisture (0-60 cm depth), groundwater, & below rooting zone percolation measurements were conducted from April-Oct 2008.
9. Pre-treatment under storey and below-ground stand characterization, including understory cover, seedlings, shrubs, downed woody debris, nutrient availability, decomposition, and microbial activity June-October 2008

5.2 Monitoring and Decision Support for Regeneration Management in a Mountain Pine Beetle Environment.

1. Plot Selection completed for 240 plots
2. Measurement protocols completed
3. Dendrology field work completed for 2008-09, 280 samples
4. Plot measurement completed on 150 pots
5. Data entry, data compilation, and initial synthesis completed

5.3 Partner and Funding Acquisition

The program acquired an additional $100,000 from per year for a three year period starting in 2008-09 ending in 2010-11 from the Alberta Forest Research Institute (AFRI). The communities have shown interest and now have a representative sitting on the Activity Team through Grand Alberta Economic Region. Discussions are on going with

the Canadian Forest Service Northern Centre with having representation on the Activity Team. And finally the Program has collaborated with the Provincial Strategic Directions Committee on MPB as their "Scientific Information Forum".

5.4 Collaboration

The MPBEP has collaborated with Dr. Nadir Erbilgin. University of Alberta on his project "Estimating Spatial Variation in Mountain Pine Beetle Productivity Across Different Landscapes of Lodgepole Pine Forests in Alberta." We also, are working with the FRI Foothills Growth and Yield Association, FRI Natural Disturbance program and the FRI Grizzly Bear Program.

5.5 Communication and Extension

The Program completed our Communications and Extension Plan and it is now under review and editing by the FRI Communications and Extension Program Area. In May of 2008 the Program completed a successful work shop held at the Hinton Training Centre with 29 participants.

5.6 Development and Management of the Program (Program Administration)

The administration costs were less than expected it was budgeted for a total of 120 days for working on the Program and all its projects. The time utilized is less than 65 days. At this time the budget is forecasted to have a surplus of $98,000. All Program areas their respective budgets and completion are outlined on Table 1. Table 2 shows the revenue for the reporting period.

Program budget and expenditures 2008-09 Table 1

Budget Variance	Up dated Nov. 6 2008 budget/income to date	expenses to date	projected expenses	total expenses	projected balance
246:					
partner & funding acquisition	20,000.00	0.00	0.00	0.00	20,000.00
Collaboration	38,000.00	0.00	0.00	0.00	38,000.00
Admin	197,174.84	21,731.33	40,000.00	61,731.33	135,443.51
Comm. & Ext	30,000.00		25,500.00	25,500.00	4,500.00
246 total	285,174.84	21,731.33	65,500.00	87,231.33	197,943.51
246.1	158,801.77	20,151.13	140,000.00	160,151.13	-1,349.36
246.2	275,180.00	152,458.52	126,864.00	279,322.52	-4,142.52
246.3	100,000.00	6,515.00	0.00	6,515.00	93,485.00
totals	819,156.61	200,855.98	332,364.00	533,219.98	285,946.63

Revenue for the 2008-09 Year Table 2

Revenue	For 2008-09				
	246	246.1	246.2	246.3	
7/8 forward	154,217.84	28,801.77	83,280.00	0.00	266,299.61
ASRD grant	309,757.00	0.00	0.00	0.00	309,757.00
AFRI				100,000.00	100,000.00
FRIAA		60,000.00	83,100.00		143,100.00
transfers (ASRD grant $)	-178,800.00	70,000.00	108,800.00		0.00
totals (budgets)	285,174.84	158,801.77	275,180.00	100,000.00	819,156.61

Foothills Research Institute Annual Work Plan 2009 – 2010

300 - Communications & Extension Program

1. Prepared by:

Sean P. Kinney, Communications & Extension Program Lead
Foothills Research Institute
Box 6330 Hinton, AB T7V 1X6
Ph: (780)-865-8329 | Cell: 780-817-1844 | Fax: (780)-865-8331
Email: sean.kinney@gov.ab.ca

2. Communications and Extension Steering Committee:

**Signoff sheet included as Appendix 1*

Aaron Jones	Hinton Wood Products, A Division of West Fraser Mills Ltd.
Carolyn Duchoslav	Jasper National Park
Dave Ealey	Alberta Sustainable Resource Development, Communications
Glenn Taylor	Mayor, Town of Hinton
Tom Archibald	General Manager, Foothills Research Institute
Rob Galon	Alberta Sustainable Resource Development, Hinton Training Centre *Ken Snyder is acting during Rob's absence*

3. Executive Summary

This work plan has been developed for the period April 1, 2009 to March 31, 2010. Over the past few years, the Communications and Extension Program focused mainly on Communications and Outreach (section 5.4). In 2009/2010 there will be a shift to towards Knowledge Transfer (section 5.2) and the promotion of objectives related to Extension. A few of the objectives and deliverables in the 2009/2010 work plan are carry-overs from 2008/2009. However, many new projects are listed that will address gaps in previous work plans (mainly technology that will improve communications and knowledge transfer). The Communications and Extension program will continue to work cross functionally with all programs and provide support to the General Manager and Board of Directors when requested.

Strategy development and planning will also be addressed in this work plan. Beginning with Communications and Outreach, formal project plans will be developed for each Communications and Extension goal that support the objectives contained in this plan. Future Communications and Extension annual work plans will then be a reflection of the objectives stated in these plans. Current objectives are outlined in a fashion consistent with the 2007-2012 Communications and Extension Strategy.

The 2009/2010 work plan proceeds as follows:

4. Background Information
5. Objectives
    - 5.1 Partnerships
    - 5.2 Knowledge Transfer
    - 5.3 Informing Policy
    - 5.4 Communications and Outreach
6. Inter Program Links
7. Funding Sources
8. Program Key Members and Responsibilities
9. Appendices

4. Background Information

In November 2007, the "2007-2012 Communications and Extension Strategy" was approved by the Board of Directors. The 2007-2012 Communications and Extension Strategy outlines goals, key messages, and audiences, which guide the initiatives outlined in this work plan. This Strategy will be reviewed with the Communications and Extension Steering Committee and recommendations will be made to the General Manager. The 2007-2012 Communications and Extension Strategy will be used to guide work planning until it can be formally reviewed. Linkages between the goals in the 2007-2012 Business Strategy and the goals in the 2007-2012 Communications and Extension Strategy are listed in Table 1 below.

Table 1 – *Linkages between the 2007-2012 Business Strategy and Communications and Extension Strategy*

2007-2012 Business Strategy		2007-2012 Communications & Extension Strategy	
Goal 1.	Build a community of diverse and active partners who are working in or are concerned about natural resource management.	*Goal* 1.	Raise awareness of, support for and engagement in the Foothills Research Institute by natural resource agencies, practitioners, policy makers and municipal leaders.
Goal 3.	Provide science-based tools and knowledge that is understandable and available to natural resource managers, policy makers and the public.	*Goal* 2.	In collaboration with program leads facilitate the adoption of Foothills Research Institute science-based knowledge, tools and technology in sustainable forest management practice through strategic and structured communications and extension activities.
		Goal 3.	In collaboration with the Board and Management of the Foothills Research Institute facilitate the interpretation and use of Foothills Research Institute science to develop improved sustainable forest management policy through strategic and structured communications and extension activities.
		Goal 4.	Contribute to the general public's understanding and support for sustainable forest management research, policy and practices.
Goal 4.	Broadly disseminate our knowledge.	*Goal* 5.	In collaboration with the Board and Management of the Foothills Research Institute, develop and implement a strategy to communicate information and knowledge at the local, regional and provincial levels.

In October 2008, the Foothills Research Institute hired a new Communications & Extension Program Lead. As a result, most of the previous Communications and Extension projects from last year's work plan are expected to be wrapped up before the start of the 2009-2010 work year. However, there is an expected budget carry-over to next year of approximately $45,000. These carry-over dollars will be used to develop new projects and technology that will improve communications and knowledge transfer. This will be the last year the Communications & Extension Program will be allowed unallocated carry over.

Prior to October 2008, the Communications & Extension Program was without a Program Lead for an extended period of time. As a result, the program was only able to maintain basic levels of support and new projects were delayed or put on hold. Appendix 2 is a copy of the midterm progress report and Appendix 3 lists the status of 2008-2009 Communication & Extension deliverables.

Review of past objectives has shown a need to streamline planning and strategy development. Many plans have been proposed without a clear description of what the plan is to accomplish (i.e. multiple communication plans, independent marketing plans, media advertising plans, etc.). Formal project plans will be developed for each Communications and Extension goal that will have specific activities attached to objectives to make the work plan more functional. It is anticipated that by outlining the specific activities needed to meet each objective, future carry-overs from unfinished projects will be avoided.

5. Objectives and Deliverables for Communications and Extension

5.1 Partnership:

C&E Goal 1. Raise awareness of, support for and engagement in the Foothills Research Institute by natural resource agencies, practitioners, policy makers and municipal leaders.

Background Previous tools used to communicate with this audience have proven effective. These tools include the Website, the Footnotes Newsletter, and the Annual Report. Although they have been effective in the past, more needs to be done in order to engage this audience. Building new partnerships and adding more value to existing partnerships is needed to ensure the viability of the Foothills Research Institute. Building a community of diverse and active partners is a primary goal identified in the Foothills Research Institutes 2007–2012 Business Strategy. To do this, FRI must provide more value to existing partners in order to attract new partners. Value will be defined by the existing partnership through a survey to be conducted before the 2009-2010 work year. Building relationships with communicators from these organizations will be critical in achieving the above mentioned goal.

Audience The primary audience includes those who are responsible for, or who influence, natural resource management in Alberta. However, there is also a growing need to build relationships beyond our core study area to further the support of the Foothills Research Institute. An expanded list of this audience is included as Appendix 4.

