

FOOTHILLS MODEL FOREST

ANNUAL WORK PLAN 2005-2006

Volume II Detailed Work Plan



Volume II Foothills Model Forest Detailed Work Plan

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Foothills Model Forest 2004-2005 Annual Work Plan

Detailed Proposal

Geographic Information Systems

1. Prepared by

Name: Christian Weik
Address: Box 6330 Hinton, AB
Phone: 780-865-8290
Fax: 780-865-8331
Email: christian.weik@gov.ab.ca

2. Introduction

The role of the GIS team is foremost one of support for the on-going projects undertaken by the FtMF. The sub-heading in this section entitled *Other Relevant Information* will discuss how the GIS resources are allocated by project and will identify potential shortcomings.

In year three of Phase III the GIS team will be focused on support and data management of research projects. Initiatives taken on in the first three years of Phase III that fall outside that role, and their status, are discussed in the *Executive Summary Document*.

The only initiative that will continue through year three is the GIS Working Group. This group was struck in 2003 and is facilitated by the Foothills Model Forest. The key mandate of the group is to facilitate education on emerging GIS technologies in the Forestry sector and to do so in a collaborative manner with industry professionals. To date this group has held three meetings and one workshop.

3. Background Information

This section will provide a framework for proceeding with the development of a GIS working group during the past year, and the continuation of that group in the next two years.

The maturation of GIS and its convergence with the Information Technology (IT) sector have produced significant advances in how geospatial information are stored and managed. Technology to house geospatial information in industry standard Relational Database Management Systems (RDBMSs) such as Oracle and SQL Server have been developed and are being implemented in applications for energy and municipal infrastructure management. This advance will see organizations storing all their information in a single database, blurring the line between spatial and non-spatial data and realizing the benefits of true GIS integration. This technology though has seen little application in the natural resource sector and presents a huge challenge to GIS professionals as the immediate benefits, skills required and the costs involved remain unclear. Using these new tools ESRI has initiated the development of data model templates for several individual industry sections. These data model initiatives

have resulted in database models to store core geometric features. Models developed to date include hydrography (ArcHydro), land parcels, transportation, pipelines and biodiversity. Users of these models can realize the following advantages:

- More rapid data model design and implementation of new technology
- Simplification of the integration of data across differing scales and jurisdictions. That is the exchange of data is much more efficient and cost effective for tasks such as landscape level analysis and monitoring.

It is important to note that the development of data model templates is not to replace existing standards for data collection (i.e. the database fields/columns). Rather it is an effort that focuses strictly on the geometric features and the relationships that exist between them. The data to be collected for those features can remain in place for each business requirement.

4. Objectives

The core focus of the GIS team this year will be GIS and data management support. The section will only discuss the objectives of the GIS working group

1. Knowledge Creation

The FtMF will organize the third workshops facilitated by an ESRI data modeling specialist.

1a. Beneficiaries and Impacts

The workshop will provide the GIS Workgroup with a better understanding of how geodatabases are designed and developed. This knowledge will prepare the group to more effectively be involved in the process of developing a data model template to store forest inventory GIS layers.

The outcome of the facilitated sessions will at the very least provide members with a starting point in building geodatabases. A data model template will provide a framework for all participants to store forest inventory data and facilitate more efficient and accurate integration of datasets across multiple jurisdictions and scales.

2. Demonstration

2a. Beneficiaries and Impacts

3. Knowledge / Technology Transfer

N/A

3a. Beneficiaries and Impacts

N/A

4. Communications and Outreach

4a. Beneficiaries and Impacts

5. Policy Support

N/A

5a. Beneficiaries and Impacts

5. Abstract of Methodology

The Foothills Model Forest will facilitate at least one, potentially three workshops during year three. These workshops will retain an ESRI Geodatabase expert to work with the group. The focus of the group is collaborative learning and Geodatabase model development.

6. Deliverables

1.) Knowledge Creation

- One, potentially three workshops facilitated by the FtMF. This is considered knowledge creation (and not knowledge / technology transfer only) as it will raise knowledge amongst all attendees including the FtMF.
- One of the outcomes of these workshops are draft Geodatabase model templates.

2.) Demonstration

3.) Knowledge / Technology Transfer

4.) Communications and Outreach

- At least one, potentially six GIS Day events to teach grade eight students about GIS and GPS.

5.) Policy Support

7. Timelines

Task	2003									2004		
	A	M	J	J	A	S	O	N	D	J	F	M
Support and administration	X	X	X	X	X	X	X	X	X	X	X	X
Working with GIS Workgroup and associated workshops	X						X				X	
GIS Day events							X	X				

8. Site Information

9. References

10. Scientific Review

11. Improvements to Management in Forest Ecosystems

12. Amount of Money Requested From the Foothills Model Forest

\$160,000

Item Description	Project Budget
Total	<i>\$160,649.06</i>
Salaries and benefits	\$121,099
Software	\$15,950
Hardware	\$9,600
Training and travel	\$9,200
Office and Administration	\$1,700
Utilities	\$900
Insurance	\$700
Contingency	\$1,500

13. Partner Contributions

Partner/Organisation	Cash			In-kind		
	Current Funding	Promised Contributions	Funding Pending	Current Funding	Promised Contributions	Funding Pending
The Forestry Corp				\$5000	\$5000	

14. Proposed Payment Schedule

15. Subcontracted Work

Due to the forecasted shortcoming in GIS support allocation it is likely that some work will have to be contracted out or completed by temporary staff.

The GIS Working Group will hire a Geodatabase consultant for development workshops. These costs will be covered by the workshop fees.

16. Project Management

Christian Weik

17. Additional Organisations requesting FRIAA Administered Monies

18. Other Relevant Information

18.1 Predicted GIS Time Allocation

The table below describes the forecasted GIS support time requirements by project.

In an effort to equitably allocate GIS support and to forewarn projects of the potential necessity to budget additional funds the table below describes approximate historical requirements and notes projects that have indicated the need for additional support. This method has been put in place to encourage (or force) projects that have significant increases in support needs to budget a percentage of funds to cover increased GIS requirements. As there is a projected GIS staff time deficit for the coming year the GIS will complete work on a first come and priority basis by quarter. In the event GIS resources are still not available, GIS staff will work with project leaders to outsource where suitable.

Task	Q1	Q2	Q3	Q4	Total	2yr Average	Notes
Grizzly bear	40	30	35	40	145	166	
Natural disturbance	6	6	4	4	20	10	May require additional funds
Fish and watershed	20	15	10	5	50	50	
Communications	2	2	2	2	8	15	May require additional funds
Jasper National Park	4	2	2	2	10	5	
Traditional Cultural Study	6	6	6	6	24	New project	Projected days
Foothills growth and yield	5	2	10	10	27	31	
Overhead (management)	40	50	50	50	190	190	
GIS Working Group	4	1	3	1	9	7	

Total	127	114	122	120	483	
Man Days Available	115	115	115	115	460	2 man years
Deficit**	(12)	1	(7)	(5)	(23)	

18.2 Spatial Data Requirements

The GIS data requirements provided in the table below represent spatial and attribute data that will have to be acquired from project partners, FtMF partners or from outside agencies in order to complete GIS related project tasks. These data are identified to ensure that the partners are aware of data they are expected to provide as part of signing the Annual Work Plan. In the event data are to be provided by outside agencies the project leader and, if necessary FtMF GIS staff, will work together to ensure acquiring those data is achievable.

All spatial data provided to the FtMF are considered confidential and to be used only for projects approved in the annual work plan. The data will be managed strictly by the FtMF GIS staff. In the event data must be provided to off-site project partners the FtMF will require the signing of a data sharing agreement between the FtMF and the off-site partner to ensure data security.

The data required for the coming year has actually been reduced from the previous year, although more recent versions of the themes will be requested.

Data set (theme)	Source (Data required for one or more projects listed at right)	Project(s)
Alberta Vegetation Inventory (AVI)	<ul style="list-style-type: none"> • West Fraser • Weyerhaeuser Canada • Sundance Forest Industries • Sunpine Forest Products • Alberta Government • Vanderwell Contractors 	<ul style="list-style-type: none"> • Grizzly bear • Fish and watershed • Chisholm/Dogrib
Digital orthophotos	<ul style="list-style-type: none"> • West Fraser • Weyerhaeuser Canada • Sundance Forest Industries 	<ul style="list-style-type: none"> • Grizzly bear • Fish and watershed
Ecological Land Classification (ELC)	<ul style="list-style-type: none"> • West Fraser • Jasper National Park • Alberta Energy** 	<ul style="list-style-type: none"> • Grizzly bear • Fish and watershed • Chisholm/Dogrib
Existing roads	<ul style="list-style-type: none"> • West Fraser • Weyerhaeuser Canada • Sundance Forest Industries • Sunpine Forest Products • Alberta Government • Vanderwell Contractors 	<ul style="list-style-type: none"> • Grizzly bear • Fish and watershed • Chisholm/Dogrib
Compartment boundaries	<ul style="list-style-type: none"> • West Fraser 	<ul style="list-style-type: none"> • Grizzly bear • Fish and watershed
Existing pipelines, powerlines, seismic, wellsites	<ul style="list-style-type: none"> • Alberta Energy** • Alberta Government 	<ul style="list-style-type: none"> • Grizzly bear
Planned areas of exploration	<ul style="list-style-type: none"> • Alberta Energy** 	<ul style="list-style-type: none"> • Grizzly bear
Existing and planned, active and inactive minesite boundaries	<ul style="list-style-type: none"> • Alberta Energy** 	<ul style="list-style-type: none"> • Grizzly bear
Existing and planned minesite haul roads	<ul style="list-style-type: none"> • Alberta Energy** 	<ul style="list-style-type: none"> • Grizzly bear
Hydrography	<ul style="list-style-type: none"> • Alberta Government 	<ul style="list-style-type: none"> • Grizzly bear • Fish and watershed • Chisholm/Dogrib
Digital elevation models	<ul style="list-style-type: none"> • Alberta Government • Jasper National Park 	<ul style="list-style-type: none"> • Grizzly bear • Fish and watershed • Chisholm/Dogrib
Roads, trails, human use activities	<ul style="list-style-type: none"> • Jasper National Park 	<ul style="list-style-type: none"> • Grizzly bear
IRS Satellite imagery	<ul style="list-style-type: none"> • Alberta Government 	<ul style="list-style-type: none"> • Grizzly bear
Soils	<ul style="list-style-type: none"> • Alberta Government** • West Fraser** 	<ul style="list-style-type: none"> • Fish and watershed
Historical forest harvest	<ul style="list-style-type: none"> • West Fraser 	<ul style="list-style-type: none"> • Grizzly bear • Fish and watershed
Base features access	<ul style="list-style-type: none"> • Alberta Government 	<ul style="list-style-type: none"> • Grizzly bear • Fish and watershed • Chisholm/Dogrib
Administrative or jurisdictional boundaries (parks, natural areas, FLUZ, Special Places, etc.)	<ul style="list-style-type: none"> • Alberta Government 	<ul style="list-style-type: none"> • Fish and watershed • Chisholm/Dogrib
Surficial geology**	<ul style="list-style-type: none"> • Alberta Government 	<ul style="list-style-type: none"> • Fish and watershed

** If data are available.

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Detailed Proposal

Natural Disturbance Program

1. Prepared by

Name: Dr. David Andison (main contact)
And others (see projects for details).
Address: 3426 Main Ave., Belcarra, BC, V3H 4R3
Phone: (604) 939-0830
Fax: (604) 939-0867
Email: andison@bandaloop.ca

2. Introduction

The Foothills Model Forest 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, support and demonstrate sustainable practices and policies within and beyond the FtMF boundaries, consistent with the objectives of the 2002 Phase III proposal. This is a collaborative program involving industry and government. The work plan outlines projects to be included in the program during 2005/2006.

3. Background Information

A natural disturbance research program for the Foothills Model Forest was first designed in 1996, and has been updated nine times (Andison 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, and 2004). It was intended to span several years, and includes a detailed list of approximately 40 individual research projects from empirical data collection, to communication, to simulation modelling. Together, the projects represent a package of potential knowledge on how natural disturbance-related processes created the historical patterns observed on the Model Forest. The projects are connected to each other mainly through scalar segregation, and are thus inter-dependent. Recognising that it is not possible to understand observed patterns through a single study, the program differentiates the study of processes into observable spatial and temporal scales, ranging from the stand to the landscape. Individual projects rely on others for either context or detail. It is the overall package of project results that provides the greatest level of knowledge.

Consistent with the NDP workplan, and the requirements of FtMF Phase III, there are three classes of projects under the auspices of the natural disturbance program. *Note that the budget presented in this document provides full funding for Class A projects, but only enough funds to develop and solicit support for all Class B and Class C projects.*

Class A. Projects in varying stages of completion, from significant analysis, to completing reports. Six ND projects being proposed fall into this category in 2005/06.

Class B. New projects not currently funded, but are the next highest level of priority for developing, gathering support, and perhaps initiating during 05/06. Three such projects exist for 05/06:

Evaluating Caribou Response to a Natural-Pattern Inspired Disturbance Plan.

The Hwy 40 Demo Project provides an ideal opportunity to learn something new about Woodland Caribou response to disturbance activities in a non-threatening manner. An adaptive monitoring program linked to model and other predictions is the best possible scenario. This project proposes identifying key hypotheses of caribou movement over the next several years, and then capturing and collaring the required number of animals to allow tracking. This will ultimately improve knowledge and management of caribou throughout the province.

Evaluating Grizzly Bear Response to a Natural-Pattern Inspired Disturbance Plan.

The FtMF Grizzly Bear program has developed valuable new planning tools that remain largely untested. The Hwy 40 Demo Project provides an ideal opportunity to not only test these new models, but to improve them based on the knowledge gained. As with the caribou, the models will provide the hypotheses, which will determine the location and number of individuals to collar for tracking.

Comparing NRV with CRV. The FtMF ND Program has generated a large amount of pattern understanding at intermediate scales over the last two years. While we know the general level and type of differences between these natural patterns, and the cultural patterns we typically create on forested landscapes, on one has identified these differences in a detailed, objective manner. This project is largely a GIS exercise that will compare in detail many of the patterns noted in research reports 5, 6, and 7 (to come).

Class C. Potential future projects not funded, and not fully developed. These are projects that require development for inclusion in the 06/07 workplan. They are NOT included in the project list at this time since they are just ideas, not detailed proposals. Four such projects exist for 05/06, including (in no particular order):

Hinton FireSmart. The original intent of the FireSmart project was to include Hinton along with Jasper. The Hinton FireSmart project has been developed independently by both Alberta PLFD and Alberta FPD, but fits logically with the ND program. FtMF responsibility and costs would be mostly related to communications.

Willmore Fire History Study. Understanding of the fire regime of the Willmore is the most glaring knowledge gap of the FtMF ND Program. As time goes on, this knowledge is becoming more critical as Community Development embarks on a management planning exercise. The major financial hurdle to be overcome is raw data collection.

Fire Severity. Research thus far within the ND program has focused on above-ground responses to disturbance. However, managed-disturbance objectives potentially include below-ground objectives such as control of Armalaria and other fungi, as well as promotion of “natural” lower vegetation communities and soil fauna.

Decay Rates of Woody Debris. The riparian LWD study (see ahead) will develop relationships between decay-classes and the time-since-death within riparian zones. This is a key pattern of riparian zone disturbance regimes for managers. However, the same information is notably absent for upland areas of the Alberta Foothills. The dendro-ecological study of LWD currently underway at UBC Dept. of Geography could easily be extended to upland areas.

A total of \$12,000 from the FtMF ND budget will be allocated to explore and further develop class B and C projects. Specifically, these monies will be spent on time and travel spent on meetings and other communications with other scientists, experts, and potential partners, drafting outlines and proposals, soliciting funds from various agencies, and writing and submitting proposals for external funding. Depending on support and need, one or more of these seven projects could be up and running by the end of the 05/06 fiscal year. At the very least, one or more of these projects will be developed fully and proposals for support submitted for the 06/07 fiscal year.

4. Objectives

1. Knowledge Creation

The objective of the Natural Disturbance Program is to describe and understand the range of patterns created by historical disturbance (primarily fire, but also other agents such as insects, disease, flooding, wind, and herbivory). The program also aims to understand and describe the underlying processes responsible for the patterns identified.

1a. Beneficiaries and Impacts

The general application of these results is to assist in the conservation of biological diversity in the Rocky Mountains and Foothills of Alberta through an improved understanding of natural disturbance processes at a range of spatial scales. With such understanding it will be possible to assess planned management activities such as forest harvesting and fire management in relation to natural ranges of variability. This information is necessary to assist managers within and outside of protected areas, as both types of jurisdictions are influenced by past and current management practices that are outside the range of natural variability.

2. Demonstration

To continue integrating and testing the efficacy of natural pattern management strategies and tactics across a wide variety of scales and situations.

2a. Beneficiaries and Impacts

See project details.

3. Knowledge / Technology Transfer

To provide the opportunity to apply new knowledge of natural patterns to solving practical, tractable forest management problems.

3a. Beneficiaries and Impacts

See project details

4. Communications and Outreach

Make research results available in a variety of forms and mechanisms to maximize audience and exposure.

4a. Beneficiaries and Impacts

See project details.

5. Policy Support

Maximize / take advantage of opportunities to affect local, regional, and provincial guidelines and policies as they affect forest management practices.

5a. Beneficiaries and Impacts

See project details.

5. Abstract of Methodology

See attached project proposals for individual project details.

6. Deliverables for 2005/06

- GIS data overlays and databases, technical reports, journal manuscripts, information pamphlets, presentations, and guides. See individual project work plans for details.
- Delivery of the entire package of natural disturbance projects. This includes both time and travel costs for tasks that cover all listed projects: Compiling and tracking annual workplans and budgets, co-ordinating field activities and sub-contractors, pursuing other research / co-operative activities, exploring and reporting on research extension possibilities, and attending natural disturbance team, FtMF project steering committee, and other meetings as they arise. (not described as an individual project). Bandaloop provides at least \$10,000 worth of support annually to these activities through limiting the charging out of any and all travel time associated with FtMF activities to 50% (see budget summary ahead).
- Communication of results. Includes leading field tours, attending and presenting research results at professional and public meetings and symposia, creating and supporting posters, creation and distribution of six FtMF NDP Quicknotes per year, and compiling other educational material using various media. Also includes working with other research groups and practitioners towards integrative experiments and decision-support tool development.
- Develop broader support base through presentations, meetings, and proposals.
- Development, submission, and if necessary, initiation of more mature project proposals for several Class B and C FtMF ND projects currently un-initiated, but considered a priority by one or more partners.

7. Site Information

This work will potentially take place in all forested areas of Alberta.

8. References

Andison, D.W. 2004. Foothills Model Forest Disturbance Dynamics Long-Term Research Plan. Version 9.0. FtMF Technical Report.

9. Scientific Review

All projects either/or have had reviews of methods, or the results will be published in peer-reviewed journals.

10. Improvements to Management in Forest Ecosystems

This project contributes to the development of management strategies that are in concert with the concept of ecological management, which is “an evolving approach that focuses on ecological processes and ecosystem structures and functions, while sustaining the types of benefits that people derive from the forest” (Alberta Forest Conservation Strategy, draft, July 8, 1996).

“The unmanaged forest, even without human influence, is subject to a variety of natural processes and disturbances such as succession, nutrient cycling, fire, flood, blowdown, insect attack and disease. These processes vary in duration, frequency of occurrences, size of affected area, and severity. For each type of process, there will be a particular range of variability. The result is a mosaic of natural communities representing the range of natural variability in forest ecosystems. Each of these communities plays an integral role in maintaining the diversity and function of the forest ecosystem. An understanding of “natural variability” is fundamental to the implementation of ecological management. To varying degrees, natural disturbances have been reduced in intensity, scale, and frequency through a variety of means such as fire and insect/disease suppression and abatement programs and flood control measures.”..... “Ecological management proposes that we use human activities to maintain that range of natural variability.” (from Alberta Forest Conservation Strategy, draft, July 8, 1996).

11. Amount of Money Requested From the Foothills Model Forest

\$144,000 FtMF

\$100,000 Hinton Wood Products / FtMF

\$23,000 Alberta SRD

\$21,000 Jasper National Park

12. Financial Summary

The following outlines only the requested funds from FtMF-related sources for projects under the auspices of the ND Program. “Other Partner Support” represents other direct or identifiable in-kind support for various programs. These figures are thus minimums. An explanation of Other Partner Support is provided in the detailed proposals.

Please note that the “Short course” project is collaborative with the FtMF Communications and Extension Program. Please see the C&E program for details about financial summaries.

Project Name	Funding Source / Status					Total
	FtMF (SRD)	FtMF (JNP)	FtMF (Weld)	ANC	Other Partner Support <i>10,000 (Bandaloop)</i>	
Program co-ordination & project development	23,000	18,358	10,000			61,358
Meso-scale Landscape Patterns and Processes			22,000			22,000
Fire Effects Research Study		2,642			<i>54,500 (CFS, Parks)</i>	57,142
Communications and Extension			40,000		<i>15,000 (Bandaloop)</i>	55,000
Riparian LWD Dendro Study				8,000	<i>10,000 (UBC)</i>	18,000
ND Short Course Development			28,000		<i>30,000 (SIAST, FtMF)</i>	58,000
Hwy40 Demonstration Project				25,000	<i>203,000 (all partners)</i>	228,000
SUB-TOTALS	23,000	21,000	100,000	33,000	322,500	
GRAND TOTALS	FtMF ND Program Base =			177,000		499,500

13. Proposed Payment Schedule

Details to follow in individual project proposals.

14. Subcontracted Work

Details to follow in individual project proposals.

15. Project Management

The ND program will be overseen by Dr. David Andison of Bandaloop Landscape-Ecosystem Services. Administrative support will be provided by the Foothills Model Forest. Individual ND projects may be managed by other personnel as described in the project details.

16. Additional Organisations requesting FRIAA Administered Monies at this time.

Hinton Wood Products
Alberta Newsprint Co. Ltd.