Partnership Objectives	Deliverable	Budget	Days
P1: By August 1, 2009, develop a two page "Capability Statement" that explains to potential partners the Foothills Research Institute's research, communication, and extension capabilities. The statement will highlight the Foothills Research Institute's future capability and describe past achievements.	Hard and electronic copies of a two page "Capability Statement".	$0.00	2
P2: By April 15, 2009, produce a report that summarizes findings from partner survey to be conducted in early 2009. The findings will be reflected in the spring Communications & Extension workshop.	Detailed report from partner survey.	$0.00	2
P3: By July 1, 2009, develop an inventory of established partner communication channels and partner communicators that the Foothills Research Institute can utilize to raise the profile of the organization. (e.g. partner newsletters with established circulation)	Channel inventory list. Partner contact list.	$0.00	2
P4: In 2009/2010, develop two-page FRI "Partner Profiles" that will showcase "research growing into practice". Profiles can be used by FRI and represented partners to meet communication goals.	Hard and electronic copies of an FRI Partner Profile.	$0.00	7
P5: In 2009/2010, enhance and revive FRI's electronic newsletter (E-notes) - include additional content and ensure it is distributed once per month throughout 2009/2010.	Twelve "E-notes" distributed on the first of every month.	$1260.00	12
P6: In 2009/2010, distribute two "Footnotes" print newsletters to raise awareness of programs, research, partnerships, integration efforts, and events.	Hard and electronic copies of two *Footnotes*newsletters.	$14,000.00	8
P7: By June 1, 2009, distribute the 2008/2009 Annual Report	Annual Report	$25,000.00	8
P8: In 2009/2010, coordinate the Foothills Research Institute's participation and presentations at partners' meetings, events and lecture series. Develop a list of available presentation opportunities for FRI.	Summary of presentations Presentation opportunity listing.	$5000.00	12
P9: The final website sign-off, launch of collaboration tools, and major enhancements to be competed in 2009. In 2009/2010, maintain the FRI website and on a quarterly basis, report the website statistics as well as associated channel statistics.	Final website sign-off. Quarterly website and associated channel statistics reports.	$8779.37	30
P10: In 2009/2010, create website development plan with support from GIS program that will outline the future of our website including future requirements, additions, integrations, and enhancements.	Forward looking website development plan.	$0.00	7
P11: In 2009/2010, deliver tours to groups (and potential partners) who are interested in using Foothills Research Institute knowledge and tools in integrated land management practice and policy.	Report summarizing tours by 2009/2010 year end.	$0.00	24
P12: By July 15, 2009, review partnership strategy with General Manager and identify unique partners operating in the land base that would benefit from an	List of unique partners.	$0.00	2

association with the Foothills Research Institute and the various new programs being developed.			
	TOTAL	$54,039.37	116

5.2 Knowledge Transfer:

C&E Goal 2. In collaboration with program leads, facilitate the adoption of Foothills Research Institute science-based knowledge, tools and technology in sustainable forest management practice through strategic and structured communications and extension activities.

Background The Foothills Research Institute's 2007-2012 Business Plan states that annual work-plans for each Program must include a Communications and Extension Plan and implementation strategy. The Communications and Extension Program Lead created a Communications & Extension planning template for researchers in the fall of 2008. This template contains information for developing a Communications & Extension Plan. This is a working document and will be revised during 2009/2010. It is the view of the FRI Board and the Program Lead that Communications and Extension is very important and must be part of each FRI Program's Work Plan. The adoption of FRI knowledge, tools, and technology is dependent upon Program Leads completing this Communications & Extension template and properly supporting and implementing the resulting plans. The Communications and Extension Program will support the development, integration and presentation of these plans. Furthermore, collaboration between programs in their knowledge transfer activities will help build a case for research integration. Many of the objectives addressed under section 5.1 (Partnerships) also play an important role in the adoption of knowledge, tools, and technology in sustainable forest management.

Audience The primary audience are forest and natural resource practitioners involved with forest and land management planning and practice. The audience includes, but is not limited to, foresters, planners, biologists, and GIS technicians. A full list of this audience is included as Appendix 5.

Knowledge Transfer Objectives	Deliverable	Budget	Days
KT1: In 2009/2010, provide support to workshops that transfer Foothills Research Institute knowledge and tools to partners and potential users.	Summary of workshop evaluation forms.	$0.00	48
KT2: By August 30, 2009, review all program Communications and Extension plans to identify opportunities for future collaboration and research integration.	Report summarizing collaboration opportunities.	$0.00	14
KT3: By October 30, 2009, revise the previous year's Communications and Extension (C&E) Work Plans with Program Leads and use these plans to drive formation of overarching C&E annual Work Plan.	Revised Program C&E Plans and an overarching C&E work plan.	$0.00	14
KT4: In 2009/2010, begin developing podcasts that will be syndicated into our master news feed and contain knowledge generated by research programs.[1]	Pilot podcasts.	$600.00	6
KT5: In 2009/2010, begin taping presentations, workshops, and other knowledge transfer opportunities that will be edited and syndicated into our master news feed and available online.	Pilot videos.	$1200.00	6
KT6: In 2009/2010, begin developing pilot "webinars" with Program Leads to be delivered through the donated use of Teck Cominco's web conferencing unit. By December 1, 2009 deliver pilot "webinar" evaluation and cost analysis to purchase a web conferencing unit.[2]	Pilot "webinars" and cost evaluation.	$0.00	14

[1] Quicknotes could serve as a script. Podcasts will correspond to regularity of publications.

[2] Delivery will depend on program material and conferencing unit availability.

KT7: By May 31, 2009, run a Communications and Extension Workshop for partners, staff, and contractors.[3]	Workshop, materials, and summary report.	$3000.00	14
KT8: In 2009/2010, use interactive screen capture software to facilitate the demonstration of Foothills Research Institute knowledge and tools. In particular, decision support software, mapping tools, tutorials, etc.	Pilot demonstration videos.	$750.00	7
KT9: In 2009/2010, work with Program Leads to develop two page summary flat sheets for FRI programs to be used in communications and extension activities.	Hard and electronic copies of program flat sheets. Programs to print as needed	$0.00	3
KT10: In 2009/2010, produce a professional development plan for the C&E Program in order to facilitate further communications and extension knowledge for C&E and FRI staff.	Communications & Extension Professional Development Plan.	$0.00	3
KT11: In 2009/2010 facilitate discussions with Program Leads about developing State of Knowledge (synthesis) products for their programs. This will be useful for long running programs and future integration.	Summary of discussions outlining potential state of knowledge products.	$0.00	7
KT12: By April 15, 2009, ensure knowledge management documents and guidelines are available to FRI Program Leads.	Knowledge Management Guides.[4]	$0.00	14
KT13: In 2009/2010 Communications and Extension will work collaboratively with FRI Program Leads in organizing the delivery and development of a series of consistent FRI branded short courses.	FRI branded short courses.[5]	$0.00	10
	TOTAL	$4,800.00	160

5.3 Informing Policy

C&E Goal 3. In collaboration with the Board and management of the Foothills Research Institute facilitate the interpretation and use of Foothills Research Institute science to develop improved sustainable forest management policy through strategic and structured communications and extension activities.

Background The Communications and Extension Program will provide support to the Board of Directors and management in their efforts to facilitate the interpretation and use of Foothills Research Institute science in forest and resource management policy. Many of the objectives addressed under section 5.1 (Partnerships) also contribute to the organization's efforts at communicating with policy makers. As a non-advocacy organization, the Foothills Research Institute needs to be bias-balanced when providing understandable and readily available science-based tools and knowledge to policy makers. Supporting this process is important and may require the development of "Objective Policy Briefs" related to forest and resource management.

Although not directly tied to this goal, the C&E Program has been asked to lead a Joint Work Site Health and Safety Committee to develop an integrated safety plan and polices, which will encourage a constant awareness of the need for safe and competent work from all FRI Programs.

Audience The primary audience are individuals who make or influence land and resource management policy. An expanded list of this audience is included as Appendix 6.

[3] The Workshop will focus on how to communicate, basics of extension and knowledge transfer, research driven communications, developing and executing C&E plans, and delivering partner value

[4] Examples include: Online collaboration for Programs and Partners; Publishing FRI Technical reports (including style guide); Publishing FRI Quicknotes, Integration-notes, Footnotes, and E-notes content; Logo usage and application; etc.

[5] Development and delivery will depend on individual Programs. Course costs will also be covered by individual Programs.

Informing Policy Objectives	Deliverable	Budget	Days
IP1: In 2009/2010, facilitate discussions related to the Foothills Research Institute's participation in the policy process through the development of "Objective Policy Briefs" related to forest and resource management.[6]	Summary of discussions and outcomes.	$0.00	5
IP2: In 2009/2010, discuss opportunities with the General Manager to increase FRI's awareness among members of the Alberta Government's Cabinet Policy Committee on Resources and the Environment.	Summary of discussions and outcomes.	$0.00	5
Objective IP3: The Communications & Extension Program will, by the end of 2009/2010 and in conjunction with the General Manager, lead a Joint Work Site Health and Safety Committee to develop an integrated safety plan that will encourage a constant awareness of the need for safe and competent work from all FRI programs.	Joint Work Site Health and Safety Plan	Costs reflected in administrati on budget.	20
	TOTAL	$0.00	30

5.4 Communications and Outreach

C&E Goal 4. Contribute to the general public's understanding and support for sustainable forest management research, policy and practices.

C&E Goal 5. In collaboration with the Board and management of the Foothills Research Institute, develop and implement a strategy to communicate information and knowledge at the local, regional and provincial levels.

Background As stated in section 4 (Background), there are numerous objectives related to "planning" that need to be reviewed. In particular, there is a need to streamline planning as it relates to strategy development. C&E Goal 5 refers to communicating "information and knowledge" through a strategy developed "in collaboration with the Board and management of the Foothills Research Institute". The 2007-2012 Communications & Extension Strategy will be reviewed and the goals outlined in it will be expanded on. This will not require developing separate strategy documents but creating plans for each C&E goal that will be revised and implemented in the work plan yearly. There is already a solid understanding of these audiences as they relate to the Foothills Research Institute but there needs to be project plans that will translate strategies into action.

Communications has historically been the primary focus of the Communications and Extension Program at the Foothills Research Institute. As discussed in section 5.2 (Knowledge Transfer), this focus is changing. Knowledge transfer within the C&E Program will continue to grow as resources allocated to environmental education decrease. As outlined in last years Work Plan, partnerships and projects that involve Jasper National Park's Palisades Education Centre and the Grande Yellowhead Region will be maintained. Despite reducing environmental education resources, the C&E Program will seek opportunities to build awareness outside our region. To do this, "champions" will be identified who are keen on incorporating the knowledge and tools generated by the Foothills Research Institute in their educational initiatives.

In 2009/2010 the Communications & Extension Program will focus primarily on highlighting knowledge transfer work to the public. In order to contribute to the public's understanding of and support for

[6] If encouraged, initial "Objective Policy Briefs" will provide only a targeted research discussion of the current situation without advocacy.

sustainable forest management, FRI must continue to demonstrate how the research conducted benefits our actively engaged partnership.

Audience Residents of Jasper, Hinton, Grande Cache, Edson and Yellowhead County, as well as the media based in these areas. For a more detailed list of this audience see Appendix 7.

Communications and Outreach Objectives	Deliverable	Budget	Time
CO1: In 2009/2010, discovery boxes will be made available for use at public locations in the region.	Usage schedule. Summary of use.	$0.00	2
CO2: In 2009/2010, continue partnering with the Grande Yellowhead Regional Division (GYRD) to develop curriculum and deliver programs to GYRD students.	Report summarizing programs delivered and curriculum developed.	$0.00	14
CO3: During the summer of 2009, the Grizzly Bear Interpretive Program will be delivered ten times in Jasper National Park.	Summary of attendance at, and comments from, the interpretive program.	$2000.00	4
CO4: In 2009/2010, support communications and maintenance activities of the Natural Resources Interpretive Park.	Summary of projects and involvement.	$2500.00	2
CO5: In 2009/2010, support communications activities of the Hardisty Creek Restoration Project (HCRP).	Summary of last phase activities.	$0.00	4
CO6: In 2009/2010, work with Program Leads to develop trade show panels that can be integrated into existing display materials.[7]	Trade show panels.	$0.00	10
CO7: By June 30th, 2009, develop and deliver the first of a series of "brown bag lunch" seminars designed to engage a broad range of community members and educate them about FRI, our partners, and our research programs. May incorporate "webinar" technology.	Summary of seminars and attendance.	$1200.00	5
CO8: During 2009/2010, host an FRI open house designed to promote our research programs to the public. Open house will be available for school groups, the public, etc.[8]	FRI Open House.	$2242.69	5
CO9: During 2009/2010, partner with Inside Education to deliver "ecotour" to teachers outside of our region who are keen on incorporating knowledge and tools generated by FRI into their educational initiatives.[9]	Ecotour and summary of Inside Education's activities.	$12,000.00	5
CO10: During 2009/2010, develop a "Speaker, Theatrical and Visiting Scientist" presentation series in order to cut down on time and resources used to deliver ad-hoc presentations. To be run on a cost-recovery basis.	"Speaker, Theatrical and Visiting Scientist" presentation series.	$500.00	20
CO11: During archiving and library creation in 2009/2010, begin exploring the resources needed to develop a web-enabled "Press Clipping Compendium" that will inventory and archive media articles relevant to FRI. This will include an internal protocol for submission/collection and will require the development of distribution channels for the compendium.	Report outlining resource requirements and proposed compendium structure including protocols.	$0.00	15
CO12: In 2009/2010, work with regional media to develop a regular FRI newspaper column/section and (possibly) a radio feature that can be used to promote extension activities and showcase communications and extension products (e.g. the yet to be developed FRI Partner Profiles).	Regular FRI regional newspaper column/section and (possibly) a regular radio feature.	$4000.00	20

[7] Panel costs will be covered by individual programs. C&E will assist in design and coordinate production.

[8] There is a possibility of a joint open house with Hinton Wood Products.

[9] Approximately $8000.00 of additional regional partner funding is required for this to go ahead.

CO13: In 2009/2010, deliver a pilot public tour of the Foothills Research Institute's core study area.[10]	FRI pilot public tour.	$2200.00	10
CO14: By May 1st, 2009, execute a website and brand launch campaign to solidify our new name, new website, and promote FRI as the leader in sustainable forest management applied research.	Delivery of campaign and plan outlining activities.	$2500.00	6
CO15: In 2009/2010, develop a "Foothills Highway" (Highway 40) concept that will create more C&E products for the public sector and will also enhance FRI's profile/image. Initial stages will involve creating a database of unique foothills locations and identify linkages to Highway 40 infrastructure improvements, the Adaptive Forest Management and History Program's Ecotour, proposed "Trout Highway", Special Places in the Forest, GIS, internet mapping, partner value, and existing demonstration sites.	Foothills Highway Business Case and Working Group	$2500.00	30
	TOTAL	$31,642.69	152

6. Inter Program Links

The Board of Directors has asked that the Communications and Extension and GIS Programs work together to identify appropriate links. Communications and Extension participated in the GeoConnections User Needs Analysis process and support is being provided for the second stage of proposals. Many website enhancements are being completed in early 2009 and will help set the stage for internet mapping and other data transfer tools.

The "Foothills Highway" development concept will require collaboration with GIS to properly inventory sites in the core study and, in the future, integrate these with internet mapping and other products to be developed. The concept process will involve every FRI program and will require a collaborative approach to succeed. The Adaptive Forest Management and History Program's Ecotour will provide the base for this project.

Finally, the two programs will continue to work together on GIS-based environmental education initiatives that feature Foothills Research Institute programs and research. GIS day in 2008 was a great success and there are discussions to enhance the event in 2009, which will require further GIS support. The completion of C&E Program plans will identify new opportunities for further integration.

7. Funding Sources

In 2009/2010, the Communications and Extension Program will cover the full costs of the administrative support position (0.6 full time) that is shared between FRI Administration and the Communications and Extension Program. In previous years, Communications and Extension covered two thirds of the position's costs which totalled approx $24,000. Full costs for the position in 2009/2010 will be approximately $41,000. As a result, Communications and Extension has requested an additional $16,725.97 of core funding to account for this change. Table 2 below provides the funding breakdown for 2009/2010. Table 3 shows resources allocated by objective area.

[10] For example, there may be opportunities to partner with Town of Hinton or Travel Alberta from an "industrial/ecotourism" perspective.

Table 2 – *2009/2010 Work Plan Budget*

300. Communications & Extension	Budget	Memos
Income Sources 2009/2010		
Prior Year Balance Forward Cont	$45,000.00	Estimated based on current 2008/2009 expenses.
Total Core Funds Requested	$262,725.97	Includes $16,725.97 in additional funds for 8508 (wages for admin).
Total Income	$307,725.97	
Budgeted Expense 2009/2010		
ADVERTISING	$82,030.19	
COMPUTER EXPENSE	$5,623.84	
CONTRACTS	0.00	
EQUIPMENT	$100.00	
INSURANCE	$2,050.00	
OFFICE& ADMINISTRATION	$11,046.96	
PROFESSIONAL FEES	$2,000.00	
SUBSCRIPTIONS	$10,094.61	
TRAINING	$2,000.00	
TRAVEL	$11,500.00	
UTILITIES	$3,558.60	
VEHICLES	$3,907.10	
WAGES & BENEFITS	$173,814.67	
Total Expense	$307,725.97	
Net Income Balance	0.00	

Table 3 – *Resources Allocated By Objective Area*

Objective Area	Budget	Expected Days Required
5.1 Partnership	$54,039.37	116
5.2 Knowledge Transfer	$4,800.00	160
5.3 Informing Policy	$0.00	30
5.4 Communications & Outreach	$31,642.69	152
TOTAL	$90,482.06	458

8. Program/Project Key Members and Responsibilities

Name	Position	Contact Details	Responsibilities
Sean Kinney	Communication &	Ph: 780-865-8329	Program Management

	Extension Program Lead	sean.kinney@gov.ab.ca	
Joan Simonton	Communications & Extension Coordinator	Ph: 780-865-8311 joan.simonton@gov.ab.ca	Objective Execution and Extension
Fran Hanington	Communications & Extension Assistant	Phone: 780-865-8330 fran.hanington@gov.ab.ca	Objective Execution and Support

The Communications and Extension program is looking to better understand where time and effort are being allocated. Similar to the GIS program, Communications and Extension has created an approximate time budget for 2009/2010. Time estimates for deliverables are proposed and may change as more is discovered about certain project requirements. The first year this has been done and it is anticipated that creating a time budget will not only help in work plan development but also work plan evaluation. The 2010/2011 Work Plan will also include Communications and Extension days required by each Program.

Table 4 – *Expected vs. Available Working Days*

Expected Days Required	Available Days	Expected days as a % of Available
458	573	(458/573) = 80%

"Available Days" takes the total number of work days and subtracts estimated holidays and sick days to get an estimated total number of work days available per year. This is a rough estimate as staffing resources are currently under evaluation. The number of available days reflects an increased Communications and Extension capacity. 20% of Communications and Extension's available days are allocated for unplanned projects and events.

9. Appendices

Appendix 1: Communications and Extension Steering Committee Signoff Sheet
Appendix 2: 2008 – 2009 Communications & Extension Midterm Term Progress Report
Appendix 3: Status of 2008 – 2009 Communications & Extension Deliverables

The following items have yet to be reviewed. Currently they reflect information found in the 2008/2009 Work Plan and the 2007-2012 Communications and Extension Strategy.

Appendix 4: Partnership Audience
Appendix 5: Knowledge Transfer Audience
Appendix 6: Informing Policy Audience
Appendix 7: Public Audiences
Appendix 8: Key Messages

Appendix 1: Communications and Extension Steering Committee Signoff Sheet

Member:	Organization:	Approval Signature:	Date:
Aaron Jones	West Fraser Mills Ltd, Hinton Wood Products		
Carolyn Duchoslav	Jasper National Park		
Dave Ealey	ASRD, Communications		
Glenn Taylor	Mayor, Town of Hinton		
Tom Archibald	General Manager, FRI		
Ken Snyder **acting for Rob Galon*	ASRD, Hinton Training Centre		

Appendix 2: 2008 – 2009 Communications & Extension Midterm Term Progress Report

Project Budget	Expended to September 30th, 2008
$290,768.18	$138,033.23

Notes:

- Interpretive Programs delivered in Jasper National Park. Parks Canada contracted to deliver the grizzly bear interpretive program.
- Fall newsletter completed and distributed, begin working on spring newsletter.
- E-notes – the FMF electronic newsletter - completed three issues.
- Annual Report completed and being distributed.
- Executive Series completed.
- Phase I of new website completed and website launched.
- Delivered communications and outreach programs.
- 5 year Communications and Knowledge Plan completed.
- Updated and distributed Quicknotes collection.
- Provided support to Natural Disturbance Short Course (2 completed).
- Involved in the Natural Resources Interpretive Park and Hinton's Communities in Bloom.
- Hosted and assisted in logistics for IMFN Global Forum.
- Assisted with organizing of workshops and tours.

Appendix 3: Detailed Status of 2008 – 2009 Communications & Extension Deliverables.

Partner Communications Objectives:	Deliverables:	Status:
In 2008/2009 distribute two newsletters to keep Foothills Research Institute programs, research and events at the forefront of the target audience's minds.	Hard and electronic copies of two Footnotes Newsletters.	Fall newsletter delivered, Spring newsletter being developed.
In 2008/2009 coordinate Foothills Research Institute participation and presentations at partners' meetings, events and lecture series.	Summary of presentations.	Summary will be completed at the end of 2008/2009.
By June 30, 2008 conduct a partner survey to evaluate Foothills Research Institute communications and knowledge transfer activities.	Partner Survey &Report that summarizes findings from the partner survey.	Hasn't been completed. Goal is to complete before spring workshop.
By September 30, 2008 distribute 2007/08 Annual Report.	Annual Report.	Being distributed.
In 2008/09 deliver tours to groups who will use FRI knowledge and tools in sustainable forest and resource management practice and policy.	Report summarizing tours.	Report will be completed at the end of 2008/2009.
By July 31, 2008 launch and maintain the new Foothills Research Institute website.	New Website	Working to sign off on long list of "to do" items. Site is soft launched.
In 2008/2009 implement a marketing plan for the new Foothills Research Institute website.	Marketing Plan	Not completed. May need to carry over as no budget allocated for marketing
On a quarterly basis, report the amount and nature of knowledge being transferred from the Foothills Research Institute web site outwards.	Website Statistics Report	Official statistics monitoring will begin once the site is hard launched.

Knowledge Transfer Objectives:	Deliverables:	Status:
By June 30, 2008 all Foothills Research Institute programs will have a communications and knowledge transfer plan.	C&E Plan for each FRI program & a table outlining deliverables for all FRI partners.	Not completed as of Dec 1st. Have since developed C&E planning resource to help programs create plans during this planning cycle.
In 2008/2009 provide support to workshops that transfer Foothills Research Institute knowledge and tools to partners and potential users.	Summary of evaluation forms from workshops.	Summary will be completed at the end of 2008/2009
In 2008/2009 deliver training to Program Leads and Foothills Research Institute staff on the basics of knowledge transfer.	PowerPoint Presentation.	A more comprehensive workshop is being planned for spring 2009. Survey to provide input into this.