17. Other Relevant Information

Foothills Model Forest 2005-2006 Annual Work Plan

Detail Proposal

Meso-Scale Landscape Disturbance Patterns and Processes

1. Prepared by:

Name: Dr. David Andison
Address: 3426 Main Ave., Belcarra, BC, V3H 4R3
Phone: (604) 939-0830
Fax: (604) 939-0867
Email: andison@bandaloop.ca

2. Introduction

The Foothills Model Forest Natural Disturbance Program aims to investigate patterns and processes of disturbance across spatial and temporal scales. Although both landscape-level and stand-level scales are widely recognised, there is no reason to believe that these are the only relevant scales of observation. For instance, within landscapes, disturbance patterns vary enough to suspect that behaviour is being influenced by other factors at intermediate scales, such as riparian corridors, non-forested areas, and even soil features (influencing stand composition and structure). Landscape pattern descriptions at the simplest level do not necessarily account for these permanent landscape features. Yet these associations are vital regarding the application of this knowledge on a given landbase. This project looks at patterns at a higher level of resolution than landscape-level analysis demands, but less than more specific, directed stand-level studies require. This is the sixth and final year of a multi-year project.

3. Background Information

The data and analysis for the meso-scale and island remnants projects have already yielded five research reports, with one more to come. The analysis was far beyond what was originally envisioned.

As of March 31, 2006, this project will be completed.

4. Objectives

1. Knowledge Creation

To understand how fire regime characteristics are influenced by biotic and abiotic landscape features at scales below the landscape-level.

1a. Beneficiaries and Impacts

Greater understanding is the first step towards more defensible and consistent decision-making, and moves science forward to new and better questions.

2. Demonstration

N/A

2a. Beneficiaries and Impacts

N/A

3. Knowledge / Technology Transfer

N/A

3a. Beneficiaries and Impacts

N/A

4. Communications and Outreach

Make research results available in a variety of forms and mechanisms to maximize audience and exposure.

4a. Beneficiaries and Impacts

Everyone is targeted in order to “raise the bar” concerning the creation of a common knowledge foundation of natural pattern residual material in foothills and mountain landscapes.

5. Policy Support

N/A

5a. Beneficiaries and Impacts

N/A

5. Abstract of Methodology

Data layers were compiled at 50m resolution ARC/INFO compatible for selected areas. We compared edge and island locations with various topographic and vegetation information through multivariate and correlation methods.

Comparisons were also made of the spatial associations of older forest remnants and patch sizes with the distribution of non-commercial forested patches. Eight areas in the foothills east, as well as one large area of JNP. Final analysis and reporting are the only remaining tasks.

6. Deliverables for 2005/06

1.) Knowledge Creation

Complete.

2.) Demonstration

N/A

3.) Knowledge / Technology Transfer

N/A

4.) Communications and Outreach

By Dec. 31, 2006; final report completed.

By Dec. 31, 2006, completion of first draft manuscripts.

5.) Policy Support

N/A

7. Timelines

Task	2005										2006		
	A	M	J	J	A	S	O	N	D	J	F	M	
Final report	x	x	x	x	x	x							
First draft manuscripts	x	x	x	x	x	x	x	x	x	x			

8. Site Information

This work will take place in the Rocky Mountain and Foothills Natural Regions of Alberta.

9. References

Andison, D.W. 2004. Foothills Model Forest Disturbance Dynamics Long-Term Research Plan. FtMF Technical Report.

10. Scientific Review

Independent reviews have been obtained for the methods by Dr. W.L. Baker, U. of Wyoming. All manuscripts will be submitted to refereed journals.

11. Improvements to Management in Forest Ecosystems

We have an intuitive sense of “natural patterns” at very large and very small scales. Virtually nothing is known of such patterns and process at intermediate scales. Yet, without such information, application of large and small-scale patterns under the auspices of ecosystem management may not be effective. This project fills a vital gap in our ecological knowledge base and understanding of natural patterns and how they apply to our disturbance management activities.

This project contributes to the development of management strategies that are in concert with the concept of ecological management, which is “an evolving approach that focuses on ecological processes and ecosystem structures and functions, while sustaining the types of benefits that people derive from the forest” (Alberta Forest Conservation Strategy, draft, July 8, 1996).

12. Amount of Money Requested From the Foothills Model Forest

\$22,000 Foothills Model Forest from the base budget.

13. Partner Contributions

Partner/Organisation	Cash			In-kind		
	Current Funding	Promised Contribution	Funding Pending	Current Funding	Promised Contribution	Funding Pending
Foothills Model Forest	22,000					
TOTAL	22,000					

14. Proposed Payment Schedule

\$22,000 - June 1, 2005

15. Subcontracted Work

Bandaloop Landscape-Ecosystem Services will be carrying out the work.

16. Project Management

The project will be overseen by Dr. David Andison of Bandaloop Landscape-Ecosystem Services. Administrative support will be provided by the Foothills Model Forest.

17. Additional Organisations requesting FRIAA Administered Monies

None

18. Other Relevant Information

None

Foothills Model Forest 2005-2006 Annual Work Plan

Detailed Proposal

Fire Effects Research Study

1. Prepared by

Name: Peter Bothwell
Address: Canadian Forest Service, Northern Forestry Centre, 5320 – 122 Street, Edmonton, AB, T6H 3S5
Phone: 780-435-7312
Fax: 780-435-7359
Email: pbothwel@nrcan.gc.ca

Name: Alan Westhaver, Dave Smith
Address: Parks Canada, Jasper National Park

2. Introduction

This is the eighth year of a multi-year project to monitor the effects of fire on montane landscapes and forest stands in Jasper National Park. This project is being conducted as a component of the Foothills Model Forest - Natural Disturbance Program and is being implemented jointly by the Canadian Forest Service and Parks Canada. The principle researchers are Peter Bothwell, Dr. Brian Amiro, Dr. Bill deGroot, Dr. Jen Beverly, and Dr. Vern Peters of CFS and Alan Westhaver and Dave Smith of Jasper National Park. Phase I of the project is focused on studies in grassland/pine communities where grasslands are being heavily encroached by lodgepole pine and being substantially reduced in area. Prescribed fire is being used to restore historic processes and vegetation structure/composition. This project is monitoring resultant vegetation patterns, vegetation response and mortality, and related wildlife interactions. The project entered Phase II during the 2001/02 fiscal year with an emphasis on Douglas-fir montane communities.

3. Background Information

Phase I

Complex interactions exist among ungulates, predators, humans and vegetation in Jasper National Park, Alberta. Fire and herbivory are key parts of the interactions among these ecosystem components. Significant increases in human use, exclusion of fire, and thriving populations of elk (*Cervus elaphus*) within the montane region are impacting the ecological integrity of this vital area. Prescribed fire is being used to help restore ecosystem structure and natural processes with the goal of maintaining a landscape of open-canopy lodgepole pine (*Pinus contorta*) forest and grassland. As part of this management activity, the impact of prescribed burning, elk herbivory, and elk-fire interactions on the montane vegetation are being measured.

Permanent vegetation plots were established in 1998, some of which involved fenced exclosures to exclude elk herbivory. Plots were placed in unburned control areas and in an 80-hectare area burned in the spring of 1999, representing both closed-forest canopy and open-forest/grassland sites. The prescribed fire was lit as lines using hand torches, and the fire behavior measured in the plots. Pre- and post-burn vegetation sampling was done, which included measurements of: tree height, condition and dbh; shrub height and crown diameter; and ground vegetation percent cover by species. About 2/3 of the pine trees were killed, and mortality estimates are in the range of model predictions. Almost all of the shrubs were burned, but Canada buffaloberry (*Shepherdia canadensis*) is now regenerating. Regenerating (*Populus tremuloides*) aspen is evident within the exclosures, but these are heavily browsed by elk in non-fenced areas. There is little impact on ground vegetation cover and phytodiversity to date, but this may change as the tree canopy opens up and the solar radiation environment changes. Vegetation recovery is being monitored annually, and it is expected that a few more years will be needed to see the full impact of fire and elk interactions. A more recent higher-intensity fire in 2001 is providing the opportunity to study the impact of fire intensity in a similar community, but it is too early to assess these effects.

A small aspen area was burned in the spring of 2003. Two fenced exclosures and two unfenced plots were established in the aspen burn. Preburn data and postburn data measured immediately after, and one-year after the fire have been collected so far. This fire was ignited using hand torches, and the fire behavior was measured and documented. Understanding the effect of fire on aspen ecosystem dynamics, especially diversity and elk herbivory, is valuable to the overall project because it introduces another forest cover type to compare to the well established treatments in the pine/grassland communities.

Phase II

Phase II of the study was initiated in spring of 2001 within formerly open stands of montane Douglas fir (*Pseudotsuga menziesii*). Under the influence of fire exclusion policies of the 1930s to present, montane Douglas fir stands have been altered to contain tree densities and fuel loads that significantly exceed historical ranges of variability. The study location is a series of south and west facing slopes opposite the Jackladder burns on the opposite side of the Athabasca River. The objective of Phase II is to determine if prescribed fire can be used to successfully restore historic density and structure to forest landscapes and stands that have been deprived of fire for several decades. Initial prescribed burns in this area will attempt to replicate historic stand structure by selectively reducing the density of in-grown (immature) Douglas fir and current regeneration from the understory of these stands.

Once structural integrity of the stands is restored, the historic fire regime of more frequent, stand maintaining, low intensity fires could be re-established. Some relationships between the Douglas fir beetle (*Dendroctonus pseudotsuga*) and fire

will also be investigated as part of Phase II - since both forms of natural disturbance are important factors in this ecosystem. It is a question as to how the beetle will respond to fire restoration actions. The area was sampled in 2001 to provide data on stand density, size classes, surface fuels, height-to-live-crown, and beetle activity. These pre-fire data are being used to determine prescriptions for the planned fire. This fire was originally planned for the spring 2002, however, the weather has not cooperated over the past three years, and we will attempt the burns again in spring 2005. Post-fire sampling will yield data on the effectiveness of the burn, and provide information for adaptive planning in future fires.

4. Objectives

1. Knowledge Creation

To develop, test and refine fire prescriptions that will allow restoration of natural disturbance (fire) into montane Douglas fir stands of Jasper, Banff, Yoho and Kootenay National Parks.

To determine the results of fire restoration (prescribed fire) activities in meeting explicit ecological objectives for stand structure and composition in montane grasslands and savannah pine stands within the Foothills Model Forest.

1a. Beneficiaries and Impacts

Jasper National Park benefits by meeting a Park Management Plan (2001) commitment to focus on “promoting and co-operating in scientific studies that add to our knowledge of ecological integrity in the park and surrounding landscape”

Alberta Sustainable Resource Development and other agencies that use fire for resource objectives will benefit from results of this study as applied to their local prescribed fire initiatives.

The FtMF will benefit by demonstrating the relevance of the model forest concept to protected areas.

Protected areas (mountain national parks, Willmore Wilderness, other non-commercial forest in Alberta and B.C.) will benefit by applying research findings to their jurisdictions.

2. Demonstration

To provide tangible (operational) demonstrations of applied FtMF research that are accessible to other fire practitioners and the general public.

2a. Beneficiaries and Impacts

Parks Canada will benefit through opportunities for other fire practitioners to observe, learn and participate in these experiments, view the results and apply them to their local ecosystems.

Residents and visitors of the FtMF will be able to observe and understand tangible applications of FtMF research as they view these research prescribed burns in Jasper National Park.

Current and future prescribed burn programs of Alberta Sustainable Resource Development will benefit from the demonstration value and positive public

response resulting from these research prescribed burns and documented benefits to local wildlife populations.

3. Knowledge / Technology Transfer

To develop innovative prescribed burn methods for achieving specific ecological objectives that can be used by FtMF partners (and non-partner agencies or industry).

3a. Beneficiaries and Impacts

Prescribed fire practitioners within the FtMF (JNP, SRD) and those in other agencies beyond FtMF boundaries will benefit from the techniques, burn prescriptions and fire behavior models used and refined during this project. The forest industry (e.g. Hinton Wood Products, other industry) may benefit from the potential for expanded fire use and applications as a result of this research.

4. Communications and Outreach

This project provides exceptional opportunities for increased public awareness and understanding of natural disturbance process (and the importance of research) in the Foothills Model Forest.

4a. Beneficiaries and Impacts

The FtMF will benefit since increased public awareness and understanding translate to increased support for FtMF programs and those of its partners. To date, this includes signs along the Yellowhead Highway describing prescribed burns and the purpose of the experiment, with FtMF as a major sponsor of the work.

5. Policy Support

To develop new, more effective approaches for restoring fire to ecosystems in protected areas through carefully monitored operational experimentation.

5a. Beneficiaries and Impacts

Jasper National Park benefits from this project as a major Parks Canada initiative to fulfill its policy requirements (section 3.2 of Guiding Principles and Operational Policies 1994) towards scientifically based decision-making, management based on scientific research, and careful monitoring of ecological interventions.

The ways in which prescribed burns are implemented in protected areas (Wilmore Wilderness, national parks, other areas of Alberta and B.C.) are very likely to change as a result of this project.

5. Abstract of Methodology

Phase I

In 2005, the Aspen burn plot will be re-sampled. This includes measurements of trees, shrubs, regeneration, and ground vegetation in permanent sampling plots. Elk pellet counts will be done in the 2001 burn, the 1999 burn and control plots to track changes in ungulate use.

Phase II

The prescribed burn is planned in the spring of 2005. If weather is unsuitable, we will try an alternative window in the fall of 2005. Fire behaviour measurements, such as rate-of-spread and flame length will be measured during the fires.

Following the fire, transects measured in 2001 will be re-sampled to determine scorch height and mortality of younger trees. It may take several years to fully determine mortality on large trees. Surface fuels will be re-sampled to determine fuel consumption.

6. Deliverables

1.) Knowledge Creation

CFS and Parks Canada personnel involved in the program will continue to feature this research during future FtMF science forums, national and international fire Science conferences.

Dataset on relative ungulate population density and grazing in savannah-pine montane ecosystems (following the 1999 and 2001 burns). 2004 data collection and analyses complete March 31, 2005.

Dataset on post-fire effects on Douglas Fir-montane ecosystem following planned burn for 2005. 2005 data collection and analyses complete March 31, 2005.

2.) Demonstration/ Communications and Outreach

Three prescribed burns (60 and 110, and 1 hectares respectively) have already resulted from this project, are observed and or visited by millions of park visitors each year and are, arguably, the most publicly noted deliverable of the FtMF program.

A permanent self-guiding interpretive trail has been built within the study area. It features the FtMF research program. The fenced research plots are visible to the public, attract attention and are fitted with professionally produced signs that explain the project and it's importance to local ecosystems. We will upgrade and add to the existing signs this year (aspen plots and Douglas fir plots).

The 2005 (weather permitting) prescribed burns in the Douglas fir forests of Hawk Mountain in JNP will also be highly visible to motorists using Highway #16 as they traverse the FtMF, as well as hikers using the Overlander trail system. Demonstration of ignition techniques and fire behaviour in this ecosystem to fire personnel.

This site is frequently used as a tour site to display benefits of the FtMF program to visiting scientists, foresters, educators and bureaucrats from around the world. Several local eco-tourism companies also stop regularly to view the experiments with clients. We will also provide technical tours to professional visitors as the opportunity arises.

3.) Knowledge / Technology Transfer

2005 burns conducted in Douglas fir stands, 2003 burn in the aspen stand, and 1999 and 2001 burns in pine/grassland will provide managers with unique experiences and knowledge that will result in modifications to future planned prescribed burns.

This information will be conveyed formally and informally through the fire community during annual forums, conference attendance and presentations and preparation of year-end reports.

By inviting fire practitioners from Alberta SRD and other parks to participate in the 2004 burn, others will benefit from first hand knowledge/technology transfer opportunities.

4.) Communications and Outreach

(See Demonstration section 2 above)

5.) Policy Support

As part of an adaptive management approach that integrates research into operational programs, this project provides a continual flow of results and information that influences how prescribed burns are planned and implemented within Jasper National Park and other protected areas with similar forest types.

7. Timelines

Task	2005									2006		
	A	M	J	J	A	S	O	N	D	J	F	M
Pellet Counts		X										
Prescribed fire at Hawk site		X										
Re-sampling at Aspen Plots				X								
Re-sampling at Hawk site		X		X								
Progress report												X

8. Site Information

The sites are within Jasper National Park, and their use is approved through Park management, including having an approved environmental assessment.

9. References

Amiro, B.D., W.J. de Groot, P. Bothwell, A.L. Westhaver, and P.L. Achuff. 2004. Impacts of fire and elk herbivory in the montane ecoregion of Jasper National Park, Alberta, Canada. Pages 258–264 in R.T. Engstrom, K.E.M. Galley, and W.J. de Groot (eds.). Proceedings of the 22nd Tall Timbers Fire Ecology Conference: Fire in Temperate, Boreal, and Montane Ecosystems. Tall Timbers Research Station, Tallahassee, FL.

10. Scientific Review

No new scientific review. Original project reviewed by scientists within the Canadian Forest Service and Parks Canada. The Tall Timbers paper was reviewed by anonymous reviewers.

11. Improvements to Management in Forest Ecosystems

The montane prescribed burns are part of the scientific information required for effective ecosystem management of national parks. The goal of the fires is to

study ecosystem effects of fire, and the use of fire to achieve changes to plant and animal communities. Documentation of these successful fires will lead the way for further use of fire in forest ecosystem management.

12. Amount of Money Requested From the Foothills Model Forest

We are requesting operating funds from the Foothills Model Forest for \$2,642.65 to cover travel allowances (\$71.95/day x 27 person-days) and accommodations (\$700.00 assuming we are able to stay at the Palisades Centre).

13. Partner Contributions

Partner estimates include a cost of approximately \$40,000 by Parks Canada to achieve the Hawk Mountain burn and to help with follow-up sampling. This includes the fire team or ignition and suppression, helicopter support, and warden (Alan Westhaver and Dave Smith) and summer student salaries. The Canadian Forest Service is contributing scientific salaries for Pete Bothwell (R.P.F.), Dr. Bill deGroot, Dr. Jen Beverly and Dr. Vern Peters (about 60-person-days) with salaries estimated at about \$13,000 and operating costs for supplies and at least one additional field trip at a maximum of \$1,500. In addition, the Canadian Forest Service will support field cost over-runs, mostly when additional field trips are required.

Partner/ Organisation	Cash			In-kind		
	Current Funding	Promised Contribution	Funding Pending	Current Funding	Promised Contribution	Funding Pending
Foothills Model Forest			\$2642			
Canadian Forest Service		1,500.			13,000.	
Parks Canada					40,000.	

14. Proposed Payment Schedule

Payment made to the Canadian Forest Service in April 2005 to cover expenses for the 2005/06 fiscal year.

15. Subcontracted Work

None.

16. Project Management

Project Manager: Pete Bothwell R.P.F., Canadian Forest Service
Jasper National Park Manager: Alan Westhaver/Dave Smith

17. Additional Organisations requesting FRIAA Administered Monies

None.

18. Other Relevant Information

This project was funded by Foothills Model Forest in 2001/02 for the amount of \$3000, 2002/03 for \$1806, in 2003/04 for \$3,427, and in 2004/05 for \$3,427. A progress report will be submitted by March 31, 2005.

Foothills Model Forest 2005-2006 Annual Work Plan

Detailed Proposal

Natural Disturbance Program Communications and Extension

1. Prepared by

Name:	Dr. David Andison	Lisa Jones
Address:	3426 Main Ave., Belcarra, BC, V3H 4R3	Foothills Model Forest P.O. Box 6330, Hinton, Alberta
Phone:	(604) 939-0830	
Fax:	(604) 939-0867	
Email:	andison@bandaloop.ca	

2. Introduction

The FtMF ND Program has amassed a considerable amount of natural pattern knowledge over the past several years. Although much research remains, there is an increasing need to pass this knowledge on to broader audiences. This is not a distinct “project” in the same way that other elements of the ND Program are, but it has not reached the point at which C&E efforts should be recognized as unique contributions.

3. Background Information

The FtMF ND Program has been doing communication and extension for many years already (Andison 2003). It initiated the Quicknote program almost five years ago, and boasts a library of 29 notes and counting. The exclusive distribution list for these notes numbers in the hundreds, and the audience is international. In addition, the ND program has been invited to speak at no less than ten workshops (above and beyond group FtMF presentations), presented at two international scientific conferences, hosted two workshops, and published six full reports.

Part of the ND workplan for 03/04 was dedicated to developing a Communications and Extension (C&E) Plan for the ND Program. This has now been completed (Jones 2003), and provides much needed formal context for past and future C&E activities of the ND Program. This “project” includes elements directly from that plan. Although all of the material used for C&E efforts originates from existing and past ND Program projects, it was felt that recognizing C&E efforts as unique and important components of the overall program, with distinct deliverables, was important at this point. We will likely continue to recognize C&E efforts as “projects” in this way from now on in workplans.

4. Objectives

1. Knowledge Creation

None.

1a. Beneficiaries and Impacts

N/A

2. Demonstration

None.

2a. Beneficiaries and Impacts

N/A

3. Knowledge / Technology Transfer

To provide new knowledge on natural disturbance patterns and processes in such a way that facilitates integration into existing or new planning frameworks.

3a. Beneficiaries and Impacts

Planners, managers, regulators.

4. Communications and Outreach

Make research results available in a variety of forms and mechanisms to maximize audience and exposure.

4a. Beneficiaries and Impacts

Planner, manager, regulators, scientists, the public, special-interest groups.

5. Policy Support

To provide new knowledge on natural disturbance patterns and processes in such a way that facilitates integration into existing or new policies.

5a. Beneficiaries and Impacts

Industry, regulators.

5. Abstract of Methodology

A series of communication tools will be used, including presentations, tours, targeted workshops, research-series reports, interpretive-series report, Quicknotes, scientific manuscripts, posters, and lectures. Each is designed for specific C&E objectives, and is more fully described in the FtMF ND C&E Plan (Jones 2003). Time and cost permitting, we may also do a ten-year review / audit of the ND program.