Informing Policy Objectives:	Deliverables:	Status:
NO SPECIFIC OB JECTIVES LISTED	N/A	N/A

Communications, Outreach and Environmental Education Objectives:	Deliverables:	Status:
By September 1, 2008 a media plan will be developed and approved.	Plan and Articles from regional newspapers	Not completed. Should be a part of a larger practical marketing strategy.
During 2008/2009 there will be four public research forums within the west-central Alberta.	Summary of evaluation forms from research forums.	Confusion as to what this is, not enough detail. Nothing has been done.
In 2008/2009 Discovery Boxes will be available for use in public locations in Jasper, Hinton and Grande Cache.	Discovery boxes.	Joan to complete before fiscal year end.
In 2008/2009 continue partnering with the Palisades Stewardship Education Centre and Grande Yellowhead School Division to develop curriculum and deliver programs to Grande Yellowhead School Division students.	Report summarizing programs delivered at the Centre and curriculum developed.	Joan to provide report before fiscal year end. Partnership has continued to prove successful.
By December 31, 2008 develop a communications plan to communicate with the broader audience	Communications Plan.	Not clear on what plan this is. Nothing has been done.
During the summer of 2008 The grizzly bear interpretive program will be delivered six times in Jasper National Park.	Summary of attendance at and comments from Interpretive Programs.	Joan to provide before fiscal year end.
In 2008/2009 work with the Royal Alberta Museum to develop a new Discovery Box.	Discovery box.	Joan to complete before fiscal year end.

Appendix 4: Partnership Audience

The following information has yet to be reviewed. It can be found in the 2008/2009 Work Plan and the 2007-2012 Communications and Extension Strategy.

The Board wishes to expand the working and funding partnership of the Foothills Research Institute by engaging natural resource organizations, practitioners, senior policy makers and elected officials with an interest in, or responsibility for, natural resource management in Alberta. Their involvement and support will add resources and value to the science program of the Foothills Research Institute by improving the quality and quantity of applied research, as well as its timely delivery to users awaiting it. Among the potential clients for this service are:

- Government Departments – Provincial and Federal
- Community groups
- Industry co-operators
- Municipalities
- Research organizations
- Non-government organizations

Appendix 5: Knowledge Transfer Audience

The following information has yet to be reviewed. It can be found in the 2008/2009 Work Plan and the 2007-2012 Communications and Extension Strategy.

The target audience for knowledge transfer is forest and natural resource practitioners involved with forest and land management planning, e.g. foresters, biologists, GIS specialists, technologists. The C&E Program will work with Program Leads to get them the information and tools they need from the Foothills Research Institute research program.

These practitioners are working in such agencies as:

- Foothills Research Institute sponsoring partners Alberta Sustainable Resource Development, Canadian Natural Resources Ltd., ConocoPhillips Ltd., EnCana Corporation, Jasper National Park, Petro-Canada, Talisman Energy Inc., and West Fraser Mills Limited, Hinton Wood Products.
- Foothills Research Institute forestry partners.
- Foothills Research Institute oil and gas partners.
- Forest management agreement holders in Alberta
- Oil and gas companies and consultants exploring or developing along Alberta's east slopes.
- Provincial government ministries involved in land, resource and community planning and management along Alberta's east slopes including:
    - Aboriginal Relations,
    - Agriculture and Rural Development,
    - Energy,
    - Environment,
    - Sustainable Resource Development,
    - Tourism, Parks and Recreation.
- Federal government departments and agencies with an interest in land and resource planning and management including:
    - Department of Fisheries and Oceans,
    - Natural Resources Canada – Canadian Forest Service,
    - Environment Canada,
    - Industry Canada,
    - National Round Table on the Environment and Economy,
    - Parks Canada
- Canadian Model Forest Network and its partners.
- Forest Communities Program network and its partners
- Leading researchers and academia
- Technical associations, e.g. Mixedwood Management Association, Foothills Growth and Yield Association

Appendix 6: Informing Policy Audience

The following information has yet to be reviewed. It can be found in the 2008/2009 Work Plan and the 2007-2012 Communications and Extension Strategy.

Throughout Phase III of the Model Forest Program, the Foothills Research Institute made an organized effort to communicate with key decision-makers including elected officials, science and technology policy makers, as well as senior management of government and industry. The Foothills Research Institute Board of Directors as well as the General Manager have been instrumental in developing and delivering the communications and extension program to this audience, and will continue to do so, with the support of the Communications and Extension Program Manager in the 2007-12 Business Plan period.

The objectives of communication with policy makers are to:

- Raise awareness of the Foothills Research Institute Program and its relevance to the interests and needs of these policy makers
- Demonstrate the organization's value to secure ongoing and long-term financial support;
- Transfer knowledge to support science-based policy.

This audience will continue to evolve over time, but at present – not prioritized - it is seen to include:

- Provincial Ministers, Deputy Minister, Assistant Deputy Minister and directors of Provincial government ministries involved in land and resource planning and management along Alberta's east slopes including:
    - Aboriginal Relations,
    - Agriculture and Rural Development,
    - Energy,
    - Environment,
    - Sustainable Resource Development,
    - Tourism, Parks and Recreation.
- Cabinet Policy Committee on Resources and the Environment
- Senior executives from forestry and oil and gas sector.
- Federal Minister, Deputy Minister, Assistant Deputy Minister and senior bureaucrats from:
    - Department of Fisheries and Oceans,
    - Natural Resources Canada – Canadian Forest Service,
    - Environment Canada,
    - Industry Canada,
    - National Round Table on the Environment and Economy,
    - Parks Canada
- Special task forces such as the Canadian Council of Forest Ministers, Climate Change Central, Roundtable on the Economy and the Environment
- Science and technology groups such as Alberta Forest Research Institute and Sustainable Forest Management Network Centers of Excellence.
- Industry associations including Alberta Forest Products Association; FPInnovations (FERIC Division, Forintek Division); Forest Products Association of Canada (FPAC); Council of Forest Industries; Forest Alliance of British Columbia; Canadian Institute of Forestry; Canadian Association of Petroleum Producers.
- ENGOs such as the World Wildlife Fund

Appendix 7: Public Audiences

The following information has yet to be reviewed. It can be found in the 2008/2009 Work Plan and the 2007-2012 Communications and Extension Strategy.

Regional Public:

The core funding for the Communications and Extension Program at the Foothills Research Institute is primarily for the communications effort to various audiences. Some funding supports work to generate funds for extension activities, but these funds should be contained within the respective budgets of the other Foothills Research Institute Programs. In 2008/2009 the Foothills Research Institute will focus its public communications efforts at the regional audience which includes residents of Jasper, Hinton, Grande Cache, Edson and Yellowhead County.

The target audience for this group is listed below but it is not exhaustive or prioritized:

- Grande Yellowhead School Division and the separate school division educators.
- Grande Yellowhead School Division and the separate division school children.
- Public Advisory Groups and Public Involvement Groups.
- Regional media.
- Residents of Jasper, Hinton, Grande Cache, Edson and Yellowhead County.

Provincial Public:

In 2008/2009 a strategy to communicate with a broader audience will be developed in collaboration with the Board of Directors. However, there are existing initiatives that target this audience group. The audience group for the provincial public and beyond includes:

- Edmonton and area public who are interested in land and resource management issues, for example visitors of the Wild Alberta exhibit at the Royal Alberta Museum.
- Visitors to Jasper National Park.
- Employees and contractors of Foothills Research Institute partners.

Appendix 8: Key Messages

The following information has yet to be reviewed. It can be found in the 2008/2009 Work Plan and the 2007-2012 Communications and Extension Strategy.

During the 2007-2012 Business Plan, the Foothills Research Institute Communications and Extension Program's priority is on building awareness and support for the Foothills Research Institute program, and facilitating and encouraging the application of Foothills Research Institute research in policy and practice. Success in these endeavours will bring attention to the Foothills Research Institute's impressive program, thereby attracting more support for the program and more take-up of its products. Further, it supports an impressive story to present to the public at various levels. The following key messages, built around the Values of the Foothills Research Institute, will be communicated throughout the 2007- 2012 Business Plan.

Healthy Landscapes, Sustainability and Stewardship

- The Foothills Research Institute is providing the scientific basis for sustainable resource management and environmental stewardship at all levels from the forest stand to the landscape level
- This research is well regarded, and is reflected in improved practices and policies that encourage and support these new approaches

Community

- The Foothills Research Institute research program examines issues of importance to the well-being and sustainability of resource-based communities, and is responsive to the needs of these communities

Working and Engaged Partnerships

- Foothills Research Institute is a research organization consisting of partners from industry (coal, oil and gas, forestry), government (federal, provincial and municipal) and resource-based communities working towards a sustainable future.
- Partners at all levels provide funding and input to the research program of the Foothills Research Institute.
- Foothills Research Institute partnerships are a true example of synergy. Working together and pooling resources and expertise minimizes overlap and duplication and is more effective than expending the same efforts and resources in individual efforts.

A Focus on Sound and Leading Science

- The Foothills Research Institute is undertaking research and developing tools to advance sustainable forest management within and beyond the Foothills Research Institute land base.
- The Foothills Research Institute maintains a very low administration overhead to maximize the use of scarce dollars to the research and extension program.
- Foothills Research Institute research is directed by the needs of, and is developed in consultation with, land and resource managers. Applied research focuses on practical research that gives natural resource managers an expanded and improved toolkit to improve stewardship of natural resources, managing them for long-term sustainability. The program addresses real and current, as well as future, land use issues in a coordinated and cross-jurisdictional manner.
- The Foothills Research Institute conducts sound science which is peer-reviewed and published.
- Many Foothills Research Institute research programs are world-class and provide a strong scientific foundation upon which to develop extension activities, tools and technologies used in land and resource management.
- Foothills Research Institute has volumes of research findings about the ecological, economic and social values of the Foothills Research Institute.
- Current research findings.

Demonstration and Application of Research

- The Foothills Research Institute is participating in demonstration projects that apply information and tools to test their effectiveness at maintaining the ecological, economic and social values of a forest landscape
- The Foothills Research Institute research program supports the development of knowledge, planning tools and technology to improved natural resource management
- An active program of knowledge and technology transfer through the Extension Program is bringing this information and products to the attention of those that need them, and is providing the training needed to facilitate their application.

Foothills Research Institute Annual Work Plan 2009 - 2010

401 Administration and Program Support

1. Prepared by

Tom Archibald, General Manager
Foothills Research Institute
Box 6330 Hinton, AB T7V 1X6
Ph:(780) 865-8332 Fax (780) 865-8331
Email: Tom.Archibald@gov.ab.ca

2. Sign off Sheet

The General Manager reports directly to the president and FRI Board of Directors. The group that plays the direct role at this time is the Executive Committee and the sign off will come at their review and in conjunction with the approval and allocation of funds to all program areas for 2009-2010.

3. Executive Summary

The Administration Program provides support to Directors, ensures financial control and adherence to accepted accounting practices, and provides initial contact and coordination to outside interests. The objectives on the following page will ensure that these goals are met.

4. Background Information

The General Manager carries out the administration of the Foothills Research Institute with support from a part time administrative assistant, a part time clerical and a full time accountant. This team ensures accurate records are kept of Board meetings and direction, financial accountability is maintained for all FRI activities, and documents are managed responsibly. The General Manager is also, the link to the Canadian Model Forest network and strives to maintain viable partnerships and is constantly seeking new partners towards the development of the 2007 – 2012 business strategy.

5. Objectives

The following are the Objectives for the Administration and Program Support for 2009 –2010:

1. To have a FRI completed work plan for Board approval by February 19, 2009.
2. To ensure a successful audit of financial records is completed by June 15, 2009.
3. To seek Board approval for 4 permanent Board Meeting dates for the work plan period.
4. To complete a physical inventory of the FRI equipment and materials - underway.
5. To ensure complete financial records are maintained on a real time basis.
6. To maintain a direct link to the Canadian Model Forest Network and International Model Forest Network.
7. Continue to work with Program Leads in the development and implementation of an integration strategy.
8. Review and update all FRI Policies and Procedures during 2009/2010 Work Plan.
9. Review and finalize a staffing structure and organization chart for FRI that will include Administration, Communications and GIS options to present to the Executive and Board.

6. Objectives and Deliverables for Communications and Extension

The Foothills Research Institute recently hired a Communications and Extension Program Lead to fulfill the goals and objectives of FRI's communications and extension needs.

7. Inter Program Links

The Administration of the Foothills Research Institute will work with all program areas and ensure that all programs and projects under the name of the Foothills Research Institute follow the policies and procedures of FRI. Through management of the respective work plans the General Manager will work towards integration and collaboration between program areas.

8. Funding sources for this period

The total budget for Administration for 2009 – 2010 is $290,000.

(Administration 401)

Contributing Organization (Incl. Requested from FRI)	Carry Forward	Cash Committed	Total Confirmed Funding	In-kind Support	Comments (including in-kind descriptions)
SRD	Est. 90,000	28,000	118,000		Carry forward is for a Coordinator position
FRI		172,000	172,000		
Totals	$ 90,000	$200,000	$290,000		

9. Program/Project Key Members and Responsibilities

Tom Archibald: General Manager responsible for the day-to-day operations of the FRI and reports to the Board through the President.

Denise Lebel: Accountant responsible for financial recording and reporting. Reports to the General Manager and supports all program areas.

Judy Astalos: Administrative Assistant responsible for records management, support to the General Manager and Accountant, and secretary to the Board.

10. Environmental/Occupational Health and Safety

The Foothills Research Institute tested a call in service for summer field operations which was a success. Programs will be encouraged to continue this service which will be use pay.

FRI will initiate a Join Worksite Health Committee during this fiscal year which will include representation from management, field, technical and administrative staff. A Terms of Reference and Safety Plan for the Foothills Research Institute will be completed as well as a commitment to hold a minimum of 4 safety meetings annually.

11. Appendices *(mid term and year end reports, references, review information publications, business case)*

Foothills Research Institute Annual Work Plan 2009 – 2010

612 – Adaptive Forest Management/ History

1. Prepared by

Robert Udell, Program Lead, Adaptive Forest Management and History
384 Collinge Road, Hinton, AB T7V 1L2
Ph: 780-865-4532 Fax: 780-865-8331
Email: udellconsulting@shaw.ca

2. Sign off Sheet

Program Lead: Bob Udell _____

Peter Murphy: _____
Consultant and Author

Robert Stevenson: _____
Archivist, Photographer, Author

Bruce Mayer: _____
Forest History Association of Alberta /Alberta Sustainable Resource Development

Tom Archibald _____
General Manager, Foothills Research Institute

3. Executive Summary

Four new projects and one carry over project are proposed for 2009/10 with a total budget of $127,000.
The AFM/History program has been supported for the past two years by a $45,000 grant from Alberta Sustainable Resource Development, as well as other granting agencies and the proceeds from book sales. This year, projected cost savings from the various projects are projected to be $25,500, and funds carried forward to complete the EcoTour project are forecast to be $65,000. If the AFM/History program is again supported by an SRD grant, we would request $36,500.

General Administration:
Meetings, travel and program administration
Proposed Budget $5,000

Project One: Ecotour of the Highway 16 Corridor Hinton – Tete Jaune Cache; Jasper-Lake Louise

This project carries over from 2008/09 in order to complete the text and photography in the spring of 2009 following leaf-up, publish the booklet and develop the GPS guide that complements it.

This blend of interpretation with technology and communications holds considerable potential for the Communications and Extension program of the Model Forest and many of the program areas.
It is supported by a $45,000 grant from Alberta Sustainable Resource Development (2008) and $25,000 from the Community Initiatives Program (2008)
Proposed Budget: $65,000 – carried forward from 2008/09

Project Two: A 50-Year History of Silviculture on the Hinton FMA

In 2000, consultant Lorne Brace produced a preliminary report on the history of Silviculture on the Hinton FMA. This will be updated to include more recent developments in the advancement of the silviculture program, as well as the inclusion

of graphs and images. Proposal is to publish the report as an FRI publication, perhaps including copy from the earlier FRI report – "50 Years of Harvest and Reforestation".
Project Lead/Author: Bob Udell
Advisor: Diane Renaud, Silviculture Dept. Hinton Wood Products
Proposed Budget: $40,000 - to be covered by the annual SRD Grant, if renewed with the balance from carryover funds from 2008/09.

Project Three: A Logging History of the Whirlpool River

A study of the unique history of the Whirlpool River valley, and its links to the history of Aboriginal people in the area, the development of the fur trade, and the early development of Jasper National Park. Project Lead/Author: Peter Murphy
Proposed Budget: $5,000

Project Four: Milton and Cheadle Revisited (working title)_

This will be an adaptation of a 2007 report by British historian Brian W. Long, who visited Canada in 2007 to retrace the footsteps of Lord Milton and Dr. Cheadle on their expedition of 1862 and 1863. His report sheds new insight into the expedition and provides a context that was not available to the authors of A Hard Road to Travel when they described the expedition. Project is pending permission from Brian Long.
Project Lead: Peter Murphy
Author: Brian Long
Proposed Budget: $5,000

Project Five: History Database

In 2008, FRI established a database for historical information and reports. In 2009 materials and interviews from the AFM/History program will be stored in the database.
Project Lead: Bob Udell
Proposed Budget: $4,000

4. Background Information

a. Linkages to the Foothills Research Institute Business Plan 2007-2012

The 2009/10 workplan for the Adaptive Forest Management/ History Program is situated within the Landscape Dynamics Program Theme of the 2007-12 Business Strategy. It is firmly aligned with the Goals of the Research Institute as described in the Business Strategy, as follows:

FRI Goal One:
Build a community of diverse and active partners who are working in or are concerned about natural resource management

The AFM/History program core team works on programs and projects within the Research Institute, and this team includes Bob Udell, Peter Murphy, Bob Stevenson, Bruce Mayer, and Tom Archibald. Other collaborators participate on a project basis. Partners involved in the program have included West Fraser Timber Mills Ltd., the University of Alberta, the Forest History Society of Durham, N.C., Alberta Sustainable Resource Development, Hinton Historical Tracks and Trails Society, Jasper National Park, the Forest History Association of Alberta and the Forest Resource Improvement Association of Alberta.

In 2009/10 the partnership involved in the program will include the Hinton Tracks and Trails Historical Society, the Forest History Association of Alberta, Jasper National Park and Alberta Sustainable Resource Development.

FRI Goal Two:
Identify natural resource management issues at the landscape level that are common to our partnership, recognizing the necessity of integrated resource management

The AFM/ History program supports this goal by examining the policies issues that have characterized our past, to provide a factual context for current and future decisions and actions. This is particularly germane to the other programs in Landscape Dynamics as well as to FRI's land and resource management partnership.

FRI Goal Three:
Provide science-based tools and knowledge that is understandable and available to natural resource managers, policy makers and the public

Several AFM/History reports examine the science and practice of forestry and some of them have supported thesis projects for post-graduate degrees, and are also used as reference documents in university programs.

FRI Goal Four:
Broadly disseminate our knowledge

The AFM/History Program contributes to the Communications Program of the Research Institute by providing information to support that program – including participation in Research Institute forums and events, and providing information for the newsletter and other products. AFM/History Program products have been widely used by the shareholders of the Research Institute in their own communications and extension work.

A Hard Road to Travel is currently available in local shops in Hinton and Jasper, as well as at Greenwoods and Audreys and the University of Alberta bookstores in Edmonton, Chapters in St. Albert. Through reading this book, people well removed from the Hinton area are learning of our history and the role of the Research Institute in preserving and learning from it.

Mountain Trails will also be made available for sale at various shops within and outside the region, and it is expected that the Eco Tour projects will have a very positive response and uptake by travellers and residents alike with an interest in this region.

b. History of the AFM/History Program

In 1996, Weldwood initiated a history and case study of its sustainable forest management program at Hinton, setting this whole Program in motion. Since then, seven reports have been produced, including three books. See Appendix 2 – Overview of the AFM/History Program.

c. 2008/09 Project Status

#	Title	Description	Status
1	Mountain Trails	Book – the memoir of Jack Glen, DFB/AFS Ranger at Entrance 1920-1945 Supported by ASRD, FRIAA, FHAA	Complete Dec. 2008
2.	Ecotour	Ecotour of Hwy 16 to Tete Jaune Cache; Hwy 93 to Lake Louise – Paper and GPS based Supported by ASRD, Community Initiatives Program	Underway Carry Over to 2009/10
3.	DVD	History Plenary at CIF/ SAF 2004 AGM in Edmonton, AB Supported by FHAA	Underway Completion Planned January 2009
4.	The Last Patrol	Harry Edgecombe's 1982 Willmore Wilderness Patrol Report with Introduction by P.J. Murphy Supported by FHAA	Not begun Completion planned February 2009
5.	Historical Database	Establish a database in FRI to store forest history – related data and information – interviews, other records, photos, etc.	Underway Completion of Database design planned February 2009

d. New and Continuing - 2009/10

#	Title	Description	Notes
A. Carry Over Projects from 2008/09			
1	Ecotour $65,000	Ecotour of Hwy 16 to Tete Jaune Cache; Hwy 93 to Lake Louise – Paper and GPS based Supported by ASRD, Community Initiatives Program	Hwy 93 corridor is added as well as some shorter side trips to ensure FRI landbase is better represented. Additional detail and expanded scope resulted in a 2-year project.
New Projects 2009/10			
2.	History of Silviculture Brace and Udell $40,000	Detailed history of the development of the silviculture program on the Hinton FMA from 1955 to 2005.	Original report by Lorne Brace to be updated with new information to 2005, and incorporating other material from other reports in a publication for distribution.
3.	The Whirlpool River Story Murphy and Peterson $5,000	A study of the unique history of the Whirlpool River valley, and its links to the history of Aboriginal people in the area, the development of the fur trade, and the early development of Jasper National Park.	Peter Murphy and Tom Peterson with assistance from Debbie Mucha and the GIS group
4.	Milton and Cheadle Revisited Murphy and Peterson B.W. Long $2,000	A commentary on the Milton and Cheadle expedition of 1862 and 1863	Provides an historical as well as present-day context for a fascinating expedition described in A Hard Road to Travel – Project is pending discussion and permissions from Brian Long, the author
5.	Historical Database $4,000	Place Information in the Historical Database	In 2009 materials and interviews from the AFM/History program will be archived in the database.