6. Deliverables for 2005/06

1.) Knowledge Creation

Internal review of the FtMF ND program (optional).

2.) Demonstration

N/A

3.) Knowledge / Technology Transfer

At least one "Integration Series" report (a proposed new type of report that is halfway between a Research Series Report and Quicknote in length and depth).

Two draft manuscripts to peer-reviewed journals

At least one presentation at a major scientific conference

4.) Communications and Outreach

6 FtMF ND Quicknotes

At least one workshop / symposia presentations

At least two Model Forest presentations / tours

5.) Policy Support

At least one presentation to senior SRD staff.

7. Timelines

Task	2005										2006	
	A	M	J	J	A	S	O	N	D	J	F	M
Communication and Extension Activities as Above	x	x	x	x	x	x	x	x	x	x	X	x

8. Site Information

Most of this work will take place in Alberta, but some of it beyond.

9. References

Andison, D.W. 2004. Foothills Model Forest Disturbance Dynamics Long-Term Research Plan, Version 9.0. FtMF Technical Report.

Jones, L. 2003. Communications and Extension Plan for the Foothills Model Forest Natural Disturbance Program. Technical Report, Foothills Model Forest, Hinton, Alberta.

10. Scientific Review

The project is not science-based. However, with respect to the methodological approach taken for communications and extension, the C&E plan for the ND program was developed from a communications and extension professional as a result of an external, objective Request For Proposals (RFP).

11. Improvements to Management in Forest Ecosystems

Any increase in the understanding of new scientific knowledge by as wide as possible an audience can only lead to improvements in how forest ecosystems are managed.

12. Amount of Money Requested From the Foothills Model Forest

\$40,000 Foothills Model Forest.

13. Partner Contributions

Bandaloop only charges the time necessary to draft the first submitted version of each manuscript or other publication, and does not charge for any time spent attending scientific conferences. Any additional time spent on manuscript or publication drafts and edits, or in conferences is thus donated time to the FtMF.

Partner/Organisation	Cash			In-kind		
	Current Funding	Promised Contributions	Funding Pending	Current Funding	Promised Contribution	Funding Pending
Foothills Model Forest	40,000			15,000		
TOTAL	40,000			15,000		

14. Proposed Payment Schedule

N/A

15. Subcontracted Work

Bandaloop will be carrying out some of the work.

16. Project Management

The project will be overseen by Dr. David Andison of Bandaloop Landscape-Ecosystem Services. Administrative support will be provided by the Foothills Model Forest.

17. Additional Organisations requesting FRIAA Administered Monies

None

18. Other Relevant Information

None

Foothills Model Forest 2005-2006 Annual Work Plan

Detailed Proposal

Dendroecological Analysis of Large Woody Debris in Riparian Zones

1. Prepared by

Name:	Dr. David Andison	Prof.. Lori Daniels
Address:	3426 Main Ave., Belcarra, BC.	Dept. of Geography, UBC
Phone:	(604) 939-0830	Vancouver, BC
Fax:	(604) 939-0867	(604) 822-3442 (voice)
Email:	andison@bandaloop.ca	

2. Introduction

The one place we most expect to find more complex disturbance history is within riparian zones. The type, timing, and severity of various disturbance agents can have dramatic impacts on the amount, timing, and type of in-stream large woody debris recruitment, and terrestrial stand habitat dynamics. We have been unable to study this question in any great detail.

3. Background Information

We have done an excellent job of describing the pattern of disturbance in riparian zones, but we have not yet dealt with the processes. The best way to do so is to re-construct their history using dendrochronological methods – using cross-dating of tree-rings to determine the year of death and/or recruitment of an individual tree near and/or into a stream system. This is an infinitely more precise method of “knowing” than simple streamside inventories of woody debris. Nor does the streamside inventory method tell us anything about the stand or age dynamics of the riparian forest, or what type, severity, or size of the initiating disturbance was (fire, flooding, beaver, erosion, gap dynamics, or even wind). This information is potentially vital towards stand-level management criteria in riparian zones. However, there is a risk that these methods will not be fruitful, either because tree-rings will be unavailable or unreadable.

From 2001-03, we ran a small pilot study to determine the feasibility of the sampling methods within the FtMF. We not only were successful in extracting readable cores and “cookies” from in-stream LWD, but were able to date some of this material to more than 100 years ago (Daniels and Powell 2003). In 2004, the project was expanded to a full field season plus lab measurements. The analysis and writing of the final report will take until mid-way through the 05/06 year to complete.

4. Objectives

1. Knowledge Creation

Ultimately, to understand the exact processes and scales of disturbance in riparian zones on the FtMF.

1a. Beneficiaries and Impacts

Greater understanding is the first step towards more defensible and consistent decision-making, and moves science forward to new and better questions. Forest industry has better “natural” knowledge with which to choose management regimes for riparian zones.

2. Demonstration

To understand if/how dendrochronological techniques may be used to reconstruct detailed riparian disturbance history in Foothills landscapes.

2a. Beneficiaries and Impacts

The scientific community will benefit significantly from gaining such knowledge, and the techniques could be expanded to include many other applications not otherwise tested.

3. Knowledge / Technology Transfer

N/a

3a. Beneficiaries and Impacts

N/a

4. Communications and Outreach

Make research results available in a variety of forms and mechanisms to maximize audience and exposure.

4a. Beneficiaries and Impacts

Everyone is targeted in order to “raise the bar” concerning the creation of a common knowledge foundation of natural pattern residual material in foothills and mountain landscapes.

5. Policy Support

Potentially, define new types of management options for riparian zones.

5a. Beneficiaries and Impacts

Industry and regulators will share the new understanding towards building new, more sustainable riparian management tactics.

5. Abstract of Methodology

Subjective field selections for 12 sample sites were taken across all natural sub-regions along large river systems (targeting those areas that we know have been impacted by other, small scale disturbance activity). River reaches were walked to locate downed and live and dead adjacent trees. In addition, the terrestrial zone adjacent to the rivers were walked to look for any physical evidence of disturbance (stumps, scars, damage, etc). Live trees were randomly selected for evidence of “release” (indicating adjacent tree death). Selected trees within or adjacent to the rivers were cored and/or a complete cookie taken (depending on within-stream “function” and location of the tree or bole at the time). Finally, approximately 20 other live trees per site were sampled to generate a local chronology. Tree samples are being sanded, and tree-ring widths and/or scar-dates recorded using standard tree-ring methodologies. A master chronology will

be developed (if possible) for the area, and the distribution and dates of small-scale disturbances noted.

6. Deliverables for 2005/06

1.) Knowledge Creation

Final results and report.

2.) Demonstration

N/A

3.) Knowledge / Technology Transfer

N/A

4.) Communications and Outreach

At least one presentation to FtMF partners.

5.) Policy Support

N/A

7. Timelines

Task	2005										2006		
	A	M	J	J	A	S	O	N	D	J	F	M	
Lab preparation and measurements of samples	x	x	x	x									
Final report and presentation				x	x	x	x	x					

8. Site Information

This work will take place in the Rocky Mountain and Foothills Natural Regions of Alberta.

9. References

Daniels, L.D. and S.R.E. Powell. 2003. Dendroecological Analysis of Large Woody Debris in Riparian Zones of Foothills Landscapes of Alberta. Pilot Study Report. Department of Geography, UBC, Vancouver, BC.

10. Scientific Review

Standard dendrochronological methods will be applied consistent with the literature. If successful, this project will become a graduate thesis for one graduate student (meaning that at least four well-qualified academics will be overseeing the project), and result in at least one publication in a refereed journal.

11. Improvements to Management in Forest Ecosystems

This project contributes to the development of management strategies that are in concert with the concept of ecological management, which is “an evolving approach that focuses on ecological processes and ecosystem structures and functions, while sustaining the types of benefits that people derive from the forest” (Alberta Forest Conservation Strategy, draft, July 8, 1996).

- 12. Amount of Money Requested From the Foothills Model Forest**
\$8,000 Foothills Model Forest

13. Partner Contributions

The UBC Dendro-lab provides equipment, space, expertise, and limited technician time at their own expense.

Partner/Organisation	Cash			In-kind		
	Current Funding	Promised Contributions	Funding Pending	Current Funding	Promised Contribution	Funding Pending
Foothills Model Forest	8,000			10,000		
TOTAL	8,000			10,000		

14. Proposed Payment Schedule

April 1, 2005 - \$8,000.

15. Subcontracted Work

University of BC, Department of Geography will be carrying out the work. Bandaloop will oversee the pilot study on behalf of the FtMF.

16. Project Management

The project will be overseen by Dr. David Andison of Bandaloop Landscape-Ecosystem Services. Administrative support will be provided by the Foothills Model Forest.

17. Additional Organisations requesting FRIAA Administered Monies

Hinton Wood Products

18. Other Relevant Information

None

Foothills Model Forest 2005-2006 Annual Work Plan

Detailed Proposal

Natural Disturbance Short Course Development

1. Prepared by

Name:	Dr. David Andison	Lisa Jones
Address:	3426 Main Ave., Belcarra, BC	Foothills Model Forest
Phone:	(604) 939-0830	P.O. Box 6330, Hinton, AB
Fax:	(604) 939-0867	
Email:	andison@bandaloop.ca	

2. Introduction

Interest in natural disturbance patterns has grown at a rapid pace over the last ten years within Alberta and beyond. New research results on natural disturbance patterns and processes are quickly absorbed by an ever-broadening audience of managers, planners, regulators, scientists, and the public. And although the work is far from complete, a substantial collection of natural disturbance knowledge has been generated.

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. Coarse filters offer considerable benefits. Consider the prospect of choosing and managing towards a landscape design that is not only described in familiar and direct terms of vegetation structure and composition, but is (at least theoretically) based on a form of ecological integrity.

We have also observed some remarkable convergences between natural patterns and other sustainable forest management (SFM) objectives. For example, natural patterns demonstrate a logical and positive link to fire threat mitigation, large mammal habitat, avian habitat, aesthetics, access planning, old growth management, and even harvesting costs. This list alone represents a tremendous opportunity. Furthermore, natural patterns are by their very nature variable, thus allowing for the flexibility to accommodate, as opposed to compete with, other management objectives.

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 forest management activities as they relate to the ultimate goal of SFM. 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) strategies or tactics, which may represent a significant lost opportunity for Alberta, and potentially a diminished progression of sustainable forest management ideals.

Such are the growing pains of any new idea. Everyone in Canada is struggling with practical ND integration issues today. The thirst for understanding of natural disturbance concepts was demonstrated by the feedback at our own natural disturbance symposium in 2001, as well as from the size and composition of the mailing list of, and positive feedback on, the FtMF Natural Disturbance Program “Quicknote” series. 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. It removes the need to seek creative viable solutions, which means that natural patterns become yet another set of variables thrown into the planning melting pot. The BC biodiversity guidelines are an excellent example of this predicament.

The Foothills Model Forest Natural Disturbance Program strongly supports the more flexible Alberta approach to moving forward with ND integration.

However, we suggest at this point that the answers lay less in science than they do education and communication - based on sound science. By exposing Alberta’s foresters, in both industry and government, 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. Education is one of the critical first steps towards the successful integration of any new ideas. A structured and strategic approach best ensures the full potential of natural disturbance decision-making systems (whatever that may be) are realized. This approach better ensures that ND does not become an untested “fad” because years of accrued knowledge are not effectively transferred to those making forest management decisions.

Towards this, in 04/05 we developed an intensive 2-3 day short course “primer” on natural disturbance in collaboration with the Saskatchewan Institute of Applied Science and Technology (SIAST). As the first in a series of such short courses, this one will cover 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.

A second course will focus on one of several relevant specific topic areas.

3. Background Information

There is no shortage of material on which to draw for such a course. The Natural Disturbance Program of the Foothills Model Forest has been involved in natural pattern and process research for seven years. This program was from the beginning an extensive program driven by practical questions, and designed to address pattern and process questions from a range of spatial and temporal scales (Andison 2003). The long-term research plan now has over 50 different projects listed, of which almost half have at least been initiated. We have also entered into

an important implementation phase of the work, concentrating on opportunities for integrating ND knowledge into planning and monitoring programs. In addition, there is a growing emphasis on natural pattern research at other institutions such as the Sustainable Forest Management Network which we can, and will, draw upon.

Based on research, a **professional development** course of this nature does not currently exist. Research included internet searches and interviewing individuals across North America involved in the field of forest management extension.

Based on secondary research, interviews with both industry and government representatives, and the overwhelming response from potential supporters of this idea during the drafting of the proposal, there is a need for this short course, in and beyond Alberta.

4. Objectives

1. Knowledge Creation

None

1a. Beneficiaries and Impacts

N/A

2. Demonstration

None

2a. Beneficiaries and Impacts

N/A

3. Knowledge / Technology Transfer

To help develop a common understanding of the concepts, terms used, potential value, techniques, issues and opportunities of a coarse-filter approach to sustainable forest management.

3a. Beneficiaries and Impacts

Planners, managers, regulators.

4. Communications and Outreach

To help develop a common understanding of the concepts, terms used, potential value, techniques, issues and opportunities of a coarse-filter approach to sustainable forest management.

4a. Beneficiaries and Impacts

Planner, manager, regulators, scientists, the public, special-interest groups.

5. Policy Support

To help develop a common understanding of the concepts, terms used, potential value, techniques, issues and opportunities of a coarse-filter approach to sustainable forest management.

5a. Beneficiaries and Impacts

Industry, regulators.

5. **Abstract of Methodology**

Develop Course Plan. The course director and course leader have worked with the Saskatchewan Institute of Applied Science and Technology to develop a course plan. Such a plan details the following:

Course goal

Course objective

Identify audiences

Identify learning outcomes

Set indicators of success

Develop course outline and content

Course development, including materials. After a course plan has been developed and approved by the program partners and course sponsors, a curriculum developer will be used to develop the curriculum, and help design materials for this two-day short course. At this stage, the interaction between the course director (Andison) and the curriculum developer will be crucial. The complex and contentious nature of ND strategies is such that a curriculum developer will require considerable familiarity with the material. Furthermore, much of the materials used in the course will come from the Interpretative Reports of the FtMF Natural Disturbance Program. While this is occurring, the Foothills Model Forest Communications and Extension Program will begin to promote the short course through existing and new channels.

Interpretive Course Material. The Natural Disturbance Program will develop a new tool called “Interpretive Reports”. This tool will bridge a gap between the existing brief “Quicknotes” and the much more detailed research reports. The objective of an interpretive report is to present knowledge that can be integrated into forest management practices. Each Interpretive Report will be limited to ten to twenty pages, be very visual and will use everyday language. Material from these reports will be used to develop associated course material.

Course Marketing and Delivery. The Foothills Model Forest by collaborating with its partners and course sponsors will promote the course. Course delivery will be done on a cost-recovery basis, and if possible, a portion of course development dollars will be recovered. If course development dollars are recovered they will be reinvested into future Natural Disturbance short course development.

Focus Groups to Direct Future Short Courses and Knowledge Transfer Activities. The *Introduction to Natural Disturbance* course gives industry and government the foundation to begin integrating natural disturbance concepts into forest management plans and practices. However, additional extension and knowledge transfer activities will be required. Therefore it is proposed that focus groups are conducted immediately after the delivery *Introduction to Natural Disturbance* short course. The focus groups will help identify information and knowledge gaps in the existing course, and guide direction and content of future short courses and extension activities.

6. Deliverables for 2005/06

1.) Knowledge Creation

Detailed report that summarizes future knowledge and technology transfer needs of sustainable forest management professionals.

2.) Demonstration

N/a.

3.) Knowledge / Technology Transfer

Delivery of short course to sustainable forest management professionals in Alberta and Saskatchewan.

4.) Communications and Outreach

Delivery of short course to sustainable forest management professionals in Alberta and Saskatchewan.

5.) Policy Support

Delivery of short course to sustainable forest management professionals in Alberta and Saskatchewan.

7. Timelines

Task	2005										2006		
	A	M	J	J	A	S	O	N	D	J	F	M	
Dry run course #1 and fine-tune			x	x	x	x							
Course Development for #2								x	x	x	x	x	
Develop Course Goals & LO's for #2									x	x	x	x	
Focus group feedback										x	x	x	
Begin developing course material											x	x	

8. Site Information

Course development & coverage - Alberta and Saskatchewan (as a minimum).

9. References

Andison, D.W. 2004. Foothills Model Forest Disturbance Dynamics Long-Term Research Plan, Version 9.0. FtMF Technical Report.

Jones, L. 2003. Communications and Extension Plan for the Foothills Model Forest Natural Disturbance Program. Technical Report, Foothills Model Forest, Hinton, Alberta.

10. Scientific Review

The course will be developed using a variety of educational professional consultants both internal and external to the project team. The natural disturbance pattern material used for the course will come from a variety of sources, and most of it will either be already published in refereed journals, or will be at some point in the future. Most of the lecture content will be gathered, if not directly provided, by Dr. Andison who is a recognized expert in this field, and has an

extensive network of contacts across Canada. In any case, the content and structure of each lecture will be peer-reviewed by the appropriate expert(s).

11. Improvements to Management in Forest Ecosystems

Any increase in the understanding of new scientific knowledge by as wide as possible an audience can only lead to improvements in how forest ecosystems are managed.

12. Amount of Money Requested From the Foothills Model Forest

\$28,000 Foothills Model Forest. These monies will be primarily used for time and travel for the lead scientist to complete the development of course #1, and to commence the development of course #2. Although the courses will all be run on a cost-recovery basis, we do not anticipate a steady flow of money from courses until well into the 2005/06 fiscal year. These monies thus represent an up front investment that may or may not be recovered next year.

13. Partner Contributions

Continuing course development will include at least another \$20,000 from the FtMF Communications and Extension Program, and \$10,000 from SIAST staff time and travel in 2005/06. Please see the FtMF C&E workplan for further financial details on these courses.

Partner/Organisation	Cash			In-kind		
	Current Funding	Promised Contribution	Funding Pending	Current Funding	Promised Contribution	Funding Pending
Foothills Model Forest ND Program	28,000					
SIAST		10,000 (est)				
FtMF C&E program		20,000 (est)				
TOTAL	28,000	30,000 (est)				

14. Proposed Payment Schedule

April 1, 2005, - \$28,000

15. Subcontracted Work

Bandaloop Landscape-Ecosystem Services
SIAST

16. Project Management

The project will be coordinated jointly by Dr. David Andison of Bandaloop Landscape-Ecosystem Services and Lisa Jones of the Foothills Model Forest. Administrative support will be provided by the Foothills Model Forest.

17. Additional Organisations requesting FRIAA Administered Monies

Hinton Wood Products

18. Other Relevant Information

None.

Foothills Model Forest 2005-2006 Annual Work Plan

Detailed Proposal

Hwy 40 Demo Project

1. Prepared by

Name: Dr. David Andison
Address: 3426 Main Ave., Belcarra, BC, V3H 4R3
Phone: (604) 939-0830
Fax: (604) 939-0867
Email: andison@bandaloop.ca

2. Introduction

The volume of natural disturbance pattern results from the FtMF 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 where has anyone 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 Hwy 40 Natural Disturbance Demonstration Project (from the FtMF ND 2003/04 workplan) was designed to borrow heavily from the natural disturbance toolkit to install a large experiment on or near the FtMF 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 Hwy 40 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 (HWP), ANC, and Foothills Forest Products FMA’s, 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 proposed budget will cover the completion of the plan, and the completion of a detailed FtMF report on the planning process.

Funds were acquired last year (\$153,000) from Alberta SRD to fund disturbance activities above and beyond those considered “normal”. These monies are still part of the ND budget for 05/06 as no disturbance activities occurred during 04/05.

3. Background Information

The three main objectives of the original Hwy 40 Demo Project were:
Evaluate the robustness of the NRV *strategy* as a package, as opposed to judging the individual pieces.

Identify and explore potential convergences and conflicts with existing policies, practices, objectives, and other economic, social, and ecological values.

Build a common understanding of the concept and practice of adopting a natural disturbance based plan.

The site chosen for this demonstration project is an area approximately 70,000 hectares in size spanning approximately equal parts of the HFP, ANC, and Foothills Forest Products FMA's, as well as a portion of the Willmore Wilderness Area. The area is bisected by Highway 40, and runs from approximately the Berland River in the south to Pierre Greys Lakes in the north and roughly corresponds to the main foothills winter range of the A la Peche caribou herd. (see Figure 1). This location and size were chosen deliberately for several reasons: It is highly visible and accessible. Part of the reason for doing this is to raise awareness about NRV and forest management issues. The Hwy 40 corridor offers excellent access for the public, scientists, and professionals.

There are unique and high values and risks in the area already. Caribou, old growth, and bull trout are of particular concern, and it is also the most likely entry point for Mountain Pine Beetle (currently present in the Willmore Wilderness Area). The proximity to, and vegetation of, the Willmore also poses a significant forest fire risk.

Despite these unique biological values and risks, the management of the area falls under many jurisdictions, including three FMA's, a protected area under the auspices of Alberta Community Development, oil and gas companies, trappers, and many different types of public. We intend to test whether we can define a more efficient, cross-jurisdictional "one window" planning approach to dealing with these and other values.

The three FMA's currently have plans and approvals for harvesting in the vicinity within the next 5-10 years.

Its proximity to protected areas offers the potential for some alternative management solutions perhaps not as readily available elsewhere – prescribed burning in particular.

4. Objectives

1. Knowledge Creation

N/A

1a. Beneficiaries and Impacts

N/A

2. Demonstration

To demonstrate how holistic disturbance planning across administrative boundaries using an NRV foundation can be implemented efficiently and effectively to meet the goals of most other SFM values.

2a. Beneficiaries and Impacts

Essentially everyone benefits from an NRV demonstration project. Regulators, practitioners, environmentalists, scientists, and the public all benefit from gaining better insight into exactly what a comprehensive NRV strategy might look like on the ground, in real time, integrating real values and issues.

3. Knowledge / Technology Transfer

To demonstrate how holistic disturbance planning across administrative boundaries using an NRV foundation can be implemented efficiently and effectively to meet the goals of most other SFM values.