5. Objectives

Project One: Ecotour of the Highway 16 and 93 Corridors

Target Date – March 2010

a. Knowledge Creation

- Produce an interpretive guide – TransCanada Ecotour for the highway 16 and 93 corridors including side trips encompassing FRI research. The resulting product will encapsulate not only the interesting ecological and historical highlights of the trip, but also selected projects and programs of the research institute and its partners
- Adapt this guide to a GPS-based program with voice over and images, possibly video to enhance the interpretation.

b. Knowledge and Tech Transfer

- Use of GPS-based technology to enhance interpretation has potential application in a number of fields, as well as FRI's own communications and extension programming.

c. Policy Support and Demonstration

- The interpretive program will highlight the work of the model forest along the corridors and can easily be adapted to other corridors within the model forest.

Project Two: History of Silviculture on the Hinton Forest

Target Date – March 2010

a. Knowledge Creation
   - The original history draft, written by Lorne Brace in 2000, provided much insight into the antecedents of today's silviculture programs not only at Hinton, but also as they have influenced subsequent programs across Alberta.

b. Knowledge and Tech Transfer
   - Provides insight into the scientific foundation as well as the adaptive management philosophy that led to so many early advances in silviculture

c. Policy Support and Demonstration
   - Some insight into the development of silviculture on Alberta's first large-scale operation, and the manner in which silviculture and regulations have changed from 1955 to 2005 provides a context and perhaps some cause for both celebration and reflection on the evolution and current status of silvicultural planning and programming.

Project Three: The Whirlpool River Valley – From Major Transport Corridor to a Blip in History

Target Date – March 2010

a. Knowledge Creation
   - Prepare a history of the Whirlpool River Valley, a trade route of national historic value which now lies mostly forgotten, to help restore its rightful profile in this region.
   - Through researching the history of the valley, the authors have been able to re-establish the location of parts of the original trail used by Aboriginal people and fur traders as they climbed up and over "La Grande Traverse".

b. Knowledge and Tech Transfer
   - Provides insight into the evolution of policy and practices in Jasper National Park in the context of one river valley
   - Will be of value to Parks planners and cultural interpretations specialists in building the record of early use and management

c. Policy Support and Demonstration
   - The history of the Whirlpool is a microcosm of the history and management challenges of Jasper National Park itself – from early trade route to industrial development and exploitation to a challenge in ecological restoration.

Project Four: Milton and Cheadle Revisited

Target Date – March 2010

a. Knowledge Creation
   - Post to the website a 2007 report by British historian Brian W. Long in which he retraced the steps of Milton & Cheadle in their 1862 and 1863 Exploration of Canada. These adventurers were the second "tourists" through this region, following in the footsteps of the Earl of Southesk who passed through in 1859

b. Knowledge and Tech Transfer
   - This report fills in gaps that have puzzled historians on why someone from such a favoured position in society would abandon all luxuries to embark on a two year quest into the wilderness
   - It also provides insight into the historical context for the Milton and Cheadle expedition

c. Policy Support and Demonstration
   - N/A

Project Five: Historic Database
Target Date – March 2010

a. Knowledge Creation
   - The technical development of the database will be completed in 2008/09, and in 2009/10 the interviews and other materials collected in the course of the 1996-2008 AFM/history program will be loaded into the database.

b. Knowledge and Tech Transfer
   - This database, as it develops will be a first stop for scientists and others who are looking to provide a historical context for their reports
   - A repository and reference source for photo collections

c. Policy Support and Demonstration
   - Regulators may search the database for interviews and other information from Alberta forestry pioneers who established the foundations of today's regulatory framework.

6. Objectives and Deliverables for Communications and Extension

Objectives of the AFM/ History program are to:

a. Track and examine the issues and responses that have characterized our past, so that we may shape our future from this broader understanding
b. Seek out opportunities to broaden the understanding of our rich history of adaptive forest management and those people and organizations that have contributed to it.
c. Develop and maintain a record of forest history in the FRI landbase as well as elsewhere in Alberta

The following activities will take place in 2009/10, subject to approval and funding.

a. Continued marketing of "A Hard Road to Travel", along with marketing of the new book in the AFM/History series - Mountain Trails"
b. Development and marketing of an Eco Tour of the FRI landbase based on the two major highways going east-west to Tete Jaune Cache and north-south to Lake Louise, with side trips to Switzer Park, Cardinal Divide and Maligne Lake.
c. Adaptation of the interpretive guide into a GPS-based communications tool available for visitors as well as practitioners
d. Two "quicknotes" on the AFM/History Program
e. Maintenance of AFM reports on the model forest website
f. Place AFM/history materials into the Forest History database
g. Updates to the Board and participation in model forest forums as appropriate and requested.

7. Inter Program Links

a. All programs and Model Forest in general – Interpretive Guide to Yellowhead Corridor. Certain projects will be highlighted in the tour as well as the FRI program itself
b. Fisheries and Watershed – interpretive guide and technology can be adapted to the "Trout Highway" project
c. GIS – development of new technologies adapting GIS technology to GPS communications tools
d. FGYA – the members of FGYA are committed to examining the linkages between silvicultural strategies and growth and yield, this History of Silviculture will be of value

8. Funding sources for this period

As of November 2008, secured funding of $90,500 is in place. See Table 1.

The Adaptive Forest Management/ History program receives no direct funding from the Foothills Model Forest, but receives in-kind support in Administration and GIS. For 2009, we are requesting 7 days of GIS support per quarter to assist with Projects 1, 2, 3 and 5.

The AFM / History program has been supported by an annual grant from Alberta Sustainable Resource Development for the past two years and if the grant is renewed in 2009 the full program will go forward. Further, the program is supported by sales from its products, primarily A Hard Road to Travel, and now Mountain Trails. The Forest History Association of Alberta has also supported the program on a project-specific basis and will be approached again to support the 2009/10 program.

Project One: TransCanada Eco Tour of the Yellowhead Corridor and Icefield Highway.
The most comprehensive project this year is the completion of Ecotour of the major highway corridors in the FRI landbase. The paper copy will be somewhat delayed as the tour stops were not selected in time for photography, and much of the writing will be done this winter. In-kind support to this project is being provided by Fred Pollett the principal author, and local historian Tom Peterson who is an advisor to the project. Pete Murphy is also a reviewer and advisor to the project.
Upon completion of the publication, an adaptation in the form of a GPS-based tour will follow. The development of this technological resource will be of value for other FRI programs in their CE programs.
Proposed Budget in 2009/10: $65,000
The overall budget is $75,000 but part of that is being spent in 2008.

Project Two: A History of Silviculture on the Hinton Forest 1955-2005. In 1999, retired CFS forester Lorne Brace produced a draft report on this history covering the period up to 1998. A review by retired Chief Forest Jack Wright pointed out some errors in the report which will be examined and the report will also be updated to 2005, corresponding to the 50th anniversary of the establishment of the forest management program at Hinton. It will be enhanced with the addition of photos, tables and maps as well as with the incorporation of elements of the 2007 AFM Report #7 – 50 Years of Harvest and Reforestation on the Hinton FMA. Because this operation was the first large scale industry with full silvicultural responsibilities, the evolution of silviculture planning and practices is certainly significant to the story of Alberta's forest history as a whole.
To be published in hard copy.
Proposed budget $40,000

Project Three: Logging on the Whirlpool River is a project that Pete Murphy and Tom Peterson have begun work on in 2008. The Columbia and York Factory Expresses used this route for about 40 years as the main transCanada mail and commerce route in the 1800s, and the logging that followed in the early 20th century appears to have used the old trail for tie points. Murphy and Peterson have been researching the history of the logging and its relevance to the evolution of Parks policy in Jasper.
Proposed budget $5,000.

Project Four: Milton and Cheadle Revisited. In 2007 Brian Long, a British historian traced the route of Lord Milton and Dr. Cheadle from Fort Edmonton to Victoria. His resulting report was written from the perspective of one acquainted with the story from a British perspective, living very close to the ancestral family seat Milton Hall, and acquainted with the current family members. It sheds new insights and hitherto unknown detail about the journey and would be a useful supplement to the A Hard Road to Travel book. Some editing and clarification will be needed, this will be done by Pete Murphy. To be posted on the FRI website, provided Long agrees and permissions for illustration can be achieved.
Proposed Budget: $2,000

Project Five: Historical Database is an adaptation of the Aboriginal Database to serve as the repository archival information collected for the AFM/History program since its inception in 1996. The database design will be completed in 2008/09. In 2009/10, the interviews conducted for earlier projects of the AFM/History program will be added to the database, along with photo collections from various contributors.
Proposed Budget $4,000.

9. Program/Project Key Members and Responsibilities

Key team members involved in the various projects are listed below, along with their responsibilities

Project/ Key Member	Responsibility
1. EcoTour	
Bob Udell	Project Lead: Oversee completion of Ecotour product,
780-865-4532	Develop GPS based product
Fred Pollett	Lead Author EcoTour: Complete site selection, writing,
613-592-0977	map identification and imagery selection
Peter Murphy	Advisor and Reviewer
780-459-1176	
Tom Peterson	Hinton Tracks and Trails Historical Society:
780-865-7340	Advisor and Reviewer
Ken Walker	Parks Canada: Advisor and Reviewer
780-852-6190	
Bob Stevenson	Imagery
780-922-2540	
GIS Group	Map Products
2. History of Silviculture	
Bob Udell	Project Lead: Update Brace Report to 2005, taking into account external reviewer comments and incorporating tables, graphs and other material. Oversee editing and design work, publishing and printing
Peter Murphy	Reviewer and advisor
Diane Renaud	West Fraser Advisory: Provided updated data and imagery, review text
780-865-8139	
Bob Stevenson	Imagery
GIS Group	Map Products
3. Logging on the Whirlpool River	
Peter Murphy	Project Lead
Tom Peterson	Co-Author
GIS Group	Map Products
4. Milton and Cheadle Revisited	
Peter Murphy	Project Lead
Brian Long	Author
Tom Peterson	Local historian
GIS Group	Map Products
5. Historical Database	
Bob Udell	Project Lead
Peter Murphy	Interviews
GIS Group	Database Design

10. Environmental/Occupational Health and Safety/Permits

Not Required

11. Appendices

Appendix 1: Mid-Term Progress Report 2008
Appendix 2: The Adaptive Forest Management/ History Program – Updated November 2008