3a. Beneficiaries and Impacts

See above

4. Communications and Outreach

N/A

4a. Beneficiaries and Impacts

N/A

5. Policy Support

N/A

5a. Beneficiaries and Impacts

N/A

5. Abstract of Methodology

The Hwy 40 Project team consists of the ND Activity Team, plus the Hinton Area ASRD Manager, and representatives from Alberta Energy, Foothills Forest Products, and Community Development. This group provides the study area boundaries, the terms of reference for the planning team, and the project objectives.

The Hwy 40 planning team was struck early in 2004 and includes members of all four land areas involved, the Hinton Area ASRD rep, the ND program lead, and a fire specialist from ASRD. An extended planning team also includes a representative from ASRD Fish and Wildlife, Canadian Association of Petroleum Producers (CAPP), and Alberta Energy. The main task of this group is to develop the disturbance plan.

The Planning Team has compiled all relevant planning objectives (including harvest levels) from higher-level plans into a single set of plan objectives. The team has also been briefed on specific planning issues such as fire and mountain pine beetle threat and management, caribou, grizzly bear and water shed issues, oil and gas sector guidelines and patterns, and local natural disturbance patterns. Towards this last point, a series of more than 100 spatial simulation scenarios of natural pattern possibilities for both 10 and 40 years was completed and presented to the group.

Based on all of the information and guidelines provided, the planning team started by identifying general sizes and locations for disturbance activities for the first 10 year period. At the same time, the group began creating a series of simple planning indicators to enable objectively selecting the final selection of locations and sizes of 10-year events.

After this is completed, the details of roads, residuals, timing, and potential collaboration with identified energy companies will be completed. Seven of the most active gas companies in the study area have already been contacted and are

willing and able to discuss the project when we get to the point of including such details.

At this point the operational planning requirements for the different organizations becomes relevant, although we will be maintaining consistency across jurisdictions by continuing to plan in parallel as much as possible.

The final complete plan will then be submitted in pieces by the four land management agencies, plus the SRD fire management group, through the normal regulatory channels for approval – but with the plan in its entirety submitted also as context.

The FtMF ND Program will draft a report of the process for distribution, and the communications and extension program will be involved in creating public viewing and educational opportunities.

Finally, the planning team will also be identifying key adaptive management issues in the area. The FtMF ND team and others will be active in developing such projects to ensure that monitoring becomes a dominant part of the final plan. The obvious examples are Caribou and Grizzly Bear use of the landscape, but there are many other possibilities that are being explored.

6. Deliverables for 2005/06

1.) Knowledge Creation

None

2.) Demonstration

Completed disturbance plan.

3.) Knowledge / Technology Transfer

Final disturbance plan report.

4.) Communications and Outreach

At least six Hwy40 updates.

At least two presentations.

5.) Policy Support

N/A

7. Timelines

Task	2005										2006		
	A	M	J	J	A	S	O	N	D	J	F	M	
Develop disturbance plan	x	x	x	x	x								
Report and presentations				x	x	x	x	x	x	x	x	x	

8. Site Information

This work will take place in the 70,000 ha area on the north side of the FtMF as described above.

9. References

Andison, D.W. 2004. Foothills Model Forest Disturbance Dynamics Long-Term Research Plan. FtMF Technical Report.

10. Scientific Review

N/A at this time.

11. Improvements to Management in Forest Ecosystems

This project contributes to the development of management strategies that are in concert with the concept of ecological management, which is “an evolving approach that focuses on ecological processes and ecosystem structures and functions, while sustaining the types of benefits that people derive from the forest” (Alberta Forest Conservation Strategy, draft, July 8, 1996).

12. Amount of Money Requested From the Foothills Model Forest

\$25,000 FtMF

13. Partner Contributions

Since the Hwy 40 Project represents a “real” planning exercise, there are many people who are contributing to the project through time and travel that is above and beyond that which would normally occur for operational planning exercises. The Alberta SRD figure is higher than the others in the table below because it involves more staff directly in the process.

Partner/Organisation	Cash			In-kind		
	Current Funding	Promised Contribution	Funding Pending	Current Funding	Promised Contribution	Funding Pending
FtMF ND Program	25,000					
Alberta SRD		153,000		16,000		
Hinton Wood Products				5,000		
ANC				5,000		
Alberta Community Development				5,000		
FtMF GIS program				5,000		
Alberta Energy				5,000		
CAPP				5,000		
FtMF C&E				4,000		
TOTAL	25,000	153,000		50,000		

14. Proposed Payment Schedule

FtMF July 1, 2005 - \$25,000

15. Subcontracted Work

Bandaloop Landscape Ecosystem Services

16. Project Management

The project will be overseen by Dr. David Andison of Bandaloo Landscape-Ecosystem Services. Administrative support will be provided by the Foothills Model Forest.

17. Additional Organisations requesting FRIAA Administered Monies

Alberta Newsprint Co. Ltd.

18. Other Relevant Information

None.

Foothills Model Forest 2004-2005 Annual Work Plan

Detailed Proposal

Enhanced Aboriginal Initiative Multi-Community Traditional Cultural Study

1. Prepared by

Name: Don Podlubny
Address: Box 6330
Hinton, AB T7V 1X6
Phone: 780-865-8332
Fax: 780-865-8331
Email: Don.Podlubny@gov.ab.ca

2. Introduction

3. Background Information

In an attempt to more clearly understand the needs of aboriginal communities historical ties to the landbase, the FtMF participated in Weldwood's Aboriginal roundtable. Because of the complex nature of aboriginal interest in the region, the round table concept proved ineffective. Through discussion, the FtMF Board of Directors had identified the need for a traditional and cultural study (TCS) on lands within the FtMF landbase. In 2001, a program based on elder consultation was initiated and resulted in the development of the TCS protocol for the completion of such a study. Once the draft protocol was completed, it was introduced and endorsed by the local elders at a formal conference held in Hinton. A Steering Committee consisting of FtMF General Manager, Industry, both timber and oil and gas, and aboriginal representatives had been established to develop the terms of reference for a possible TCS. The FtMF has recruited a Coordinator/Team Leader in a full-time capacity for Phase III to work on the aboriginal initiative.

4. Objectives

1. Knowledge Creation

The objective of the Traditional Cultural Study (TCS) is to gather aboriginal community sensitive sight location information in the FtMF land base complete with elder's oral history. Sensitive sights will be identified through this process with the objective of not being disturbed by resource management practices. The program will also develop trust between the aboriginal communities and resource industries through creation of an aboriginal community / FtMF protocol information process and a GIS repository under the terms of reference developed by the Enhanced Aboriginal Initiative Steering Committee.

1a. Beneficiaries and Impacts

The application of this knowledge will benefit the aboriginal communities involved by providing and recording GIS historical documentation through transcripts, audio and videotapes. An indirect benefit to regional resource

companies will be a sensitive sight avoidance referral mechanism, which will produce project certainty regarding aboriginal sensitive sight disturbance concerns. This process will be delivered in accordance with the TCS protocol process. The creation of a repository for the communities will create a vault for the information collected and help in the assurance of the knowledge being available for future generations of aboriginals.

2. Demonstration

The development, through negotiation, of a Traditional Cultural Study and its data management, in a central repository under a controlled process, will provide well defined procedures and develop trust and aid in building a working relationship between industry, government and aboriginal communities. This process will be passed on to all interested parties as a way of demonstrating industry, Aboriginal communities and governments working together.

2a. Beneficiaries and Impacts

Initially the application of this process will benefit the capacity capability of aboriginal communities involved in the studies in the FtMF area. The sensitive sight avoidance mechanism benefit extends to the natural resource industries working within the FtMF area and the land and resource managers as well. There is not a defined referral process provincially; the ultimate goal is to go beyond the boundaries of the FtMF and set a standard that can be used provincially and possibly influence policy.

3. Knowledge / Technology Transfer

As the process is refined the Aboriginal Program is committed to taking this beyond the boundaries and working with interested parties. As the first TCS is completed we intend to host a workshop that will openly discuss the pros and cons of the process and identify areas of improvement. We are recommending to the communities to publish a book on completion of their respective TCS.

3a. Beneficiaries and Impacts

The aboriginal communities, resource managers, partner organizations and other groups will benefit in increasing their capacity by the documenting oral knowledge and developing a secure data management system. The TCS project supports the CFMN goal on meaningful involvement of aboriginals in sustainable forest management.

4. Communications and Outreach

As the Studies and process develop the FtMF will provide presentations to interested aboriginal communities, industry (both Forest and Oil & Gas) and prepare reports that will be made available to those that have contribute and are interested in the program. Where possible workshops will be provided to interested communities lying out the process and steps need to develop a multi community referral process.

4a. Beneficiaries and Impacts

The beneficiaries will include the aboriginal communities, the FtMF Board of Directors, the partner organizations, the FtMF staff, contractors, the Model Forest network and other natural resource organizations.

5. Policy Support

The TCS/referral process will provide information to the governments that will aide in the examination of forest and natural resource policy as it relates to management on public lands, where aboriginal interests have been communicated.

5a. Beneficiaries and Impacts

The beneficiaries will be the aboriginal peoples, natural resource industries, governments and the people of Alberta and Canada.

5. Abstract of Methodology

N/A

6. Deliverables

1.) Knowledge Creation

Traditional Cultural Studies for two identified aboriginal communities and as funds are acquired three additional ones in the immediate FtMF land base. The first two studies are scheduled for completion by March 31, 2007. During the work on the TCS's the Aboriginal Steering Committee will work on and develop a referral process with a target on March 31 2006 for a final document.

2.) Demonstration

The completion of an agreed to process for the FtMF and four aboriginal communities for documenting traditional knowledge, March 31, 2006. The construction of a secure records management system for the storage and management of the aboriginal study data.

3.) Knowledge / Technology Transfer

Implementation of the aboriginal TCS data repository for aboriginal communities and FtMF as per agreed to criteria, April 2004. Continue to improve project information packages that will be distributed to funders and partners.

4.) Communications and Outreach

Working with the aboriginal communities and the partner organizations in culture exchanges and information sharing sessions/workshops, on going throughout the program to be implements at milestones. Continue to create and maintain FtMF TCS/referral process awareness stewardship amongst aboriginal stakeholder communities, industry and government.

5.) Policy Support

Reports of progress and capacity of the system for use by aboriginal communities, natural resource base industries, and governments, ongoing. Aboriginal community/industry referral process that will address aboriginal community ties

to the land disturbance issues. Communities will share quarter sections of blank and void information with the FtMF, which will contain areas of interest within them and a community referral contact.

7. Timelines

Task	2004									2005		
	A	M	J	J	A	S	O	N	D	J	F	M
TCS/referral process for 4 communities	X	X	X	X	X	X	X	X	X	X	X	X
Work plan will be developed and facilitated with communities	X	X										
Records management system	X	X	X	X	X	X	X	X	X	X	X	X
Data repository						X	X	X	X	X	X	X
Information sessions/workshops								X	X	X	X	X
Progress reports					X				X			

8. Site Information

9. References

10. Scientific Review

N/A

11. Improvements to Management in Forest Ecosystems

The availability of the TCS information and the efficiency of a multiple aboriginal community referral process will strengthen the relationship between the communities and the resource based industries. This will allow for a better understanding by all parties of their objectives and will strive to eliminate unnecessary land disturbances.

12. Amount of Money needed for 2004 program

2004-2005 activities for the position of an Aboriginal Coordinator/Team Leader and program development and management.

TCS Agreements 2005-2006:

Foothills Ojibway	\$ 64,000.00
Aseniwuche Winewak Nation	\$ 49,000.00
Nakcowinenak Nation	\$ 60,000.00
Program Coordinator	\$ 60,000.00
Steering Committee	\$ 10,000.00
Total for 2005-2006	\$243,000.00

13. Partner Contributions

Partner/Organisation	Cash			In-kind		
	Current Funding	Requested Contributions	Funding Pending	Current Funding	Promised Contributions	Funding Pending
Foothills Model Forest	\$ 37,000	\$44,000		\$10,000		
Canadian Forest Service Aboriginal Program						
Aboriginal Affairs and Northern Development	\$33,000					
West Fraser Mills Ltd FRIAA contributions	\$10,000		\$75,000			
Alberta Dept. of Energy						
SRD		\$200,000				
CAPP		\$150,000				
Nakcowinewak First Nation				\$10,000		
Foothills Ojibway society				\$10,000		
AWN				\$10,000		
TOTALS	\$80,000	\$394,000	\$ 75,000	\$40,000		

14. Proposed Payment Schedule

Out payment of funds will be dependent on the signing off of the “Agreement in Principle” document. To date we are signed off with the Foothills Ojibway Society for a two-year program at \$ 64,000.00 per year for a total of \$ 128,000.00. The payments of these funds are tied to the agreement’s schedule of payments.

15. Project Management

The individual TCS’s will be over seen by the Aboriginal Coordinator, Terry Garvin and reported to the General Manager of the Foothills Model Forest.

16. Other Relevant Information

- Necessary research permits need to be in place with SRD and Jasper National Park and will need to be in effect for the duration of the program.
- Need to create awareness of program nationally in 2004 not just locally.
- Travel to the Canadian model forests in 2004.
- TCS/Referral Process is focused on undertaking and getting FtMF stakeholder communities underway with their TCS so that an aboriginal community/industry referral process can be created to address the aboriginal ties to the land disturbance issues.

17. Consent of Other organizations involved

Foothills Model Forest 2005-2006 Annual Work Plan

Detailed Proposal

Fish and Watershed Program

1. Prepared by

Name: Richard McCleary
Address: Foothills Model Forest, Box 6330, Hinton, AB
Phone: 780-865-8383
Fax: 780-865-8331
Email: rich.mccleary@gov.ab.ca

2. Introduction

While the Phase III workplan identified six specific goals for the Fish and Watershed Program, the overall goals are to develop knowledge, inform policy, and transfer technology on key aspects of forest management that influence aquatic ecosystems. The four key topics are community group partnerships, riparian management, stream crossings and local level indicators.

Community group partnerships have been built through the Hardisty Creek Watershed Restoration Project. The focus of the Foothills Model Forest will be to complete the Kinsmen Park watershed restoration demonstration site prior to the end of Phase 3. Other members of the group have been encouraged to initiate additional restoration projects on their lands along other sections of Hardisty Creek. FtMF work will include completion of fish passage remediation in Year 4 and interpretive trails in Year 5. While the main FtMF investment in the project in Years 1-3 was contribution of technical expertise to assist restoration, the focus will shift to communication for the remainder of Phase 3.

Within the riparian management portion of the program, we need to continue work in a number of areas to meet our Phase III objectives. In Year 4, we will begin to execute a strategy developed in Year 3 that included establishment of a partnership with UBC Department of Geography to address knowledge gaps. Prof. Marwan Hassan, UBC Geography, has agreed to serve as academic advisor for this project. Our strategy is to calibrate existing riparian management and assessment tools currently used by BC Forest Service and USFS for use in Foothills of Alberta. These tools include a stream channel assessment procedure, and landscape simulation model. The majority of funds were secured in Year 3 and several additional proposals will be prepared in Year 4. Other project activities in Year 4 include data acquisition, draft guidebook preparation and extension. A communications plan will also be developed to guide extension based on the outcomes of the applied research in Year 5.

Stream crossings were a prime focus of the program during Years 1, 2 and 3. Several knowledge development, extension and demonstration site projects were initiated, including a proposed association of stream crossing owners and

construction of fish passage remediation demonstration sites. Early in Year 4, stream crossing owners, including Hinton Wood Products and 6-8 key energy companies, will determine if the proposed stream crossing association is a useful means of improving their stream crossing management. If the association is supported, an inspection procedure will be field-tested and an inspection plan will be developed through the association. The role of the FtMF in the association will likely include database development, data management and technical support. Year 4 will also include development of detailed proposals for demonstration sites at Kinsmen Park and the Robb Road / Anderson Creek crossing. The Communications Program will take the lead in developing these proposals. The FtMF Fish and Watershed Program, Hinton Wood Products and FERIC are interested in providing technical support.

The local level indicators program continued to gain momentum through 2004, starting with an indicator review workshop held in January. There were two major outcomes from the workshop. First, ASRD has committed to supporting the Foothills Model Forest program with the intention of applying the indicators in other parts of the province. Second, the Local Level Indicators team developed a plan to develop indicators in areas with identified gaps and produce a second State of the Forest Report by the end of 2007. As an outcome of the workshop, the Fish and Watershed Program has taken the lead for the development of two indicators: stream crossings and water yield. Stream crossing indicators will be developed through the proposed association and a detailed proposal for the water yield indicator will be developed in cooperation with the natural disturbance program.

Development of communication and extension activities in each of these four key areas is also an important component of the program. Our strategy to accomplish this will be to liaise with organizations with a professional training mandate include the Training Section of ASRD, NAIT's satellite institution in Peace River - the Boreal Forest Research Centre, the Woodland Operations Learning Foundation (WOLF) and UBC Department of Geography. During 2004, FtMF was appointed a seat on the WOLF Program Advisory Group to provide input on curriculum pertaining to water quality and stream crossings. Therefore we will complete reports that can be used as reference material during the development of training curriculum. In addition to incorporating material into training programs, our extension plan also includes ongoing communications and regular project updates with resource practitioners through the activity team and project steering groups.

3. Background Information (Year 3 Update)

Highlights of Year 3 included co-hosting the Forest Land – Fish II Conference, managing the Kinsmen Park Restoration Project and gaining support for a new Riparian Management initiative from both the FtMF Executive Committee and from FRIAA. These projects were successful due to expanded partnerships. Field projects included the Hinton Wood Products Operational Inventory and the

Jasper National Park stream crossing assessment project. Although long periods of rain delayed fieldwork at times, field projects were completed safely and within budget.

4. Objectives

1. Knowledge Creation

Our knowledge creation efforts will continue to focus on riparian management, stream crossings and local level indicators.

1a. Beneficiaries and Impacts

Beneficiaries of riparian management project (LWD budget and sediment budgets) are forest managers within the Foothills of Alberta. This includes the people responsible for planning and regulating harvest activities. The project also includes a Foothills stream channel assessment procedure that will benefit professionals who are interested in evaluating the state of fish habitat as it relates to land use impacts.

The beneficiaries of the proposed stream crossing association are primarily crossing owners who are interested in achieving fish passage and water quality conservation at their crossings.

The beneficiaries of the proposed LLI work include resource managers, resource stakeholders and other groups interested in the LLI process.

2. Demonstration

Demonstration site development efforts include Hardisty Creek within Kinsmen Park and Anderson Creek at Robb Road. These efforts will be done collaboratively with other stakeholders.

2a. Beneficiaries and Impacts

The beneficiaries will include resource managers, stakeholders and other groups interested in fish passage, stream bank and fish habitat restoration. The target audiences for the Hardisty Creek site include both public and professional, whereas mainly professional stream crossing managers will be the target audience for the Anderson Creek site.

3. Knowledge / Technology Transfer

This objective will be achieved through initiatives within each of the four project areas. In Year 5 we anticipate that technology transfer emphasis will be on riparian management, therefore in Year 4 we will develop a communications plan to help ensure that successful extension activities will occur during the final year of this phase. We also recognise that the gap is widening between FtMF researchers and land managers in terms of utilizing GIS-based fish and stream information. Therefore, in Year 4 we will complete an information needs assessment for both Hinton Wood Products and Whitecourt / Hinton ASRD land managers.

3a. Beneficiaries and Impacts

The intended audience includes both the scientific and management communities. The scientific community includes biologists employed by other agencies in the

province of Alberta. The management community includes staff of Hinton Wood Products, ASRD, Jasper National Park and other agencies.

4. Communications and Outreach

As in Year 3, outreach programs will be produced for technical, management and public audiences. The Communications Program will develop public programs with our assistance.

4a. Beneficiaries and Impacts

Public programs are intended for local residents and visitors to the area. The information may also be used to educate stakeholder groups such as the Forest Resources Advisory Group (FRAG).

5. Policy Support

Our efforts are intended to influence policy such as the Provincial Forest Operations Ground Rules. In addition, our work with Local Level Indicators may influence the policy established by other government initiatives.

5a. Beneficiaries and Impacts

Our proposed work should influence a range of resource stakeholders and participants in other adaptive management efforts.

5. Abstract of Methodology

The overall methodology for the Fish and Watershed Program is as follows. First, we determine key challenges for achieving sustainable forest and aquatic resources management. Second, we develop partnerships and detailed plans to address these needs. Third, we seek funding to implement projects. Finally, we undertake the project and ensure that extension activities are completed in a timely fashion as knowledge and tools are developed.

6. Deliverables

1.) Knowledge Creation

DRAFT Handbook for managing sediment sources and large woody debris in foothills riparian areas.

DRAFT Alberta foothills channel assessment procedure.

DRAFT Watershed wood budget / sediment budget model.

Stream crossing indicators.

Water yield indicator.

Fish population status for Upper Athabasca and Upper McLeod watersheds.

2.) Demonstration

Kinsmen Park Demonstration Site.

Anderson Creek / Robb Road Demonstration Site.

3.) Knowledge / Technology Transfer

Riparian management extension workshop.

Integration of findings into WOLF and other training programs.

4.) Communications and Outreach

Communications plan for riparian management outreach / extension in Year 5.
Presentations, interpretive programs with Fish and Watershed content.

5.) Policy Support

Contribute to riparian management and water yield guidelines within forest planning documents.

Formation of stream crossing association and development of approved inspection procedure.

7. Timelines

Task	2005									2006		
	A	M	J	J	A	S	O	N	D	J	F	M
I. Community Projects												
1.1 Kinsmen Park fish habitat, fish passage and stream bank remediation demonstration Site.	X	X	X	X	X	X	X	X	X	X	X	X
II. Riparian Management												
2.1 Handbook for managing sediment sources and large woody debris in foothills riparian areas.	X	X	X	X	X	X	X	X	X	X	X	X
2.2 Alberta foothills channel assessment procedure.	X	X	X	X	X	X	X	X	X	X	X	X
2.3 Watershed wood budget / sediment budget model.	X	X	X	X	X	X	X	X	X	X	X	X
2.4 Riparian management extension workshop.	X	X	X	X	X	X						
2.5 Integration of findings into WOLF and other training programs.							X	X	X	X	X	X
2.6 Kinsmen Park bioengineering demonstration site.			X	X	X	X	X	X				
2.7 Communications plan	X	X	X	X	X	X	X	X	X	X	X	X
III. Stream Crossings												
3.1 Stream crossing association	X	X	X	X	X	X	X	X	X	X	X	X
3.2 Anderson Creek Demonstration Site	X	X	X	X	X	X	X	X	X			
3.3 Stream crossing tech transfer to Woodland Operations Learning Foundation (WOLF)	X	X	X	X	X	X	X	X	X	X	X	X
3.4 <i>Operational Inventory</i>	X	X	X	X	X	X	X	X	X			
3.5 Digital fish inventory data	X	X	X	X	X	X	X	X	X	X	X	X
IV. Local Level Indicators												
4.1 Indicators developed for stream crossings (see 1.1)	X	X	X	X	X	X	X	X	X			
4.2 Indicators developed for water yield	X	X	X	X	X	X	X	X	X			
4.3 Fish population status	X	X	X	X	X	X	X	X	X			

8. Site Information

Work will be conducted within the FtMF. Riparian research projects may occur in other parts of the province if additional partnerships are developed.

9. References

Provided upon request.

10. Scientific Review

For all technical papers, scientific review will be requested from a number of individuals considered to have a background or expertise in the area of study involved. The review will not be limited to members of the activity team and may include academics and private sector professionals who are knowledgeable in the area of study. The project leader will ensure that reviewers have at least three weeks to provide their comments.

Prof. Marwan Hassan will review papers related to riparian management, UBC Department of Geography.

11. Improvements to Management in Forest Ecosystems

This program helps land managers to address three challenges including using science-based approaches, dealing with multiple stakeholders / industries and completing these tasks with a reduced workforce.

The mandate to shift towards a more science-based approach means that land managers can consider the structure and function of forest ecosystems into their planning activities. The FtMF riparian management projects are intended to provide practical tools to assist managers and field technicians describe the structure and function of these systems in a meaningful manner.

With the increasing importance of the energy resources within the FtMF and many parts of Alberta, there is a need for integrated land management. The stream crossing association is an attempt to help owners improve infrastructure management and also work collaboratively to address fish passage issues.

Forest managers also have limited resources. They have indicated that they need maps and management frameworks that organize complex scenarios. The products that we are in the process of developing are intended to be practical in their application.

12. Amount of Money Requested From the Foothills Model Forest

This workplan was based on a contribution of \$147,000 from the Foothills Model Forest.

13. Partner Contributions

The forecast project budget is \$600,000 with \$348,000 cash and \$252,000 in-kind contributions.

Partner/Organization	Cash			In-kind		
	Current Funding	Promised Contribution	Funding Pending	Current Funding	Promised Contribution	Funding Pending
Foothills Model Forest	\$147,000					
Kinsmen Park / Hardisty Creek Restoration						
CIP			\$50,000			
Riparian Project						
FRIAA	\$65,000					
UBC				\$62,500		
Earth Systems Institute					\$30,000	
ACA			\$24,000			
NRCan Internship			\$12,000			
Stream Crossing Association						
Hinton Wood Products (1,000 xings)			\$10,000			\$75,000
Energy Companies (300)			\$20,000			\$22,500
Local Level Indicators						
FRIAA (Water Yield)			\$20,000			
ACA (Upper McLeod)						\$50,000
JNP (Upper Athabasca)						\$12,000
Total	\$212,000		\$136,000	\$62,500	\$30,000	\$159,500

14. Proposed Payment Schedule

Payments from each of the above partners are established in contracts as either twice per year or quarterly.

15. Subcontracted Work

The riparian project will be completed under the supervision of Prof. Marwan Hassan of UBC Department of Geography. A payment agreement will be established between the FtMF and UBC.

16. Project Management

Prof. Marwan Hassan will oversee the Wood Budget / Sediment Budget project. Richard McCleary will be responsible for all field aspects that project. Richard will also supervise all other projects. The Operational Inventory Project will largely be delegated to a senior technician. We are planning to recruit a full time person to coordinate the stream crossing association and this person will work for the Association. A project management consultant will be hired for the Kinsmen Park / Hardisty Creek Project.

17. Additional Organizations requesting FRIAA Administered Monies

18. Other Relevant Information

Fish collection permits will be required for proposed research work to be conducted within the lands managed by Alberta Sustainable Resource Development. Permits will also be required to complete the Kinsmen Park / Hardisty Creek restoration project and applications will be submitted to appropriate agencies on behalf of the landowner at the restoration site (i.e. Town of Hinton). The FtMF will ensure that permits and authorizations from Fisheries and Oceans Canada, Alberta Sustainable Resource Development and Alberta Environment are in place for any aspects of the Hardisty Creek Project where we are actively involved. Hardisty Creek has been designated as non-navigable and therefore our project will not trigger the Canadian Environmental Assessment Act.

Foothills Model Forest 2005-2006 Annual Work Plan

Detailed Proposal

Grizzly Bear Research Program

1. Prepared by

Name: Gordon Stenhouse
Address: Box 6330, Hinton, AB T7V 1X6
Phone: (780) 865-8388
Fax: (780) 865-8331
Email: Gordon_Stenhouse@gov.ab.ca

2. Introduction

In 1999 the Foothills Model Forest Grizzly Bear Research Program (FtMF GBRP) was initiated with a goal of providing new knowledge, tools and models to aid in the long-term conservation of this species in Alberta. Over the course of the past 6 years this program has fulfilled its mandate and has developed a number of new tools and models (Franklin et. al, 2001, Nielsen et. al. 2002, 2003, Schwab et. al. 2002, and Stenhouse et. al. 2000, 2001, 2002) that are now being used in land management planning in portions of the eastern slopes of Alberta, where we have completed this work. This work provided new insights into many aspects of grizzly bear ecology related to sustainable resource development and land management planning.

Our research team has also made some important new findings, related to grizzly bear health that have potentially serious implications for the long-term survival of grizzly bears in portions of their range.

The program's achievements to date are in large part a result of the partnerships we have formed within this research undertaking. These partnerships start with our numerous sponsors who believe in the principles of adaptive management and sustainable development in conjunction with conservation of this important species. Our sponsors have continued to provide ongoing support for our program during the past 6 years. Our partnerships also include the teams of scientific specialists (biologist, GIS analysts, geneticists, statisticians, veterinarians, remote sensing experts, reproductive endocrinologists, and population modellers) who have worked co-operatively to aid in understanding the complexity of grizzly bear ecology and response to human activities. Without the teamwork and support of all these partnerships this program would not have achieved the major successes we have to date.

The success I refer to is not limited to ongoing support and data collection but rather is reflected in the numerous scientific publications that have been generated, the list of graduate students that have received degrees and training within this program, but most importantly the research results being applied by resource companies and land managers with an aim of integrating the needs of

grizzly bears into planning efforts. Applied research has been and continues to be a primary focus of our program and the most important goal.

Although we have completed the first phase of this program, and are now analyzing data sets to complete our final report, there remains a need to extend the model and tools we have developed to the other areas of the province that have grizzly bear habitat with no planning tools or models to assist in grizzly bear conservation and management. In addition we believe it is both necessary and advantageous to attempt to further our understanding of grizzly bear health parameters to environmental/landscape conditions as an aid to monitor the overall health of grizzly bear populations in Alberta over the long-term.

To move forward with this vision, this document outlines three primary areas of research, which our research team is proposing for 2005-2006. This work builds from our current accomplishments and continues investigation of new discoveries that have been made over the past five years.

Proposed Activities

PART 1. ONGOING REMOTE SENSING HABITAT MAPPING WITH RSF AND GRAPH THEORY MODELING – (RESEARCH TEAM STENHOUSE, FRANKLIN AND BOYCE)

Progress to Date

Over the past 6 years the Foothills Model Forest Grizzly Bear Research Program has made significant advances in improving our understanding of how grizzly bears use forested landscapes along the eastern slopes of Alberta. 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 include:

A satellite image classification and greenness estimation protocol for large areas and long time periods.

Remote sensing tools to map and identify grizzly bear habitats and human use features at the landscape level.

The use of resource selection function models (RSF) to predict probability of grizzly bear occurrence at the landscape level. Grizzly bear response to cutblocks is one finding of this exercise.

The use of graph theory models to identify grizzly bear movement corridors at both the home range (watershed) and landscape level.

A multi-disciplinary team of researchers from the Foothills Model Forest, the University of Alberta, University of Saskatchewan, and the University of Calgary developed these tools and models. These products have now been tested and validated in a 10,000-km² study area along the east slopes of Alberta adjacent to Jasper National Park and Whitehorse Wildland Park. Validation of these products has also occurred (2004-2005) for an extension area south of Highway 16 to the Highway 11 (30,000 km²). Findings from this work have been peer reviewed and

published in the scientific literature (see Franklin et al. 2001, Nielsen et al. 2001, and Schwab et al. 2002). We now have proven models and tools to apply in the management and planning of forest resources to support the management and conservation of grizzly bears in a large portion of the eastern slopes and foothills of the northern Rocky Mountains of Alberta. In 2005 we extended the classification and mapping of grizzly bear habitats along the eastern slopes and foothills south to the Montana border, where there are ongoing and immediate needs for forest and land management planning. This year we plan to continue our efforts to provide maps and models for all grizzly bear habitat in Alberta by expanding north into the Boreal forest in. This will enable us to test and refine the tools and models in new areas in order that they may be applicable over a wider landscape. We clearly recognize that models developed for the Foothills natural sub-region may be different from those required in the Parkland, Grassland and Boreal sub-regions of Alberta. The basic approach we have used to generate and test the current models will still apply to different landscapes and we envision that new model coefficients will be required. The collection of new test data when combined with new remote sensing based habitat maps will allow the development of “ecosystem appropriate” models. This research represents a continuation of new approaches to integrating grizzly bear habitat mapping with forest planning at multiple scales. Having these products will aid foresters and land managers with sustainable forest management practices and decisions.

Grizzly bears are a resource that has a high value among the public of Alberta both from a recreational perspective and as an indicator of ecosystem health. Other forest resources such as pulp, lumber, oil and gas provide significant economic benefit to Albertans. This research seeks to ensure that grizzly bears and other forest resources can continue to provide benefits to Albertans. Grizzly bear habitat in Alberta covers an area of approximately 228,000 km², in 2005 we will have habitat maps and models available for 143,488 km² or 63% of the Alberta range of this important species. The ultimate goal of this program will be to have one seamless grizzly bear habitat map, with appropriate validated predictive maps and models for the entire currently identified grizzly bear range in Alberta.

Goal

Building on the work currently underway (2005-2006), the research team would like to continue the development of a seamless grizzly bear habitat map and RSF/Graph theory models for an area that would extend north of the Berland River along the eastern slopes to Grand Prairie and will include the Swan Hills area to the east. These products would provide land and resource managers with new mapping products and tools to use for making forest resource planning and management decisions which support conservation of grizzly bears in Alberta. This will allow habitat and movement requirements of grizzly bears to be taken into account during the development of forest resources and assist in providing for sustainable forest management.

Objectives

To build upon, extend, and complete the remote sensing habitat map work already completed (103 405-km²) to include regions along the eastern slopes of Alberta down to the Montana border (Spring 2005)

To prepare maps showing probability of grizzly bear occurrence (RSF models) on the wider landscape.

To prepare maps showing potential movement corridors for grizzly bears (Graph Theory Models) on the wider landscape.

Collect a data set of grizzly bear habitat use and movement patterns in these areas for testing and refining RSF and graph theory model performance.

To deliver these tools to land and resource managers in both government and industry and provide training on interpreting maps and model outputs to ensure these products are widely used for resource and land management planning.

Work plan

Objective 1:

Create a seamless integrated grizzly bear habitat map to cover an area along the eastern slopes of Alberta. This will build upon and extend the work already completed in a 103 405-km² portion of this area.

Activities: -Acquire the necessary satellite images for processing (N=4).
 -Pre-process images (atmospheric correction, edge matching, etc.).
 -Image classification.
 -Collect and assemble all current human use GIS data sets.
 -Ground truthing of images from existing data sets and field data.

Timelines: -Objective one will be completed for the new northern area by January 2006.

Objective 2:

Utilizing map products from 2004 and 2004/2005 field program and existing RSF models and established coefficients, analyze the southern extension area and create probability of grizzly bear occurrence map products for three seasons (spring, summer and fall)

Begin this same process for the 2005 mapping and field program area with 2005 grizzly bear data.

Activities: -Working with current RSF model coefficients conduct model runs on new landsat scenes.
 -Using new GPS grizzly bear telemetry data collected during the summer of 2004 and 2005, test, validate and modify where necessary the RSF models.
 -Prepare and distribute final probability of grizzly bear occurrence maps.

Timelines: RSF model work requires finished habitat map layers so we cannot begin this work until the map layers are completed. For the 2004

southern extension this work will be ongoing in 2005, while the 2005 mapping area will start in January 2006.

Objective 3:

Utilizing products created in Objectives 1 and 2, use recently completed and tested graph theory model results to generate landscape level grizzly bear movement corridor maps.

Activities: -Utilizing the RSF landscape level map output file, we will conduct graph theory model runs with current validated coefficients for the new Landsat scenes.

Timelines: This work is also linked to the creation of a habitat layer and also the RSF model output runs. Therefore the 2004 southern extension work will be ongoing in 2005 and the northern 2005 mapping area will start in January 2006.

Objective 4:

Collect a data set of grizzly bear habitat use and movement in these areas for testing RSF and graph theory model performance. *(Note: validation of these models on new landscapes is considered an important component of this work. Hence we feel it is important to collect test data from these new areas)*

Activities: -In order to properly test and validate the existing model outputs and results in new landscapes it is important to collect a sample of bear habitat use and movement data within areas identified within the new Landsat scenes.
-We plan to capture and collar a total of 20 grizzly bears in the identified geographic area to collect GPS location data for model verification purposes. This data will only be collected for this purpose for 2 years (2005-2006). It is important to point out that some of these collars do not have to be purchased (15 x \$5K = \$75K), (require new batteries and refurbishment) are now in hand as assets of the FtMF grizzly bear research program. We only require funding for the purchase of 5 new collars, 15 new batteries and ear tag transmitters (\$40K).

Timelines: The capture and collaring for the southern extension area will take place in April-June of 2005. Data collection would occur every month through programmed data uploads and collars would be recovered in the fall of 2006 prior to denning.

Objective 5:

Deliver these tools to land and resource managers in both government and industry and provide training on interpreting maps and model outputs to ensure these products are widely used for conservation planning and stewardship. We plan to deliver these products and information to all program sponsors that have contributed > \$15,000 to the project through a series of formal workshops to be

held in 2005 and 2006. Completed maps and models will also be provided to any new partners who agree to pay \$15,000/yr. *(Although this is listed as objective 5 it is the most important component of this proposal. However this objective cannot be delivered without the completion of objectives 1-4.)*

Activity and Timeline:

All final products and reports for a 100,000 km² area (Beland River to Calgary) will be completed and distributed by April 2005 to both government land and resource management staff and industry partners. Workshops will be conducted throughout 2005.

Results And Key Deliverables

A seamless grizzly bear habitat map for the target area along the eastern slopes. RSF map products and coefficients for this study area (tested and validated). Landscape level grizzly bear movement corridor maps for this study area (tested and validated).

A series of workshops designed to introduce the tools and models to land and resource planners in both government and industry.

Final products and reports will be available to the general public through the Foothills Model Forest.

At the completion of this project, land and resource planners in both government and industry sectors in this region will have the tools and models to make informed decisions, taking into account grizzly bears requirements, which will be a significant step forward to ensuring the sustainable use of forest resources while providing for the long-term survival of grizzly bears.

Evaluation

The models and outputs from this work will be evaluated using statistical procedures to determine the degree of fit with test data sets. 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.

Budget Information for this program component

Operating Plan for the period April 1, 2005 to March 31, 2006:

Expenditures	Amount
	Cash
Purchase Landsat Images (N=4)	\$6000
Pre-process Landsat Images (3x \$6K)	\$18,000
Image classification (3x \$8K)	\$24,000
Ground truthing of 4 landsat scenes (3x \$16K)	\$48,000
Assembly of human use GIS data sets (4 weeks)	\$12,000
RSF modeling for 3 TM scenes (4 months)	\$15,000
Movement corridor modeling (4 months)	\$15,000
Capture and collaring costs of 20 bears	\$85,000
Program staff (1 biologist)	\$70,000

Collar data collection (remote via aircraft)	\$25,000
Map production/report preparation	\$3,000
User workshops (N=5)	\$20,000
GIS staff support	\$18,000
Computer hardware and software support for expanded area	\$5,000
GPS batteries and ear tag transmitters	\$40,000
Travel and meeting costs with program collaborators	\$7,000
Total	\$411,000.00

PART 2. RELATIONSHIPS BETWEEN GRIZZLY BEAR HEALTH PARAMETERS AND ENVIRONMENTAL CONDITIONS. (RESEARCH TEAM: STENHOUSE, CATTET AND GIBEAU)

Overview of Animal Health and Population Level Implications

The persistence of animal populations over time is related to a combination of factors including: suitable habitat, birth rates, mortality rates, food resources, and the overall health of individuals within the populations. If animals are in poor health as a result of disease, inadequate nutrition, chronic or acute stress, or a combination of these and other factors, the long-term persistence of the population can be threatened. We believe that when animals are in poor health, demographic characteristics (mortality and birth rates) and individual growth/development may be affected. However, if most animals in a population are in good health we believe that this population unit would remain stable or increase over time as long as a human-caused mortality is in check. A full, or at least a more comprehensive understanding, of the health status of grizzly bear populations in Alberta, when linked to landscape or environmental conditions is vital to ensure the long-term survival of this species. It is important for wildlife managers to remember that grizzly bears have one of the lowest reproductive rates of any terrestrial animal.

Background

We have been assessing and monitoring the health of individual grizzly bears since 1999 as part of standard handling and processing protocols with study animals. Because no single measure can provide a reliable picture of health, the combination of many measures has been our approach. These including physiological function (heart and respiratory rates, body temperature), body condition, and a broad array of blood analyses. Over the past 6 years our research team has made some important new findings from this grizzly bear health data set that have potentially serious implications for the long-term survival of grizzly bears in portions of their range. These findings and the relationships suggested are not perfectly clear but are certainly cause for concern for wildlife managers and conservation biologists.

This research component focuses on developing new techniques and technologies to assess grizzly bear health in relation to environmental conditions. This approach will allow managers to understand how grizzly bears respond to changing landscape conditions and human use on a shared landscape. Our research team members for this undertaking are noted experts from the University of Waterloo and the University of Saskatchewan. These specialists will investigate measures of chronic stress in both blood and tissues samples and determine the relationships to environmental conditions as measured through our mapping component and GIS data sets. The completion of this project will provide government agencies and resource managers with a clear measure of the health of this important species while also ensuring wise management decisions for their long-term conservation. The FtMF Grizzly Bear Project is uniquely positioned to undertake this work, as we now have the largest most comprehensive grizzly bear data set in Canada. Without the existing data we have amassed, and the team of specialists, this work would not be possible

Research Plan

The FtMF GBRP has the most extensive and comprehensive data set (movements, health, habitat use, human use characteristics, genetic relationships, etc) of any grizzly bear program in North America. It is important for us to fully explore and analyze all available data that is currently in place to determine possible correlations to health parameters (including reproductive function) and landscape conditions and human use variables. In addition, the FtMF GBRP has expanded its activities southward in 2004 and collared a sample of 23 grizzly bears from the Clearwater River to the Montana border. In 2005 we plan to capture and GPS collar 20 adult grizzly bears north of the Berland River to the Grand Prairie area including the Swan Hills area to the east. When combined, this sample of bears will provide a unique opportunity to compare health assessments of grizzly bears inhabiting different landscapes along the eastern slopes of Alberta.

Objectives

Develop a more thorough understanding of the relationships between current landscape conditions and grizzly bear health parameters. This understanding will be crucial as an indicator of ecosystem health when sustainable forest management practices are reviewed. Undertake a thorough and extensive analysis of existing FtMF grizzly bear health data along with all available GIS based landscape and environmental data sets.

In conjunction with ongoing FtMF GBRP activities collect appropriate health parameter data from all study animals captured as part of ongoing field activities. The research team will also organize and coordinate the collection of these samples and data with other management agency (federal and provincial) personnel who may handle grizzly bears as part of control or safety efforts.

Methods

Objective 1: Analysis of Existing Health and Environmental Data

Compile all existing grizzly bear health data and link this information to environmental/landscape variables which include:

Road densities

Levels of road use (motorized/non-motorized, high, medium and low)

RSF models and grizzly bear food models (habitat quality)

Degree of landscape fragmentation

Forest seral stages within the home range

Levels of human activity (mining, oil and gas development, etc.)

Annual landscape change

Working with the existing datasets gathered over the past 6 years, our research team (Biologists, GIS analysts, veterinarians, and statistician) will conduct this detailed analysis to look for correlations and patterns within these data. This complicated spatial analysis is necessary to ensure that we have included as many of the environmental factors that are suspected to influence grizzly bear conservation. A full report and scientific paper will be completed on this work and submitted to a journal in 2005.

Objective 2: Collection and Analysis of Additional Grizzly Bear Health Data

In conjunction with ongoing FtMF GBRP activities collect samples (as per current protocol – BCI, blood samples, etc.) from all research study animals (N=20) that will be captured and fitted with GPS collars in the 2005 field program. The importance of having GPS location data from these bears is important to help us understand the home ranges and landscape conditions that these bears are exposed to. In addition to the standard samples collected we also hope to collect semen samples from male bears and conduct ultrasonographic examination of the gonads of both male and female bears. These data will assist in understanding the current research findings mentioned previously. When this work has been completed we will have baseline data from grizzly bear populations along the eastern slopes

Each year in Alberta, conservation officers and park wardens capture and handle a number of grizzly bears as part of ongoing bear/human conflict situations.