Table 1
Adaptive Forest Management/History Program
Proposed Budget 2009/10

Adaptive Forest Management/History Budget code: 612

Project	Contributing Organization[1]	Total Proposed Budget	Carry Forward from 07/08[2]	Other Cash Committed	Total Confirmed Funding	In-Kind Support[3]	Comments Including In-Kind Support Description
612.2 Project 1: Ecotour of Yellowhead Corridor	SRD Grant CIP Grant	65,000	65,000		65,000	30,000	Supported by 2008 SRD Grant $45,000 And CIP Grant 2008 $25,000 Funds carried over from 2008/09 InKind: GIS 7 days @$500 - $ 3,500 Writing F. Pollett - $20,000 Reviewing P. Murphy etc.$ 7,000
612.3 Project 2: History of Silviculture	FRI SRD	40,000	9,500		3,500	5,000	Funds carried over from 2008/09 (estimate) In Kind: D. Renaud, P. Murphy Review, GIS support - $5,000
612.0 Project 3: Logging The Whirlpool River		5,000	5,000		5,000	3,500	In Kind GIS: 7 Days @$500 - $3500
612.0 Project 4: Milton and Cheadle Revisited		2,000	2,000		2,000		In Kind: we will request reviews from Alberta historians
612.0 Project 5: Historical Database		4,000	4,000		4,000	3,500	Gathering interviews and data to load into the database GIS in kind -$3,500
612.0 General Administration		5,000	5,000		5,000	5,000	Admin Charges FRI – Server, copier, etc. Meetings and presentations
Totals		121,000	90,500		90,500	25,300	

[1] Contributing organization is a confirmed source of funds as reported in Column 6- total confirmed funding
[2] Carry over from EcoTour ($65,000), book sales, cost savings from 2008/09 projects ($25,500)
[3] Project time donated by program partners and GIS support of 28 days ($12,600)

Appendix 1: Mid-Term Progress Report AFM/History 2008/09

612 – Adaptive Forest Management			
Project	Project Budget/ Source	Expended to August 30	Notes
Project 1: Mountain Trails 612.1	FRIAA: $40,900 FHAA: $5,000 Other: $19,294 Total $65,194	$6,499	► Project is carried forward from 2007/08 ► Is the memoir of Jack Glen, DFB/AFS ranger at Entrance from 1920 to 1942. Draft is completed and funding requests for publication are going out. ► 2000 Softcover, 300 hardcover planned All work complete except final proof and printing
Project 2: Ecotour of Hwy 16 to Tete Jaune Cache 612.2	SRD: $45,000 AB Lottery fund: $25,000 Other: $5,000 Total: $75,000	$4,497	► Consultant engaged to prepare Ecotour ► First field visit complete, writing underway ► Project will carry forward to 2009/10 with book completion and printing ► In 2009, second phase of project will develop a GPS guide for the route
Project 3: DVD – The Roots of the Present are Buried in the past – CIF/SAF History Forum 2004 612.0	FHAA: $1,500 Other: $6,800 Total: $8,300		► Design work is begun ► Quotes being gathered for production of 2-3000 CDs
Project 4: Last Patrol – A former AFS Ranger returns to his Roots 612.0	FHAA: $1,500 Other: $3,500 Total: $5,000		► Harry Edgecombe's report is on hand ► Family has donated his photos ► Other work yet to begin
Project 5: Historical Database 612.0	Total: $5,000		► Project has begun by GIS staff at FRI
General Administration and Contingency 612.0	$8,966	$1,424	► Meetings, presentations etc.
612.0 Summary and Subtotal	$27,266	$745	► Three projects and admin all in one code
Total 2008/09	$167,,460	$8,501	► Includes $65,194 carried over from 2007/08 for Mountain Trails project

Appendix 2. Overview of the AFM/History Program

"By Understanding our Past,
We Shape our Future"
Motto of Forest History Society

The Foothills Research Institute Adaptive Forest Management/ History Program
November 2008
Program Lead – Bob Udell

Background

The Adaptive Forest Management/ History Program at Foothills Research Institute has its roots in a 1995 speech by Bob Udell -*Building AAC on a Tenured FMA* - at the Grande Prairie Forestry Show. At the conclusion of the speech, Prof. Les Reed of UBC recommended that the remarkable legacy of forest management at the Hinton Forest should be documented. In 1996, Weldwood responded with a project to record the natural and management history of its Hinton Forest, with Pete Murphy and Bob Udell as lead authors and Bob Stevenson as photo historian. At the suggestion of Foothills Model Forest board member Dennis Quintilio, the project was expanded to add more reports and to encompass the entire model-forest land base.

Current Status

To date, the program has produced a seven-volume series of reports covering all aspects of sustainable forest management, drawing on the history of the model-forest land base. Partners involved in the program in 2008 include the Forest History Association of Alberta, Hinton Historical Tracks and Trails Society, Alberta Sustainable Resource Development and the Forest Resource Improvement Association of Alberta.

Four of the existing reports are on the Research Institute website, and three are published. A new book in 2008 Mountain Trails provides a personal insight into the roots of today's land management policies that should be of high interest to current and former employees of Alberta Sustainable Resource Development, forest practitioners and the general public interested in the life and times of early Albertans.

The program also sponsored a 1999 repeat photography project of M.P. Bridgland's 1915 photographic survey of Jasper National Park, which has been widely used by historians and geographer, and provided information in support of Ian MacLaren's new book "Culturing Wilderness". The success of this project encouraged another Bridgland repeat project in Waterton Lakes and another proposal is being developed for the Upper Red Deer area. FMF also produced a comprehensive series of maps to support the various reports in the series.

Publications to Date

The Development of Adaptive Management in the Protected Areas of the Foothills Model Forest -
by Michael den Otter.
November, 2000 – Research Institute Website

In 1999, the model forest supported Michael den Otter in his Masters thesis for Dr. Marty Lukert at the University of Alberta. Pete Murphy served on the supervision committee and Bob Udell was a liaison link to the FMF. Den Otter examined the evolution of adaptive forest management in the parks and protected areas of the Foothills Model Forest, and upon completion of his thesis, he adapted it for publication. His report dealt with Jasper National Park, Switzer Provincial Park and Willmore Wilderness Park, and the evolution of adaptive management within each managing agency. To support this study, a map series showing the boundary changes of Jasper and Willmore Parks was produced. These were also used and adapted for later reports by the program.

The Evolution of the Forest Management Agreements
by Dr. P.J.Murphy and Dr. M.K. Luckert
January, 2002 – Research Institute Website

Eric Huestis and Reg Loomis of the Alberta Forest Service envisaged the concept of forest management agreements as early as 1949, and the Hinton operation was the first in Alberta to capitalize on this opportunity. Over time, the agreement has evolved and changed reflecting the changing view of society and our regulators on how forests should be managed and what the appropriate rights and responsibilities of tenure holders should be. Using a common set of criteria for comparison, the authors examine this evolution using the series of forest management agreements and amendments from 1952 to 1995.

The Hinton Forest: A Case Study in Adaptive Forest Management 1955-2000
by P.J.Murphy, R.W.Udell, R.E. Stevenson.
Research Institute Website: 2002

This report is a comprehensive review of the forest management program at Hinton from its beginnings in 1955 to the 1999 forest management plan. The evolution of forest management from sustained yield to sustainable forest management of all values inherent in the forest is described through the comparison of planning, practice and adaptation from a wide range of perspectives - inventory, silviculture, multiple values and uses, protection, research, harvesting, and the planning and management cycle for sustainable forest management.

Learning from the Forest: The Evolution of Adaptive Management at Hinton, Alberta
by R.D.Bott, P.J.Murphy, R.W.Udell and R.E. Stevenson
Published by: Fifth House. 2003

This book draws upon previous publications in the series to examine the antecedents, scientific basis for and the evolution of the forest management program on the West Fraser Hinton Forest. The Foreword by Prof. Gordon Baskerville recommends it as required reading in any forestry program, and it has been well received across the country. The book provides an in depth discussion of the range of forestry practices from inventory, silviculture, multiple values and uses, protection, research, harvesting, and the planning and management cycle for sustainable forest management. It describes how foresters of industry and government collaborated to develop a forestry program not by creating rule books or codes of practice but by developing broad goals and objectives and allowing the company to establish a program that met agreed-to outcomes.

It includes an extensive discussion about the evolution of Foothills Model Forest research and knowledge and how this science is included in West Fraser's sustainable forest management program at Hinton. In the recent campaigns of ENGO organizations against West Fraser's SFM program at Hinton the book has provided high value to the company in explaining to customers and the public the history, the science, the stewardship ethic and the legacy of the forest management program at Hinton.

A Hard Road to Travel
by P.J. Murphy, with R.W. Udell, Tom Peterson and R.E. Stevenson.
Published by: Foothills Model Forest and The Forest History Society. 2007

This book is an in-depth look at the remarkable human and ecological history of west central Alberta from prehistoric times to the arrival of large-scale industrial forest management in 1955. The authors combed a number of

archives and museums to come up with over 150 photos to illustrate the book. Through examination of a number of historical records a series of 28 maps, most original for this book, supplement the text. Historian Tom Peterson joined the team to provide advice on the broad and colourful history of exploration and development from aboriginal times to the present in the area.

The Forest History Society of Durham N.C. was a partner in the project, providing a distribution and awareness capability unavailable to the Model Forest. They are also supervised the design work for the book. Pete Murphy and Tom Peterson developed a PowerPoint presentation about the Athabasca Pass, which served as the portal on the Trans-Canada overland route between Hudson Bay and the Pacific at the mouth of the Columbia for over 40 years after David Thompson's discovery in 1811. This 4000 km and 3-3 ½ month route became known as the Hudson's Bay Express with two brigades per year passing through the FMF area. The talk draws on historical material collected in connection with the *Hard Road* book, and was useed in support of the David Thompson Bi-Centennial celebrations.

The Resilient Forest: After the Stumps
A 35 Year Retrospective on a 1970s Environmental Campaign
By Bob Stevenson, Steve Ferdinand and Bob Udell
Published by: Foothills Model Forest. 2007

In 1971, the environmental organization Save Tomorrow – Oppose Pollution –(STOP) - commissioned one of its members, Arnim Zimmer, to visit North Western Pulp and Power's Hinton forestry operations and examine environmental and forestry practices there. His 1972 report, the pictures it contained and his presentation to the Minister of Forestry, Lands and Wildlife caused a flurry of activity and negative publicity in the media at the time. Consternation over this report provoked the AFS to dispatch Silviculture Program Manager Dr. Kare Hellum to locate every site identified in Zimmer's damning report and investigate his assertions of environmental degradation, deforestation and wasteful practices. This report effectively refuted most if not all of Zimmer's assertions but good news is never as popular as bad and the negative seeds planted in the public's mind lingered.

In 1997, Weldwood supported a re-photography project by Steve Ferdinand and Bob Stevenson who found all of the blocks and sites reported by Zimmer and took new pictures of them as close as possible to the original photopoints. This presented some line-of-sight problems, as young reforested stands up to 10 metres in height blocked the view from many of the original points and the authors had to use helicopters to capture the perspective. Subsequently, the Company conducted an ecological assessment of the sites to examine the soil conditions, reforestation status and growth performance of the stands.

In 2006 these sites were again visited, with ground photopoints established and new photography from the ground and aerial perspective.