Unfortunately to date, the regular and standardized collection of physiological data and samples has not occurred in an organized and coordinated manner. In order to improve this situation, and to increase our samples sizes and understanding of health parameters, we propose to coordinate an improved data and sample collection effort with these field staff. This will entail the preparation of field sheets, sample collection kits, and instructional materials. All samples will be analyzed through the currently established laboratories and staff that we have been working with over the past 6 years.

Our research collaborators at the University of Saskatchewan and the University of Waterloo will continue with the development of new laboratory procedures and techniques to assist in understanding and monitoring chronic stress levels in grizzly bear with a focus on the development of a non-invasive procedure to track these levels over time as part of a monitoring strategy.

Management Implications

The data collected on grizzly bear health status over the past 5 years in the FtMF GBRP represents a significant investment in resources and data collection. These data are now available to assist us in trying to further understand the relationships between environmental conditions and the health of a grizzly bear population. Our research team believes that an improved understanding of these relationships will be key to land use management decisions in grizzly bear habitat in Alberta. These data represent the only comprehensive long-term (6 years) grizzly bear health data set ever collected in the province. Putting these data into use will assist all stakeholders who are involved in sustainable management practices by ensuring we are utilizing the best available science in management decisions.

This project will also provide new tools and techniques for monitoring changes in grizzly bear health status that may also serve as a means to detect unsuitable habitat conditions for grizzly bear conservation. This improved understanding will form a critical component of future habitat stewardship conservation efforts.

Budget Requirements

Objective 1: Analysis of Existing Health and Environmental Data

Statistician support	15 days x \$ 400/day	\$6,000.00
GIS analyst support	10 days x \$ 300/day	\$3,000.00
Project Meeting	2 days x \$ 400/day	\$ 800.00
Publication costs	(estimated)	\$2,500.00
	Subtotal	\$12,300.00

Objective 2: Collection and Analysis of Additional Grizzly Bear Health Data

Sample collection kits	(purchase materials and assemble)	\$8,000.00
Distribution of kits and instructional materials	(non-research staff)	\$2,000.00
Meetings with Cons. Officers and Park Staff	(2 x \$ 400)	\$ 800.00
New field equipment	(field ultrasound, and semen collection)	\$20,000.00
Laboratory analysis of samples	(U of Illinois, and Saskatchewan)	\$15,000.00
Immobilization drugs and supplies	(N=15 bears)	\$10,000.00
Capture crew wages	(2 staff for 2 months)	\$24,000.00
Helicopter costs for aerial capture	(20% of total) 100 hours	\$16,000.00
Field Veterinarian	(travel and accommodations)	\$ 7,000.00
Freight and shipping of samples		\$ 2,000.00
	Subtotal	\$104,800.00
	TOTAL	\$117,100.00

PART 3: WORKSHOPS AND TRAINING: STENHOUSE AND FtMF GIS STAFF

This research program has completed the development of a number of new tools and products for portions of grizzly bear range in Alberta. We now would like to deliver these to user groups and provide the necessary training and knowledge transfer to allow land and resource managers to utilize them in the course of their planning activities. A series of formal workshops will be held in the spring of 2005 for industrial and governmental organizations that have supported the research during the initial 6 years. The workshops will provide new habitat maps and models to the AFPA (Alberta Forest Products Association) and its members, CAPP (Canadian Association of Petroleum Producers) and its members, and ASRD staff (Alberta Sustainable Resource Development). These workshops will also start the process of training to resource and land managers in the interpretation and use of these maps and models in resource development and land management planning. Our team plans to work with a professional educator/trainer to develop a training course that would take research findings and products to the stakeholders and resource managers. We would develop this training course in 2005 and with a phased implementation approach would have this ready for provincial delivery in 2006. No other jurisdiction in North America has, to our knowledge, attempted to take wildlife research findings and develop practical tools that can be used by all resource managers at a provincial scale. The development of this training program would involve the team researchers and would be coordinated with the SRD training program at the Hinton Training Centre.

Budget

The budget details for this program component are as follows:

Contract Educator and course development	\$45,000
Meetings with Principle Investigators	\$10,000
Focus Group Sessions (course testing and evaluation)	\$15,000
Production of Course materials	\$10,000
Total	\$80,000

PART 4: DEVELOPMENT AND TESTING OF INTEGRATED GPS CAMERA COLLARS (RESEARCH TEAM: NASER EL-SHEIMY, ANDREW HUNTER AND GORDON STENHOUSE)

Background and Current Status

Our research collaborators at the University of Calgary Geomatics Department have developed and tested prototype digital camera units that are linked to GPS radio collars and provide a high-resolution digital image of grizzly bear habitat use. This is a world first for this type of technology. We have done extensive laboratory and field-testing to look at system performance over the past two years, and have made significant progress in the design and application of these units. We now plan to integrate new components within the existing package to monitor

bear movements (speed and direction). These new data sets that will be gathered will allow the direct linking to program mapping efforts which has the potential to not only significantly improve our mapping products and RSF use models, but to also reduce field costs and disturbance of grizzly bears during the year.

The second generation of this product will be developed in 2004/5 and deployed on 10 grizzly bears in the spring of 2005. The second stage of this project focuses on ongoing development of hardware and software for the monitoring of grizzly bear motion. This imagery and data will serve a valuable role in the preparation of improved habitat maps and will provide new insights into the response of grizzly bears to human activities

Budget:

Materials and supplies for unit construction	\$35,000
Electronic technician support	\$15,000
Testing prior to deployment	\$ 5,000
PhD student support	\$38,000
Total	\$93,000

PART 5: DNA CENSUS 2005 (RESEARCH TEAM: STENHOUSE, BOULANGER, PROCTOR AND BOYCE)

Background

In 2001 the Director of Wildlife (SRD) provided direction that the Foothills Model Forest Grizzly Bear Research Program take on the role of coordinating and leading grizzly bear research activities in the province. This decision was based on the data, tools, skills, knowledge and infrastructure for grizzly bear research that has been assembled and accumulated since 1999.

There is a strong need by managers to better understand population status and trends of provincial grizzly bear populations. This information is important to address wildlife management issues involving allocation and also to help managers understand the linkage between population status and landscape conditions. Traditional population estimation procedures (mark/recapture estimates) for grizzly bear populations require extensive, expensive, long terms efforts spanning a number of years and usually resulting in estimates with large confidence intervals and low levels of precision. Newer approaches using DNA sampling have been shown to be more effective and can achieve tighter and more precise estimates. Although the use of DNA sampling (hair snagging technique) has now been used for grizzly bear population estimates for the past 8 years there are still issues that have not been fully resolved concerning sampling designs, grid cell sizes, and wire placement. However the biggest issue that is faced is the large overall cost to conduct these census efforts over a population unit. In short research and investigation is required to help resolve these issues.

Through 6 years of extensive grizzly bear research in Alberta the FtMF Grizzly Bear Project now has the primary and key building blocks to allow biologists to

address the issue of DNA census design and field implementation of grizzly bear census programs to monitor population trends. Specifically we have both high quality grizzly bear habitat maps for a major portion of the grizzly bear range in Alberta, along with RSF probability of occurrence maps, and grizzly bear home range data. The habitat maps allow the delineation of grizzly bear habitat, the RSF maps predict where bears are likely to be found, and the home range data determines the sampling area to work within. The design and planning of census efforts without this data is challenging and not recommended.

A primary goal of our ongoing work is to integrate and fully test whether the RSF map products will allow us to better stratify our sampling design within a population unit. Although this would seem logical and simple to implement it is crucial to emphasize that this has never been done, and full testing and validation is necessary. If we can achieve this it will be possible to significantly reduce the overall cost of ongoing DNA population census work for grizzly bear populations in Alberta. This would represent a major advancement in this area.

The FtMF Grizzly Bear Project is also recognized as pioneering the use of scat detection dogs for collecting DNA samples from grizzly bears. We are now ready to begin developing sampling methods to integrate this new technique with more standard methods (hair snagging) to build upon our earlier work and to again determine if there are cheaper and more effective ways to track population trends over time.

In 2004 the FtMF Grizzly Bear Research Project, on behalf of ABSRD Fish and Wildlife Division, conducted a grizzly bear population census for the newly defined population unit between Highway 16 and Highway 11. This unit was previously identified as two management units (4B and 3B). This was a major undertaking and the study design allowed for the testing of a number of important research questions relating to both field techniques and DNA study design. Currently samples are still being processed and we expect to have a population estimate and initial government report delivered in January 2005. Additional analysis will be required on the research questions and this will be completed in February and March 2005. With these results in hand planning new DNA census efforts on grizzly bears will be possible.

ABSRD has requested that the FtMF Grizzly Bear Research Project again conduct another population census for them in 2005 that will cover an area between Highway 11 and Highway 1. The study design for this census will be based on the use of our new maps and models and will incorporate the research findings from the 2004 census effort.

The proposed census work is a key research component within the overall provincial grizzly bear project and supports the draft Alberta Grizzly Bear Recovery Plan.

Budget (*note: this program component is being funded by ABSRD and will not utilize contributions from other program sponsors*)

Field data collection	\$ 320,000.00
Laboratory analysis (estimated)	\$ 55,000.00
Population estimate analysis and report	\$ 10,000.00
Contingency	\$ 15,000.00
Total	\$ 400,000.00

PART 6 OTHER ACTIVITIES

There is a recognized shortfall with the delivery of new maps and models that have just been completed and for the desire for immediate use of these products by end user groups. This group includes but is not limited to: government land and resource managers, the forestry, mining, and oil and gas sectors, private consultants, and NGO groups. Our hope is that with a well-designed and implemented training program, combined with new and updated products, end users will be using these products by the end of 2005. Within a two-year period most users should have sufficient knowledge to work with the products we have and are developing. However in the intervening time period it appears essential that the FtMF provide interim support to end users to allow immediate use of these tools to support sustainable forest management.

In recognition of this the FtMF Grizzly Bear Project will assist with the following in 2005:

- R11 planning – assessment and evaluation of planned activities
- Highway 40 North Planning: - assessment and evaluation of planned activities
- Cheviot Project – analysis and suggested strategies for monitoring
- Possibly Others – TBA

It is important to emphasize that these additional activities will only be considered if additional funding is made available through the proponent (client).

2005 Program Budget Summary

1. Habitat Maps and Models	\$411,000
2. Animal Health	\$117,000
3. Training and Workshops	\$80,000
4. Camera systems	\$93,000
6. Administration and office supplies/phone	\$15,000
Sub Total	\$716,000.00
6. DNA Census (SRD cost)	\$400,000
Program Total	\$1,116,000

3. Deliverables

1.) Knowledge Creation

peer reviewed and published RSF and Risk Models – March 2005
peer reviewed and published Graph Theory Models – March 2005
peer reviewed and published IDT maps with validation – March 2005
peer reviewed and published response to roads – April 2005
peer reviewed and published animal health papers – April 2005
peer reviewed and published DNA census and techniques paper – June 2005
final program report (1999-2003) completed – April 2005
distribution of newest map products and models – spring 2005

2.) Demonstration

creation of GIS applications for land managers and planners to utilize research findings in an applied manner
creation of chapter in CAZWV national standard on bear capture and handling protocols and standards for Alberta provincial undertakings - completed

3.) Knowledge / Technology Transfer

preparation of new RSF map products (2004 southern expansion) for land use management decisions
creation of Graph Theory module to work in GIS environment and allow scenario reviews

4.) Communications and Outreach

hold workshops for end users to distribute and explain products created
continue with numerous and varied research presentations throughout Alberta and Internationally – ongoing
participate on numerous graduate student committees (Uof C and Uof A, U of S, Wilfred Laurier) - ongoing
continue to work with media as time permits – ongoing

5.) Policy Support

complete annual reports and demonstration projects, along with peer reviewed scientific papers – (see section Other Activities above)
deliver interim and final products to users and program sponsors – underway and ongoing
deliver of products and tools to assist in land and resource management in Alberta. Currently ASRD, Forest Management Branch has indicated that resource industry in the province should be using our products and tools in the development of their plans. A number of workshops in 2004/2005 have been completed to help to provide end users with an understanding of how these products can be used.

4. Timelines

Task	2005										2006		
	A	M	J	J	A	S	O	N	D	J	F	M	
Capture and collaring	x	x	x	x									
Habitat Mapping field work				x	x								
Vegetation Sampling		x	x	x	x	x	x						
Animal health field and lab	x	x	x	x	x	x	x	x	x	x	x		
GPS Camera System	x	x	x	x	x								
GPS data collection		x	x	x	x	x	x	x	x			x	
Reports and publications					x	x	x	x	x	x	x	x	
Training and Workshops	x	x	x	x	x	x	x	x	x	x	x	x	

5. Site Information

The primary study area for field activities in 2005 is shown in figure 1. However this project extends from this area south to the Montana border along identified grizzly bear range in Alberta.

Activity Team

A newly created activity team will be holding their first meeting in February 2005 to review this workplan, activities to date, and program direction. Members of this committee have not been confirmed as of this date but will include representatives from:

AFPA – Rick Bonar
 CAPP
 SRD –Fish and Wildlife
 ACA – Robert Anderson
 Parks Canada – Mike Gibeau
 CPAWS
 SRD - PLFD

This research project also has a Scientific Advisory Group to assist with the review of the multi-disciplinary nature of the program. This group of experts, from a multitude of disciplines, meets annually to review the progress and work plans of the project and provides scientific input into all facets of the program.

6. Scientific Review

This project focuses on producing peer-reviewed papers in scientific journals for all program elements. Through this approach we feel that we maximize the distribution of research findings and this allows managers to have further confidence in the research results and recommendations. All program collaborators are expected to produce at least one publication each year. Annual program reports are a collaborative effort and are seen as a way to provide summary information to partners but are not viewed as the principle medium to disseminate research findings.

7. Improvements to Management in Forest Ecosystems

Both senior resource managers and local resource managers see the tools and models that we are developing as fundamental in ensuring that forest management is able to understand the needs of grizzly bears and adapt practices as required to ensure their long-term survival in this ecosystem.

8. Amount of Money Requested From the Foothills Model Forest

\$70,000.00 – (Jasper National Park)

9. Partner Contributions

Partner/Organisation	Cash			In-kind		
	Current Funding	Promised Contribution	Funding Pending	Current Funding	Promised Contribution	Funding Pending
Foothills Model Forest	\$70,000		\$70,000			
SRD		\$50,000		55,000.00	salary/staff support	\$200,000 for DNA work
Parks Canada					staff support	
FRIAA (2005)		\$300,000				
Weyheuser	\$25,000	\$25,000				
Canfor	\$15,000	\$30,000				
ERAC	\$20,000	\$20,000				
NSERC	\$59,000	\$59,000				

10. Proposed Payment Schedule

FtMF monies will be requested April 1, 2005

At the time of preparation we do not have the full 2005 research project budget in place. Some of our current program partner have indicated that they will again provide funding support in 2005, while other applications and requests are still pending. Some of the current funding submissions that are now pending include:

Alberta Innovation	Requested	\$740,000
Habitat Stewardship	Requested	\$100,000
Rocky Mntn. Elk		
Foundation	Requested	\$25,000
World Wildlife Fund	Requested	\$25,000

11. Subcontracted Work

NSERC agreement in place with Dr. Franklin and Dr. Boyce
 Co-operation agreement in place with WCVI in Saskatoon – animal health
 Co-operation agreement in place with U of C Geomatics – camera collar system

12. Project Management

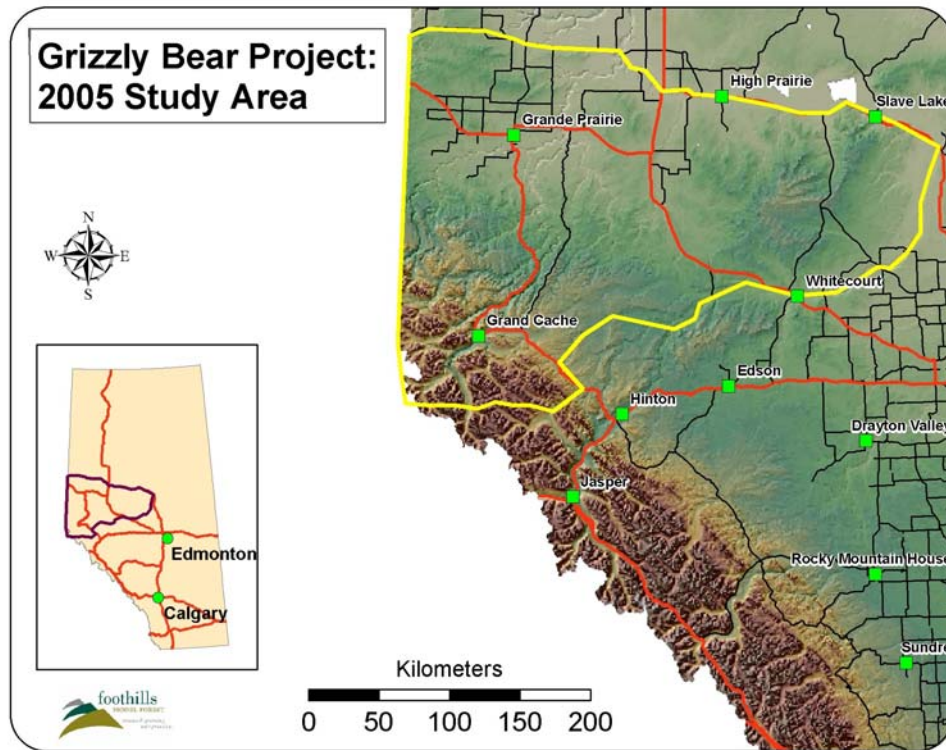
Gordon Stenhouse

13. **Additional Organisations requesting FRIAA Administered Monies**
Other FMA holders as listed in funding sources for 2004.

14. **Other Relevant Information**

A list of publications and technical reports is available on our web site.

Figure 1.



Foothills Model Forest 2004-2005 Annual Work Plan

Detailed Proposal

Local Level Indicators

1. Prepared by

Name: Christian Weik
Address: Box 6330, Hinton Alberta, T7V 1X6
Phone: (780) 865-8290
Fax: (780) 865-8331
Email: Christian.Weik@gov.ab.ca

2. Introduction

The major focus of Canada's Model Forest Program in Phase II (1997-2001) was the development and reporting of Local Level Indicators of Sustainable Forest Management. This initiative was undertaken in Phase II in support of the Canadian Council of Forest Minister's (CCFM) commitment to reporting on Criteria and Indicators of Sustainable Forest Management in Canada. At the outset of Phase III the Canadian Model Forest Network took on reporting Local Levels Indicators of Sustainable Forest Management as a network strategic initiative. At the national level, the Canadian Council of Forest Ministers identified six national criteria of sustainable forest management. These criteria are conditions, which Canada believes must exist for sustainable forest management to become reality. For the criteria to be effective, they must be adopted by land/resource managers and adapted to local conditions.

3. Background Information

Foothills Model Forest (FtMF) accepted the task of assessing these national criteria at a local level, and began by identifying local goals and indicators that would support the intent of Canada's broad commitment to sustainable development. Partners with major forest resource management responsibilities in the FtMF worked with stakeholders, including members of the public, to develop their own individual goals for sustainable forest management. They then collaborated with each other to identify shared goals for sustainable forest management. The Board of Directors of the FtMF reviewed the resulting set of shared goals, and ultimately endorsed them as reflective of Board members' values and priorities.

The next requirement was to develop a set of indicators that would measure performance against these goals. An initial set of indicators was developed with input from many of the partner agencies, and was reviewed by technical specialists representing the agencies with primary responsibility for forest management within the FtMF. This "reality check" allowed those involved to develop categories for those indicators that can be reported upon now, and those that will be reported on later.

After the release of the Initial Status Report in 2003 the activity team sought the confirmation of the shared goals for sustainable forest management (SFM) of the Board of Directors. The shared goals were ratified in December 2003. At this time the team recognized the need and opportunity to review and enhance the initial suite of indicators, based on inputs by managers and experts involved in monitoring achievement of SFM against such goals. In January 2004 the team held a workshop in Jasper and a report of the results was completed in June of 2004. The FtMF Executive Committee accepted the report's recommendations in November of 2004. The report recommended the activity team proceed with reporting approximately 50 indicators to demonstrate progress against all 23 of the shared goals of the partnership in the Follow-up State of the Forest Report. It also outlined key steps in accomplishing this task by March of 2007; these are described in more detail in the section titled *Abstract of Methodology*.

FtMF has assembled and presented some of the scientific data to provide the element of measurement for most of the chosen indicators. The intent of the Local-Level Indicator Project is to repeat the monitoring and measuring over time, so that updated reports will show any changes and trends as they occur. It will also seek to refine and enhance indicators through collaboration with FtMF partner agencies.

4. Objectives

The FtMF will continue its work on Local Level Indicators in Phase III. Reporting on LLI brings together, in a common document, highlights of much of the research and activities undertaken at the FtMF. It brings focus to the fact that many SFM issues cross jurisdictional boundaries and allow the land / resource management partners a neutral forum for reporting on continuous improvement and progress towards SFM. With this in mind, the following objectives were approved for the FtMF LLI Program in Phase III:

- Maintain and as new research and information becomes available, improve upon and or enhance the indicator set.
- Provide yearly progress /annual reports on maintaining and improving LLI set.
- Produce a full, Follow-up State of the Forest Report at the end of Year 5 of Phase III (2007)

1. Knowledge Creation

Maintain, and as new research and information becomes available, improve upon and /or enhance the indicator set.

1a. Beneficiaries and Impacts

The Follow-up State of the Forest report will be beneficial to land and resource managers, FtMF partners and the general public. The report will provide follow-up indicator measures as well as provide new measures or action plan where gaps in data exist. This information, both current and since the Initial Status Report, can be used by resource managers and the

general public to assess Sustainable Forest Management within the FtMF Landbase.

It is important to note that the Model Forest does not have the mandate to provide much of the data reported on in the report and the creation and provision of data for a large number of these indicators does, and will continue to, fall on land and resource management partners with FtMF.

2. Demonstration

In its Phase III Proposal, the FtMF indicated that it will endeavour to create opportunities for projects focused on demonstration of sustainable forest management activities and techniques. The FtMF will seek opportunities to include demonstration of indicators as part of these demonstration projects.

FtMF State of the Forest reporting will demonstrate progress and or issues related to measuring progress towards sustainable forest management. Use of indicators developed at the FtMF and used by its land and resource management partners (Jasper, Weldwood, Alberta Government) will also allow them to measure and demonstrate progress towards sustainable management objectives of their respective organizations. It is the intention of the FtMF to include indicators as a component of Demonstration Projects that will be undertaken during Phase III.

2a. Beneficiaries and Impacts

Demonstration of indicators will allow land and resource management agencies to show how indicators are relevant and crucial at the local level as well as in management planning. It should also be able to demonstrate how indicators are measured and possible management implications of this reporting.

3. Knowledge / Technology Transfer

Provide knowledge exchange and support to partner agencies including Weldwood, Jasper National Park of Canada, Alberta Sustainable Resource Development and Alberta Environment. This may facilitate working with land managers to help in their understanding of challenges, methodology and opportunities for LLI through sharing knowledge of an LLI implementation process.

3a. Beneficiaries and Impacts

Working with land and resource managers, partner organizations and other groups to increase knowledge and provide assistance in developing and reporting on Local Level Indicators, supports the CCFM's commitment to managing forest lands in Canada sustainably.

4. Communications and Outreach

The communications and outreach objectives of the FtMF LLI program are as follows

- To increase the general public's understanding of local level indicators and their link to SFM not only within the FtMF, but also

at regional, provincial, national and, potentially, international scales.

- To educate the general public about the indicators that are monitored on the FtMF land base and how they link to sustainable forest management.
- To seek opportunities to increase awareness and understanding of, and with a planned approach, capacity to report on local level indicators by other forestry and sustainable development research organizations through such tools as progress reports, indicator templates and protocols for indicator selection, development and data collection and reporting.

4a. Beneficiaries and Impacts

Beneficiaries could include FtMF staff, program leaders, collaborators, contractors, partners, stakeholders, Canadian Model Forest Network, International Model Forest Network, and other Forestry/sustainable development research organizations (University of Alberta Sustainable Development Network; Alberta Science Council, ASRA, International Development Research Centre) and Albertans with an interest in learning about sustainable forest management. This could include students, lay persons, and professionals from all backgrounds and disciplines, and Alberta Government MLAs whose constituencies have major industry alongside the boreal forests of Alberta.

A desired impact would be a common understanding of, and acceptance that LLI reporting was a desirable methodology for neutral reporting on SFM in Alberta, Canada and the world. This could include support for reporting on progress towards SFM in such initiatives as the National Forest Strategy.

5. Policy Support

To have land and resource management organizations, both inside and outside the FtMF partnership, accept that LLI reporting is a viable and cost effective method of measuring progress towards sustainable forest management and to have these organizations commit to LLI reporting as part of their management planning frameworks.

5a. Beneficiaries and Impacts

Beneficiaries include land and resource managers and the people of Alberta and Canada

5. Abstract of Methodology

The FtMF obtained commitment via ratification from the board of directors to support the “State of the Forest Report” to be completed by March 2007. This was accomplished through a series of discussions, presentations and follow-up letters with FtMF Board members. These activities centered around clarification from the Board on the following items:

1. Confirmation of shared goals
2. Confirmation of shared priorities of the FtMF land management partners
3. Commitment to allocation of resources to support the LLI program pending direction/mandate of the program by the FtMF Board.

The results of these discussions have been used as the basis for the direction of the program for the remainder of Phase III. At this point the team chose to review and enhance the initial suite of indicators, based on inputs from managers and scientific experts involved in monitoring achievement of SFM against such goals. In January 2004 the team held a workshop in Jasper that resulted in a report summarizing input on the indicator suite and clearly stating the recommendations of the LLI activity team on how to proceed towards the 2007 Follow-up State of the Forest report.

Key recommendations to proceed are highlighted below.

- The team recommended the FtMF target approximately 50 indicators for inclusion in the 2007 *State of the Forest* Report. Most indicators can be developed with minimal effort by virtue of already being developed by partners or previous work conducted by the FtMF. The team also believes that the following 10 areas require and justify special cooperative effort among the partners:
 - Genetic diversity (1.2.3)
 - Rare, unique or special ecological sites and landscape features (1.3.1)
 - Natural diversity of forest ecosystems (1.4.2, 1.4.5, 2.2.1)
 - Productive capacity of ecosystems (2.1.1, 2.1.2)
 - Water quality - stream crossing standards (3.1.2.a)
 - Water yields (3.2.1)
 - Carbon fixation (4.1.2)
 - Recreational opportunities (5.2.1)
 - Integration of lineal infrastructure (5.5.2)
 - Threats from large-scale disturbances (5.6.1, 5.6.2)
- The team recommended the hiring of a full time Project Coordinator from January 2005 until March 2007. For indicators where a collaborative effort is required to develop indicator protocols, the key role of the Project Coordinator will be to build and facilitate teams to accomplish this task. The Project Coordinator will also be responsible for work plan development, data collation and project management towards the Follow-up State of the Forest report in 2007.

6. Deliverables

1.) Knowledge Creation

- Establishment of task teams for the development of the 10 indicators identified for collaborative development.
- Collation of all indicator data for reporting requirements. (December 2005).
- Progress Report – April, 2005

2.) Demonstration

- TBA – Pending development of FtMF Demonstration Projects.

3.) Knowledge / Technology Transfer

- N/A

4.) Communications and Outreach

- Annual / Progress Report – April 2006

5.) Policy Support

- N/A

7. Timelines

Timelines for fiscal 2005-2006.

Task	2005										2006		
	A	M	J	J	A	S	O	N	D	J	F	M	
Annual Progress Report												X	
Data acquisition and indicator development*	X	X	X	X	X	X	X	X	X				
Data compilation, analysis, and draft report writing										X	X	X	

*The cut-off for data collation for the purpose of inclusion in the 2007 report will be December 2005.

Timelines to completion of project and Phase III.

Task	2006				2007
	Q1	Q2	Q3	Q4	Q1
Annual Progress Report				X	
Data compilation, analysis, and draft report writing	X	X	X		
Report finalization				X	X
Approval of report by Executive Committee and Board					X
Release of final report					X

8. Site Information

FtMF Landbase

9. References

N/A

10. Scientific Review

The Follow-up State of the Forest Report will be developed within the framework of the LLI Activity Team and will include an internal review by that team. Also, the task teams developed for collaborative indicator development will be made up of technical experts from sponsoring agencies.

11. Improvements to Management in Forest Ecosystems

LLI reporting is fundamental in measuring progress toward SFM in Alberta and Canada.

12. Amount of Money Requested From the FtMF

\$15,000 core funding

\$15,000 deferred

The FtMF board has agreed to provide funds to pay for the Project Coordinator position until January of 2006. It is expected that funds for the second year of the position will be provided by sources outside the Model Forest.

The Coordinator position will be taken over by Christian Weik, currently the GIS Coordinator at the FtMF. The funds allocated to the Project Coordinator position will be used to backfill GIS support as necessary.

13. Partner Contributions

Partner/Organisation	Cash			In-kind		
	Current Funding	Promised Contributions	Funding Pending	Current Funding	Promised Contributions	Funding Pending
FtMF	\$55,000 Est. Carryover	\$15,000 – core funding, \$15,000 deferred			2 Staff members and 1 consultant for committee - \$ to be determined	
Weldwood of Canada Limited					1 Staff member for committee - \$ to be determined	
Jasper National Park of Canada					1 Staff members for committee - \$ to be determined	
Alberta Sustainable Resource Development					3 Staff members for committee - \$ to be determined	
Alberta Community Development					1 Staff members for committee - \$ to be determined	
Canadian Forest Service					1 Staff members for committee - \$ to be determined	
Canadian Association of Petroleum Producers					1 Staff members for committee - \$ to be determined	
Alberta Environment					1 Staff members for committee - \$ to be determined	
Total	\$22,300 Carryover - Estimate	\$70,000			\$ to be determined	

14. Proposed Payment Schedule
N/A

15. Subcontracted Work
N/A

16. Project Management
The Project Coordinator will undertake project management. A project charter or terms of reference will be developed to better clarify the roles and expectations of the members of the LLI Activity Team.

17. Additional Organisations requesting FRIAA Administered Monies
N/A

18. Other Relevant Information
N/A

Foothills Model Forest 2005-2006 Annual Work Plan

Detailed Proposal

Decision Support System for Computable General Equilibrium Model of the FtMF

1. Prepared by

Name: Dr. Bill White
Address: 5320 122nd St. Edmonton AB T6H 3S5
Phone: 780-435-7315
Fax: 780-435-7359
Email: bwhite@nrcan.gc.ca

2. Introduction

The Social Science Research Group is in the process of updating the computable general equilibrium (CGE) economic impact model for the Foothills Model Forest area. If someone wanted results from the model, a request was given to researchers in Edmonton and the potential impact of a shock or change to the regional economy was estimated. By this proposal developed at the request of the FtMF Board we are requesting funds to contract the development of a user-friendly decision support system (DSS) that can be delivered to FtMF for use by its officials and the community

3. Background Information

The CGE model developed for FtMF represents the state of the art in regional economic impact models. It allows for greater flexibility than input-output and other economic impact models by allowing for one sector to grow while others shrink in response to the same shock. It accomplishes this by allowing land, labour and capital to move between sectors. For example, a decrease in forest activity may allow for an increase in recreation.

4. Objectives

1. Knowledge Creation

This project does not create new knowledge but focuses on the transfer of knowledge.

1a. Beneficiaries and Impacts

N/A

2. Demonstration

The project will be useful in demonstration exercises by allowing civic, industrial, provincial and other officials to demonstrate the economic impact of shocks or changes to the regional economy at workshops, open houses FtMF or other events or for internal analysis.

2a. Beneficiaries and Impacts

FtMF officials, local communities, industry

3. Knowledge / Technology Transfer

This is the primary benefit of this project. Knowledge that has been created in the development of the model can be transferred to and used by the FtMF community through the DSS that will be developed.

3a. Beneficiaries and Impacts

FtMF officials, local communities, industry

4. Communications and Outreach

A portable DSS can be used in outreach activities to demonstrate the CGE model that was developed at FtMF.

4a. Beneficiaries and Impacts

FtMF community, other model forests, any group to whom FtMF gives a presentation

5. Policy Support

The DSS will assist in policy support by making it easier to transmit the results from the CGE model to policy makers.

5a. Beneficiaries and Impacts

Local and provincial governments

5. Abstract of Methodology

The actual methodology for developing the DSS will be coordinated with the contractor. This is not an academic process but simply taking a model and making its use user-friendly.

6. Deliverables

1.) Knowledge Creation

N/A

2.) Demonstration

The DSS can be used in demonstration activities as required but no specific activities are planned.

3.) Knowledge / Technology Transfer

A user-friendly DSS and user manual will be developed by a contractor by 31 Aug 05.

4.) Communications and Outreach

The DSS can be used in communication and outreach activities as required. A QuickNote may be developed to explain the product. This could potentially be covered off by the development of the user manual.

5.) Policy Support

The DSS can be used for policy support activities as required but no specific activities are planned.

7. Timelines

Task	2005										2006		
	A	M	J	J	A	S	O	N	D	J	F	M	
RFP	x	x											
Development of DSS			x	x	x								
QuickNote							x						

8. Site Information

9. References

10. Scientific Review

Not a scientific activity.

11. Improvements to Management in Forest Ecosystems

The dissemination of information on the economic impacts of changes in forest ecosystems may result in improved management.

12. Amount of Money Requested From the Foothills Model Forest

\$30,000

13. Partner Contributions

Partner/Organisation	Cash			In-kind		
	Current Funding	Promised Contributions	Funding Pending	Current Funding	Promised Contributions	Funding Pending
Foothills Model Forest			\$30,000			
CFS					\$5000	

14. Proposed Payment Schedule

\$30,000 by June 1 2005

15. Subcontracted Work

The development of the DSS will be sub-contracted to a successful bidder.

16. Project Management

17. Additional Organisations requesting FRIAA Administered Monies

18. Other Relevant Information

This proposal was developed at the request of the FtMF Board

Foothills Model Forest 2005-2006 Annual Work Plan

Detailed Proposal

Community health and well being in resource-based towns: A comparative study of emerging issues.

1. Prepared by

Name: John Parkins
Address: Northern Forestry Centre, 5320 – 122 Street, Edmonton, AB
T6H 3S5
Phone: 780-435-7373
Fax: 780-435-7359
Email: jparkins@nrcan.gc.ca

2. Introduction

As resource-based communities¹ in Canada evolve from their origins as little more than “camps” for seasonal workers, they have become attractive places to work and live. These are communities with well-paying jobs, low levels of transience, a strong sense of community, large retirement populations, and a wide range of recreational opportunities for all ages. At the same time, some persistent social and health related issues remain prevalent in a wide range of resource-based communities. These include higher rates of poverty, health issues such as obesity and diabetes, and higher-than-average drug and alcohol use.

Furthermore, exposure to dramatic fluctuations in global commodity markets, the gradual but persistent replacement of labour with technology, and an increase in businesses offering lower paying service jobs, has created a situation in many resource-based communities where higher-paying jobs with good benefits are being replaced by lower-paying jobs with limited benefits. These trends are not unique to resource-based communities, but they do represent unique challenges in rural and remote regions of the country.

This project proposes to focus on drug and alcohol misuse, a pressing challenge for community leaders and health professionals in these locales. Using several exploratory methods, research will be guided by several key questions: To what extent do local employment conditions, such as shift work or minimum wage employment, combined with high levels of income among a large proportion of the population, contribute to certain social and health problems? Is the local industrial structure connected to these health issues or must we look to broader social and economic issues? What are the risk factors associated with drug and alcohol misuse?

In conjunction with the Town of Hinton (and other potential partners), we have developed two primary objectives for this study.

¹ This term ‘resource-based’ refers to forestry, mining, and oil and gas activity.

Understand the relationship between drug and alcohol issues and the economic structure of resource-based communities.

Understand the key factors and implications associated with the transition from union-based and larger-scale industrial employment to non-union and contractor-based employment.

3. Background Information

According to a recent study, there are strong positive relationships between levels of resource dependence and family income in western Canada (Stedman et al. 2004). Similarly, many resource-based communities are less transient than was once thought and they are making gains in human capital development (education attainment) that have been traditionally quite weak (Parkins et al 2003; MacKendrick and Parkins 2004)

While these social and economic gains are impressive, several other social and health-related indicators of community well being have not followed the same positive trajectory. For many resource-based regions of Alberta, for instance, illicit drug offences are much higher than the provincial average (AADAC 2003). In 2001, the Fort McMurray service area had a rate of illicit drug use that was five times the provincial average, and other resource-based areas such as Hinton, Whitecourt, and High Prairie followed closely behind. Similarly, alcohol consumption was also much higher in many of the same areas of the province where resource-based industries predominate. In another study, forestry and mining workers reported a higher than average prevalence of alcohol and gambling (AADAC 2002). With more recent concerns about drug misuse such as methamphetamine (crystal meth) in Alberta, this may be an important and timely opportunity to explore some of the foundational linkages between these social and health related issues and the economic structure of resource-based communities in Alberta.

Several scholarly traditions have examined many of the social and health-related issues in resource-based communities. The health literature, for example, talks a great deal about indicators of community health and the delivery of health programs in rural areas, as well as the social determinants of health. There are several published models on how to define and measure community health (e.g. Pong 2002). There is also a focus on preventative medicine and more holistic approaches to community health that encompasses recreation and better lifestyle choices. The effect of socio-economic status on health is also a central theme in the social determinants of health literature (e.g. Health Canada 2003).

There are also several health-related studies looking at broader issues such as the 'deskilling of labour' and the 'fragmentation' of rural society that has contributed to poor health outcomes in rural Canada (Williams et al. 1999). Studies out of the United States also point to the linkages between substance misuse and rural communities that relate to the social structure and processes that influence more risky behaviour (Conger 1997).

Although much of the published existing literature provides important insights and starting points for an investigation into the linkages between rural community health and a resource-based economy, a review of the published literature reveals no systematic study of this relationship. As the census data show, there have been some very positive social and economic developments in resource-based community within western Canada over the past 50 years but there also remains a persistent and troubling collection of health-related pathologies that has hampered the development of these communities (AADAC 2003). Not only do communities and individuals feel the impact from these health effects, local industrial and commercial interests who rely on pools of local labour are not able to tap the full potential of their workforce.

Given these current conditions, this study provides a timely opportunity to explore the risk factors associated with drug and alcohol misuse in resource-based communities. Questions about the business cycle of local industries, shiftwork, the changing nature of labour relations (employee versus contractor), general levels of education, lifestyle, social support and social networks will all form the basis of an exploratory study.

In addition, we will also attempt to understand the shifting nature of labour relations in these communities. Not only do we observe a transition to more low-paying and non-unionized jobs in the service sector and amenity-based sectors in rural resource-based communities, we also observe a transition to more contract employment in the more traditional extractive industries. This macro-level economic transition may also hold implications for the future well-being of resource-based communities in Alberta and beyond.

4. Objectives

A significant component of the knowledge transfer and communications component of this project will be undertaken directly with the *Project Steering Committee*. This committee will allow for maximum dialogue during all stages of the project and lead to project outcomes that can be incorporated into local strategies and initiatives.

1. Knowledge Creation

A review of published literature, key informant interviews and secondary data analysis will provide insights into the health and social conditions of contemporary resource-based communities in Alberta.

1a. Beneficiaries and Impacts

Beneficiaries include not only Foothills Model Forest (FtMF) partners who have made a commitment to more holistic approaches to sustainable forest management but also local municipal leaders who are interested in tracking community trends and in monitoring social and economic dimensions associated with community health.

2. Demonstration

Primary demonstration opportunities will coincide with opportunities to present results of FtMF partners and community leaders. Project reporting will take place through the regular FtMF channels as well as arranged meetings with community leaders and social and health care agencies.

A QuickNote (project summary) will also be developed to highlight dominant trends and implications for community sustainability.

2a. Beneficiaries and Impacts

Impacts will depend on the results of this exploratory study. If specific policy recommendations become clear, then impacts will be measurable.

3. Knowledge / Technology Transfer

The primary link for knowledge transfer is through the *Project Steering Committee* that will guide research from the outset. Knowledge transfer will also take place through report distribution, QuickNote publication, and scientific manuscripts.

3a. Beneficiaries and Impacts

Those who benefit from the project will include resource managers and municipal leaders, and others interested in the social and economic well being of model forest communities. The Local Level Indicators (LLI) working group may also benefit from knowledge transfer the LLI objects associated with future revisions and updates to indicator frameworks.

4. Communications and Outreach

Communication will be undertaken primarily through report distribution and QuickNote publication. Efforts will focus on clearly defining the relevant risk factors associated with substance misuse and specific implications for community sustainability as resource-based communities make transitions into new modes of industrial and commercial activity.

4a. Beneficiaries and Impacts

Beneficiaries include FtMF staff, partners and interested organizations within the region who maintain an interest in community well-being. These may include front line social workers, community leaders and health care advocates.

5. Policy Support

Policy support will be undertaken when clear policy issues are determined. This will become clearer as the project unfolds.

5a. Beneficiaries and Impacts

Beneficiaries include land managers, community leaders, the people of the Foothills region, and other resource-based communities throughout western Canada.

5. Abstract of Methodology

This study will adhere to the methods associated with exploratory and comparative case study research. As a specific type of research in the social sciences, exploratory research is designed to do the following: become more

familiar with basic facts, people and the concerns involved, develop a well-grounded picture of what is occurring, generate ideas and tentative theories, determine the feasibility of doing additional research, formulate questions and refine issues, and develop techniques and a direction for future research (Neuman 1994). One of the key components to the project will involve a 'steering committee' of local leaders who can provide oversight to the project and can assist in developing case study materials that will be linked closely with local information needs and interests.

Especially given the sensitive nature of topics associated with drug and alcohol misuse, it will not be feasible to undertake an intensive primary data collection process with large numbers of people. Rather, researchers will rely upon (1) an extensive review of published literature, (2) key informants from a wide variety of backgrounds within the community, and (3) secondary data sources from AADAC and other agencies involved with these issues. If additional funds are secured from another partner, a survey component of the project may be undertaken.

Analysis of primary data will be undertaken through an extensive and systematic review of narrative data from key informants. Detailed coding and aggregation of themes will be accomplished with the assistance of computer-based analytical tools such as QRS NUD*IST Vivo.

The comparative component of this case study provides an opportunity to examine the differences and similarities between various settings and contexts. Within Alberta, there are a large number of resource-based communities and many of these communities share similar socio-economic profiles. For the Hinton case study, a suitable comparison community will be identified, one that will likely be dependent on another type of extractive industry or may have other characteristics that help researchers to understand the relationship between health factors and local economic structures.

6. Deliverables

Deliverables will be presented in the form of a project report with several major headings: literature review, research methods, summary of results from key informants, summary of results from secondary data, discussion, and recommendations for policy and research. A FtMF QuickNote will also accompany the final report.

As an exploratory study, the project will provide some insights into the two major research objectives. Along with a discussion of the major risk factors associated with substance misuse in resource-based communities, the study will provide insights into the changing nature of the economy in resource-based communities. These insights will result in a more precise definition of these issues, some theoretical directions, a more precise direction for future research, and input into

strategies and interventions designed to address health-related issues in resource-based communities.

7. Timelines

Task	2005									2006		
	A	M	J	J	A	S	O	N	D	J	F	M
Literature review	X	X										
Key Informant interviews		X	X	X	X							
Secondary data collection				X	X	X	X					
Data analysis							X	X	X	X		
Final project report										X	X	
Quick Note												X

8. Site Information

Hinton, Alberta.