50 Years of Harvest and Reforestation
- A Historical Photo Review of the Hinton Forest Management Agreement Area
By Bob Udell, 2007

This report is a pictorial and historical record through time of harvest areas on West Fraser's Hinton Forest Management Area. Drawing upon his own records as well as the archival records of West Fraser and others collected through the Foothills Research Institute's Adaptive Forest Management and History Program, the author selected 36 blocks from the 1950s to the 1990s for rephotography.

A continuing pictorial record is thus established, along with a discussion of significant and interesting events associated with the times as well as represented by the blocks themselves.

Most of the blocks, with the exception of some aerial and landscape images, were visited on the ground and photopoints established with GPS coordinates recorded for future retrospectives.

Mountain Trails (new, 2008)
By Jack Glen, 1969
Adapted by Rob Mueller, Bob Udell, Pete Murphy, Bob Stevenson
Published 2008 by Foothills Research Institute and Alberta Sustainable Resource Development

Jack Glen was a ranger at Entrance from 1920 to 1945 and saw much of the early development in the forests around Hinton, particularly in the Athabasca Forest. His memoir was originally published in a series of articles in the Western Producer in 1969. Mrs. S. McCreedy was Forest Service librarian at the time, and kept the articles, which Pete Murphy arranged to have reproduced in 1997. They are a fascinating read of the life and times of a DFB/AFS ranger who saw the transition from Dominion to Provincial resource ownership.

In 2003, Jack Glenn's family was contacted for permission to publish this memoir and not only gave permission but provided the original manuscript upon which it was based, as well as Glen's photo collection from the time. This Project is supported by FRIAA Open Funds as well as a grant from Alberta Sustainable Resource Development and the Forest History Association of Alberta.

2008/09 Program

TransCanada Eco Tour – The Yellowhead Corridor and Icefields Parkway: Foothills Research Institute
Over two million people a year drive through the landscape studied by the Foothills Research Institute, yet interpretive media for the human, ecological, and geological history are largely unavailable. The "Eco Tour" interpretive program was first developed by the Canadian Forest Service for the Calgary-Banff corridor in the 1970s. Since then, Canadian Geographic has used the approach to develop similar tours for different parts of Canada. Tom Peterson has provided background materials and reports which will be used for the project, along with the information contained in "A Hard Road to Travel". These are being used and expanded them with information and programs from the Research Institute and other sources to produce the Eco Tour.

Fred Pollett, retired Director General of the CFS science program, is the lead author for the Eco Tour and his time is an in-kind contribution, with the project funds covering his expenses. The project will carry over into 2009/10 at which time the bound report will be printed and available for sale. A GPS-based guide will be developed in 2009 that can be used as an alternative to the paper copy, and will also provide a template from which other FRI self-guided tours can be patterned. This project is supported by a grant from Alberta Sustainable Resource Development as well as the Community Initiatives Program.

DVD: The Roots of the Present are Buried Deep in the Past – CIF/SAF History Forum – Plenary Session 2 October 4, 2004
This historical forum, organized by Bob Udell and Pete Murphy of the Foothills Research Institute Adaptive Forest Management/ History Program, was a great success at the conference in Edmonton, several people from the SAF stating that it was the best plenary they had attended in years. It provides a fascinating look into the past as a prologue for the present and the future. A DVD of this forum is on hand, and is suitable for production and distribution. This project is also supported by the Forest History Association of Alberta.

The Last Patrol – a Former AFS Ranger returns to his roots for one last summer on patrol in Willmore Wilderness Park, 1982
Harry Edgecombe was a long service Alberta Forest Service ranger who finished his career as an instructor at the Forest Technology School in Hinton. After retirement, he spent the summer of 1982 on ranger patrol in the Willmore Wilderness Park, traversing many of the trails developed by or travelled on by Jack Glen so many years earlier. Mr. Edgecombe's report of that summer and his photographs provide an interesting contrast to the times of Jack Glen, reported in the recent book "Mountain Trails" from the Adaptive Forest Management/ History Program. This project is supported by the Forest History Association of Alberta.

Historical Database

The Adaptive Forest Management/ History program has, in the past 10 years, assembled a number of interviews and other historical information that currently resides in various databases within and outside the Research Institute control. This proposes to adapt the Research Institute's Aboriginal database template for use as a forest history database.

Future Projects
In the Adaptive Forest Management/ History Series

Projects Proposed for 2009/10

1. Trans Canada Eco Tour
by Fred Pollett
This is a carryover of the 2008/09 project.

2. A History of Silviculture at Hinton 1955-2005
By Lorne Brace, adapted and supplemented by Pete Murphy and Bob Udell
Des Crossley, who originated the forest management program at Hinton was a distinguished CFS researcher, frustrated at his inability to see his research knowledge adapted into practice. When given the opportunity and challenge to do so at Hinton he leaped at the chance and set in motion a remarkable and innovative silviculture program never before seen in Alberta. As background to "The Hinton Forest" a first draft of the comprehensive history of this silviculture program at Hinton from 1955 to 1999 was developed by retired CFS researcher Lorne Brace. A review by retired Chief Forester Jack Wright pointed to some errors in the manuscript. Completion of this project, including a photographic record not yet initiated, will provide insight into the science, philosophy and practice of silviculture as it has emerged under an adaptive forest management framework.

3. Logging on the Whirlpool River in Jasper National Park
By Peter J. Murphy with Tom Peterson
The Columbia and York Factory Expresses used this route for about 40 years as the main transCanada mail and commerce route in the 1800s, and the logging that followed in the early 20th century appears to have used the old trail for tie points. Murphy and Peterson have been researching the history of the logging and its relevance to the evolution of Parks policy in Jasper.

4. Milton and Cheadle Revisited
By Brian Long
In 2007 Brian Long, a British historian traced the 1864 route of Lord Milton and Dr. Cheadle from Fort Edmonton to Victoria. His resulting report was written from the perspective of one acquainted with the story from a British perspective, living very close to the ancestral family seat Milton Hall, and acquainted with the current family members. It sheds new insights and hitherto unknown detail about the journey and would be a useful supplement to the A Hard Road to Travel book. Some editing and clarification will be needed, this will be done by Pete Murphy. To be posted on the FRI website, provided Long agrees and permissions for illustration can be achieved.

5. Historical Database
In 2008/09 a Historical Database is being designed by FRI. It is an adaptation of the Aboriginal Database to serve as the repository for the growing bank of interviews and other site-specific information gathered through the AFM/History program at FRI since its inception in 1996. The database design will be completed in 2008/09. In 2009/10, the interviews conducted for earlier projects of the AFM/History program will be added to the database, along with photo collections from various contributors.

Projects Proposed for Future Years
This short list is a beginning. Each year, the AFM/History team considers a number of options for projects and reports in the series and the list continues to gros.

1. The Foothills Research Institute: A 20 Year Record of Achievement in Sustainable Forest Management Research

The current business cycle of the Research Institute will take it to its 20th anniversary. No compilation of the history of the Research Institute has been done to date, yet its achievements are remarkable and continue to grow with an increasing enthusiastic partnership. It is timely to pull this all together in one comprehensive history as others with less distinguished histories have done.

2. Harry Edgecombe – an Alberta Forestry Pioneer

Peter Murphy has collected a wealth of material on the history and legacy of Harry Edgecombe, long time AFS ranger and fire instructor at the Hinton Training Centre who retired from there in 1981. This material will be drawn upon as Peter writes a summary report on Edgecombe's life and career and its significance in the annals of Alberta forest history.

Beyond the Borders – Adaptive Forest Management/ History Program Contributions to Related Projects

Culturing Wilderness in Jasper: Studies in the Human History of the Upper Athabasca River Valley
By I.S. MacLaren, U of A Press – fall 2007

I.S. MacLaren, professor of English and history at the University of Alberta, has completed this book, which has been accepted by the U of A Press for publication in the fall of 2007. It contains a chapter authored by P. Murphy: Chapter 3: *"Following the Base of the Foothills": Tracing the Boundaries of Jasper Park and its adjacent Rocky Mountains Forest Reserve*. It was inspired by previous publications of the FMF and drew on knowledge and understandings acquired during the FMF studies, as well as further research on the topic. The book also includes a second chapter: Chapter 4: *Homesteading the Athabasca Valley to 1910: An Interview with Edward Wilson Moberly, Prairie Creek, Alberta, 29 August 1980*. Conducted, Introduced, Transcribed, and Edited by Peter J. Murphy. The introductory section, which provides a historical perspective, also drew heavily on earlier studies in connection with the FMF history project.

Long, B.W. A Mari usque ad Mare, 2007. Unpublished

A commentary on the expedition across British North America from the Atlantic to the Pacific undertaken by Viscount Milton and Dr. W.B. Cheadle in 1862 and 1863, abridged from their book, *The North West Passage byLand* and Dr. Cheadle's *Journal of a Trip across Canada 1862-1863,* and supplemented by material from other sources. In 2007 Brian Long, a British historian traced the route of Lord Milton and Dr. Cheadle from Fort Edmonton to Victoria. Tom Peterson and Pete Murphy, drawing upon their knowledge developed in writing *A Hard Road to* Travel, provided support and information which helped him retrace the trip through FRI's landbase. His resulting report was written from the perspective of one acquainted with the story from a British perspective, living very close to the ancestral family seat Milton Hall, and acquainted with the current family members. It sheds new insights and hitherto unknown detail about the journey and would be a useful supplement to the A Hard Road to Travel book.

Rhemtulla J. 1999. Eighty Years of Change: The Montane Vegetation of Jasper National Park. MSc Thesis. University of Alberta.

Rhemtulla, Jeanine M., Ronald J. Hall, Eric S. Higgs, and S. Ellen Macdonald. 2002. Eighty years of change: vegetation in the montane ecoregion of Jasper National Park, Alberta, Canada. 2002. . Canadian Journal of Forest Research. Volume 32, Number 11, Pages 2010-2021. November 2002

Jeanine Rhemtulla, a graduate student at U of A was given support by the Foothills Research Institute as well as Weldwood of Canada to complete a rephotography project of the 1915 Bridgland series in Jasper National

Park and, to a degree, the adjoining foothills. The results of this work have been used in a number of Research Institute reports and two books in the History Series, as well as validating some of the observations in the Natural Disturbance program at the Research Institute.

Repeat ground photographs (taken in 1915 and 1997) from a series of topographical survey stations and repeat aerial photographs (flown in 1949 and 1991) were analyzed to assess changes in vegetation composition and distribution in the montane ecoregion of Jasper National Park, in the Rocky Mountains of Alberta, Canada.

The results indicated a shift towards late-successional vegetation types and an increase in crown closure in coniferous stands. Grasslands, shrub, juvenile forest, and open forests decreased in extent, and closed-canopy forests became more prevalent. The majority of forest stands succeeded to dominance by coniferous species. Changes in vegetation patterns were likely largely attributable to shifts in the fire regime over the last century, although climatic conditions and human activity may also have been contributing factors. Implications of observed changes include decreased habitat diversity, increased possibility of insect outbreaks, and potential for future high-intensity fire events. Results of the study increase knowledge of historical reference conditions and may help to establish restoration goals for the montane ecoregion of the park.