Comparison community (to be determined in early phase of research)

9. References

AADAC. 2002. Summary report. Substance use and gambling in the Alberta workplace: A replication study. Edmonton, AB: Alberta Alcohol and Drug Abuse Commission.

AADAC. 2003. Alberta Profile: Social and health indicators of addiction. Sixth Edition. Edmonton, AB: Alberta Alcohol and Drug Abuse Commission.

Conger, R.D. 1997. The special nature of rural America. National Institute on Drug Abuse Research Monograph No. 168.

Health Canada. 2003. What determines health? [web-site]. < <http://www.hc-sc.gc.ca/hppb/phdd/determinants/#determinants>>. Ottawa: Health Canada.

MacKendrick, N.A. and J.R. Parkins. 2004. Monitoring community sustainability in the foothills model forest: A 2001 Census Update. Report to the Foothills Model Forest. http://www.fmf.ca/SS/SS_report6.pdf

Mitura, Verna and Ray D. Bollman. 2003. The health of rural Canadians: A rural-urban comparison of health indicators. Rural and Small Town Canada Analysis Bulletin. Vol.4, No. 6. Catalogue no. 21-006-XIE. Ottawa: Statistics Canada.

Parkins, J.R., R.C. Stedman and T.M. Beckley. 2003. Forest sector dependence and community well being: A structural equation model for New Brunswick and British Columbia. Rural Sociology, 68(4), 554-572.

Pong, R. 2002. A strategy for developing environmental health indicators for rural Canada. Canadian Journal of Public Health, Vol. 93, Iss. 5.

Ramp, William et al (eds.). 1999. Health in rural settings: Contexts for action. University of Lethbridge Printing Services.

Stedman, R.C., J.R. Parkins, and T.M. Beckley. 2004. Resource dependence and community well being in Canada: An overview. Rural Sociology, 69(2), 213-234.

Worklife. Vol 14, No.3, 2002. Shiftwork and health: Canadian evidence.

10. Scientific Review

Published paper will be subject to a peer review process.

11. Improvements to Management in Forest Ecosystems

This study relates to the social dimensions of sustainable forest management in that resource-based economic activities are clearly linked to the social conditions of resource-based communities. A report that fulfills these project objectives can assist policy makers in understanding the linkages between local economic structures and community well-being.

12. Amount of Money Requested From the Foothills Model Forest

2005/2006 funds required for staffing, primary and secondary data collection data analysis, and report writing.

Total amount requested from FtMF = \$60,000.00

13. Partner Contributions

Partner/Organisation	Cash			In-kind		
	Current Funding	Promised Contribution	Funding Pending	Current Funding	Promised Contributions	Funding Pending
Foothills Model Forest			60,000			
Canadian Forest Service					35,000	
AADAC (to be determined)						

14. Proposed Payment Schedule

N/A

15. Subcontracted Work

Work will be completed by project staff with the Social Science Research Group, Canadian Forest Service, Edmonton. Some cash and in-kind assistance may also come from AADAC and the Town of Hinton.

16. Project Management

Project will be managed by Dr. John Parkins, Canadian Forest Service.

17. Additional Organisations requesting FRIAA Administered Monies

18. Other Relevant Information

Foothills Model Forest 2005-2006 Annual Work Plan

Detailed Plan

Foothills Growth and Yield Association

1. Prepared by

Name: W.R. (Dick) Dempster
Address: 206 10009-102 Avenue, Edmonton, Alberta, Canada, T5J 5B6
Phone: 780 424 5980
Fax: 780 424 5980
Email: dick_dem@telusplanet.net

2. Introduction

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

3. Background Information

In 2000, 9 companies holding forest management agreements, the Alberta Government, and the FtMF entered into an agreement to develop and manage the Association. The 9 companies sponsor the program and act as voting members of the Association. The Alberta Land and Forest Division and the FtMF participate as non-voting members, with the Model Forest acting as the coordinating agency.

The FtMF, acting as applicant on behalf of the 9 sponsoring members, submitted a proposal to the Forest Resource Improvement Association of Alberta (FRIAA) in July 2000. A contract was issued (FOOMOD-01-01 – Foothills Growth and Yield Association) on July 25, 2000, facilitating use of FRIP (Forest Resource Improvement Program) funds to cover membership costs and project activities. The original proposal and contract had an initial term of 2 years, and were amended in September 2001, extending the term to 5 years (April 1, 2000 to March 31, 2005). In 2003, FRIAA approved 2 additional projects: Measurement and maintenance of historic research trials (FOOMOD-01-02); Enhanced management of lodgepole pine (OF-02-16). In 2004 the Association's Steering Committee approved an update to the Association's 5-year business plan, originally approved in 2002.

To date the Association has:

Completed installation of a major lodgepole pine regeneration trial, developed an associated database and procedural manual, and undertaken scheduled measurements and treatments;

Completed a study of site-index change between pre- and post-harvest stands, including preparation, acceptance and presentation of a scientific paper on results at a major international conference;

Commenced scheduled re-measurements and maintenance of historic research trials, under a formal agreement with the Canadian Forest Service and Alberta Sustainable Resource Development;

Commenced collaborative work with the Land and Forest Division of ASRD (Alberta Sustainable Resource Development) for the pilot development of improved regional yield estimation techniques;

Commissioned an expert review of opportunities for nutrition and density management in lodgepole pine and obtained funding for a detailed project to fill knowledge gaps identified in the review.

Held at least one technical conference and / or field tour per year.

4. Objectives

The overall goal of the Association is to continually improve the assessment of lodgepole pine growth and yield in managed stands. This will be achieved by forecasting and monitoring responses to silvicultural treatments, facilitating the scientific development and validation of yield forecasts used by members in managing their tenures, and promoting knowledge, shared responsibility and cost-effective cooperation.

Desired outcomes of the program are listed below.

Stand-level timber yield forecasts are defensible and accepted by scientists and regulators.

Recognized scientific, regulatory and certification standards for validation and monitoring of sustainable forest management practices are met.

Managers' knowledge, and their abilities to predict responses to management practices, are improved, facilitating management by objectives rather than by arbitrary prescription.

Stakeholders influencing forest management decisions understand the probable effects of management interventions on stand development.

Investments in growth and yield assessment are cost effective, and there is no unnecessary duplication of effort.

Participants remain committed to the program, and share costs equitably.

Work is user-driven, results-focused, and directly applicable to management and crop planning.

Specific program objectives, beneficiaries and impacts are described below, relative to each of the strategic objectives of the FtMF.

1. Knowledge Creation

The following projects and objectives pertain to knowledge creation.

Regenerated Lodgepole Pine Trial. Objective: forecast and monitor the growth and yield of lodgepole pine, regenerated after harvesting, in relation to site, initial

spacing of planted stock, natural ingress and mortality, competing vegetation (brush), and density regulation (pre-commercial thinning).

Comparison of Pre-harvest and Post-harvest Stand Productivity. Objective: provide credible and reliable forecasts of post-harvest stand productivity and development, relative to pre-harvest values.

Cooperative Management of Historic Research Trials. Objective: provide forest managers the full and continued benefit of relevant established long-term field trials assessing responses of fire-origin lodgepole pine to nutrition and density management.

Regional Yield Estimators. Objective: develop stratum-based stock and stand table generators for lodgepole pine ecosystems, with compatible forward and retrospective projection capability, providing an improved basis for productivity estimation, yield planning, and evaluation of crop performance standards.

Enhanced Management of Lodgepole Pine. Objectives: predict response of lodgepole pine stands to thinning and fertilization across a range of site and stand types, develop managed stand yield tables, and develop diagnostic criteria (guidelines) for prescribing silvicultural treatments.

In spite of considerable interest in, and an established need for, enhanced forest management (EFM), Alberta has no accepted system for predicting managed stand development (e.g. “managed stand yield tables”), verification of yields resulting from enhanced practices, or for linking silvicultural practice to EFM objectives (e.g. silvicultural assessment guidelines and interpretative criteria). The above projects will address these knowledge gaps in regards to lodgepole pine. Lodgepole pine forests are particularly subject to intensifying land-use pressures, threats, and uncertainty.

The targeted audiences for created knowledge are the voting members of the Association, the Alberta government, forest scientists, and members of the public who influence forest management decisions. The primary and direct beneficiaries will be the 9 sponsoring members of the Association and the Alberta Department of Sustainable Resource Development. However, informed and enhanced management of lodgepole pine is essential to overall enhancement of the forest resources of Alberta, providing benefits to a broad portion of Albertans.

2. Demonstration

Field demonstrations of how lodgepole pine responds to different management treatments will be provided by the Regenerated Lodgepole Pine Trial, approximately 12 historic trials being measured and maintained by the program, and the Enhanced Management of Lodgepole Pine Project experimental sites. Interpretative signage will be targeted at forestry practitioners and public groups interested (and influential) in sustainable forest management. Beneficiaries will be these groups, members of the Association, and forest research agencies.

3. Knowledge and Technology Transfer

Knowledge and technology transfer will be achieved through:

Technical conferences and field tours (anticipated audiences: Association members, scientists, forestry practitioners, and educators);

Technical and information reports (anticipated audiences: Association member organizations, collaborating agencies, forestry practitioners);

Published scientific papers and presentations (anticipated audiences: members, scientists, other forestry professionals);

Predictive computer models (anticipated audiences: Association member organizations and collaborating agencies).

4. Communications and Outreach

Outreach to broader audiences, in addition to those listed above, will be facilitated by:

Advertising reports and publications, and making them available for downloading from the FtMF website;

Publication of news, events and findings on the FtMF website, and through FtMF Quick Notes;

Interpretative signage of experimental sites.

5. Policy Support

Senior policy makers in Alberta Sustainable Resource Development² have repeatedly stated that the biggest question mark, and highest priority, regarding sustainable forest management (SFM) is the growth and yield of post-harvest regenerated stands, and that a cooperative approach to collecting growth and yield information to support SFM strategies is essential.

Information, models, and techniques provided by this program will support the development and use of policy tools including:

Regeneration and performance standards linked to management objectives;

Assessment criteria for enhanced forest management treatments (e.g. brushing, thinning and fertilization);

Silvicultural prescriptions, manuals, and crop plans;

SFM monitoring protocols;

Forest management planning guidelines;

Forest productivity estimators;

Managed stand yield tables.

It must be stressed that the FGYA, as an impartial scientific provider of information, does not itself participate in policy development or advocacy.

² R. Fessenden, Deputy Minister ASRD (presentation to FGYA Annual General Meeting, Edmonton, 2002-03-06), and D.Sklar, Executive Director Forest Management Branch (presentation to FGYA Annual General Meeting, Edmonton, 2003-2-27).

5. **Abstract of Methodology**

The following is a brief description of the 6 projects currently defined within the program.

Project 1. Development and Management of the Association

The roles, responsibilities, and activities for developing and managing the Association are described in the Memorandum of Agreement. The primary activities are project management, field co-ordination, organization of meetings, and distribution of information. A part-time contract Director and Field Coordinator undertake these activities, with administrative support from the FtMF.

Project 2. Regenerated Lodgepole Pine Trial

The Project consists of a long-term field trial, established in 2001, and interim forecasting of effects using available models and data. The trial is a three-level split-plot design. The basic balanced design consists of 90 field installations (5 ecosites x 6 spacings x 3 replications), with each installation split 2 ways into 4 treatment plots (brushing / no brushing and thinning / no thinning). Twelve additional installations (6 spacings x 2 replications) have been added in the modal ecosite category, to produce a total of 102 installations. Main activities in 2005-06 will be scheduled measurements and treatments, analysis of data, and initiation of regeneration model development.

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

The methodology involved paired-plot sampling of a total of 50 stands located in the 5 ecosite categories recognized in the Regeneration Project, in combination with analysis of data contributed by members from permanent sample plots (PSPs) where measurements are available before and after harvesting. During 2005-06 knowledge acquired will be transferred to forest managers and researchers, mainly through the FGYA's participation in a inter-disciplinary workshop on post-harvest stand development.

Project 4. Cooperative Management of Historic Research Trials

The Project involves 3 main tasks: maintenance and protection of the field installations, synthesis of results to date, and ongoing measurement and analysis. This is a cooperative effort shared between the Association, Canadian Forest Service (CFS) and ASRD (Alberta Department of Sustainable Resource Management). The main activities of the FGYA in 2005-06 will be scheduled re-measurement and maintenance of trials, and development and placement of interpretive signage.

Project 5. Regional Yield Estimators

Currently, no further work is scheduled for this Project during 2005-06.

Project 6. Enhanced Management of Lodgepole Pine

The approved proposal for this Project tentatively schedules stand and site assessment, and installation of experimental treatment plots, for 2005-06. These activities are subject to review, modification, and re-scheduling depending on results of reconnaissance and detailed design work currently in progress.

6. Deliverables

The following products and services are scheduled for delivery by March 31, 2006.

1.) Knowledge Creation

Field measurements, data entry, and verification (Projects 2, 4, 6);

Data analyses (Projects 2, 4, 6).

2.) Demonstration

Sites maintained (Projects 2 and 4) and identified (Project 6).

3.) Knowledge and Technology Transfer

Co-sponsorship and participation in interdisciplinary conference on post-harvest stand development (Projects 1 and 3);

Technical and information reports (Projects 2 and 4);

Computerized database update and dissemination (Project 2).

4.) Communication and Outreach

Program information and reports available on the FtMF website;

2 Quick-Notes distributed;

Interpretative signage of experimental sites.

5.) Policy Support

Co-sponsorship and participation in interdisciplinary conference on post-harvest stand development (Projects 1 and 3);

Contributions to development of Alberta government framework for implementation of stratum specific reforestation standards (Project 2).

7. Timelines

Task	2005									2006		
	A	M	J	J	A	S	O	N	D	J	F	M
1. Association development and management												
Direction and analysis (person days)	10	10	10	10	10	10	10	10	10	10	10	10
Field coordination (person days)	7	10	10	10	10	10	8	7	7	7	7	7
Data management services (person days)	2	2	2	2	2	2	2	2	2	2	2	2
Progress reports	X			X			X			X		X
Steering Committee meeting												X
Technical Committee meeting										X		
Interdisciplinary conference										X		

Task	2005									2006		
	A	M	J	J	A	S	O	N	D	J	F	M
2. Regenerated lodgepole pine												
Planning	X	X										
Fieldwork (treatments and re-measurements)			X	X	X	X						
Compilation and analysis							X	X	X			
Reporting								X	X	X		
3. Comparison of pre- and post-harvest stands												
Prepare and present scientific paper									X	X		
4. Cooperative management of historic trials												
Draft synthesis and interpretive report	X	X	X				X	X	X			
Field re-measurements				X	X	X						
5. Regional yield estimators (No work currently scheduled)												
6. Enhanced management of lodgepole pine	(detailed scheduling currently in progress)											
Screening-plot fertilization	X	X	X									
Foliage analysis							X	X	X	X	X	X
Installation of plot clusters				X	X	X	X	X	X			
Thinning treatments										X	X	X
Measurements							X	X	X			
Analysis	X	X	X	X	X	X	X	X	X	X	X	X
Technical reports										X	X	X

8. Site Information

The program will be based out of the FtMF headquarters in Hinton. Research and monitoring sites are not limited to the Foothills Model Forest and will be distributed along the Eastern Slopes, in the tenures of the 9 sponsoring members. Research trials are located in the Lower and Upper Foothills and the Subalpine Natural Sub-regions.

9. References

Memorandum of Agreement among Members of the Foothills Growth and Yield Association (December 1999).
 Foothills Growth and Yield Association: proposal submitted to the Forest Resource Improvement Association of Alberta (FRIAA) by the FtMF, July 2000.
 Forest Resource Improvement Association of Alberta; Project FOOMOD-01-01 – Foothills Growth and Yield Association; Amendment # 1, September 12, 2000.
 Forest Resource Improvement Association of Alberta; Project FOOMOD-01-01 – Foothills Growth and Yield Association; Amendment # 2, October 11, 2001.
 Foothills Growth and Yield Association Business Plan, April 2002 (updated April 2004).

Letter of Agreement between Canadian Forest Service, Alberta Sustainable Resource Development, and Foothills Growth and Yield Association for Cooperative Management of Historic Lodgepole Pine Research Trials, July 2002. Measurement and Maintenance of Historic Research Trials, proposal submitted to FRIAA by FtMF, April 2003.

Enhanced Management of Lodgepole Pine, proposal submitted to FRIAA Open Funds Panel by Foothills Growth and Yield Association, October 2003.

10. Scientific Review

Recognized scientific experts in growth and yield, biometrics, and forest ecology have reviewed or will review project plans and results. Drs. P. Blenis, S. Titus, V. Lieffers and P. Comeau of the University of Alberta reviewed the experimental design and procedures for Project 2 (lodgepole pine regeneration). Dr. Shongming Huang of ASRD assisted in the initial design of Project 3 (site index comparison), and has co-authored publication of project results. Dr. James Stewart of the CFS assisted in the design, and is leading analysis of Project 4 (historic research trials). Drs V. Lieffers and P. Comeau of the University of Alberta are assisting in the detailed design of Project 6 (enhanced management of lodgepole pine).

11. Improvements to Management in Forest Ecosystems

The program will improve the management of forest ecosystems through:

- improved assessment of ecosystem productive capacity;
- improved assessment of the sustainable use levels of a biological resource;
- promotion of cooperation, partnership, and shared responsibility among forest managers and researchers;
- increased levels of knowledge and awareness of sustainable forest management;
- continual improvement of sustainable forest management practices;
- stand-level data providing the basis for assessing impacts of enhanced forest management practices on natural ecosystem processes and contributions to global ecological cycles.

12. Amount of Money Requested from the Foothills Model Forest

No money is requested from the FtMF for 2005-06. In-kind services are requested as noted below.

13. Partner Contributions

Partner / Project	Cash (\$)			In-kind (\$)	
	Current Funding	Promised Contributions	Funding Pending	Current Funding	Promised Contributions
Members – fees – Project 1	0	135,000			0
Members – Project 2	0	0			43,911
Members – Project 4	0	46,889			0
FRIAA – Project 6	0	142,800			0
FtMF GIS services	0	0			12,000
ASRD	10,000 ³	0			0
Other / various	78,230 ⁴	0			0
Total	88,230	324,689			55,911

The above table is provisional, as costs estimates are subject to refinement by the FGYA Technical Committee, and approval by the Steering Committee.

The table does not include contributions from the FtMF and other organizations for the following tasks administered by the Communications and Extension Program:

Proposed Interdisciplinary Conference on Post-harvest Stand Development;
Website update and maintenance.

In-kind contributions by the FtMF for data management (GIS) services are shown, but other administrative and financial services provided by the FtMF are not included.

The table also does not include costs of the following contributions by FGYA members that will be essential for proper and successful functioning of the Association:

Participation on Technical and Steering Committees;
Attendance of meetings;
Review of minutes, reports, and scientific papers;
Contribution of existing information and data;
Identification of candidate experimental sites
Provision and support of models;
Protection of trials, and restoration in event of damage or loss;
Direct participation in analysis and interpretation of data;
FtMF administration costs.

The following in-kind contributions from the LFD and CFS also are also not reflected:

Project 4 management, analysis and interpretation (CFS and LFD);
Project 5 data analysis (LFD).

³ Grant for publication of management interpretations, Project 4.

⁴ Forecast balance forward from 2004-05.

14. Proposed Payment Schedule

Payments to the FtMF will be scheduled as follows:

Membership fees through FRIAA: Members will be requested to submit letters of authorization to FRIAA by May 1, 2005. FRIAA will release payments to the FtMF on receipt of letters and a consolidated annual report for 2004-05.

Membership fees paid directly to FtMF: members will be invoiced by May 1, 2005 for payment by June 1, 2005.

Funds promised or sort for Projects 4 and 6 will be requested for payment upon approval of annual work plans and reports, with a 10% holdback pending completion of work.

Payments to the contract Director and Field Coordinator will be based on approval of monthly invoices by the FtMF General Manager.

Other contract services and meeting costs will be paid on receipt of invoices approved by the Association Director.

15. Contracted Work

The following tasks will be completed under direct contract to the FtMF:

Project 1: program direction, field coordination, data analyses, provision of meeting facilities etc.

Project 4: fieldwork.

Project 6: technical advisor, field and laboratory work, data analysis.

16. Project Management

Project management and management responsibilities are described in the Memorandum of Agreement among members of the Association. The Director will act as the project manager for all 6 projects. The Field Coordinator will supervise fieldwork and sub-contracted components of Projects 2, 4, and 6.

17. Organizations Requesting FRIAA Administered Monies

Funding of contributions to the Association, and the identification of sources for such funding, are generally the responsibilities of the individual members. Seven members have elected to authorize FRIAA to transfer funds for membership fees directly to the FtMF. One member has utilized FRIP funds, but directed the fee payment itself. One member has not utilized FRIP funds for its contributions to the Association. The Association successfully submitted a proposal to FRIAA in October 2003, for use of FRIP open funds for Project 6.

Foothills Model Forest 2005-2006 Annual Work Plan

Detailed Proposal

C5 Forest Management Unit (FMU) Fire Regime Analysis

1. Prepared by

Name: Dennis Quintilio-Dennis Quintilio and Associates Ltd.
Address: Box 345
Glenevis, AB
T0E 0N0
Phone: (780) 785-3100
Fax: (780) 785-3256
Email: dquin@telusplanet.net

2. Introduction

Wildland fire is an important long-term ecological process that has shaped the forested landscapes of Alberta. The process is characterized through a fire regime which quantifies intensity, severity, frequency, size and pattern of fires. . A fire regime analysis documents fire on the landscape and provides valuable input to forest management planning. The C5 forest management unit extends from the Montana border north to the Highwood Divide, east to the Porcupine Hills and west to the British Columbia border. The Lost Creek Fire event occurred in the southern portion of the C5 FMU and has galvanized interest in incorporating a fire regime study into the new forest management plan.

3. Background Information

Mimicking natural disturbance and restoring fire requires landscape-level knowledge of the long-term range of variability of fire regime attributes including fire cycle, frequency, intensity, severity season, and size. A fire regime assessment is a multiple step process. In March of 2004 the “recent” fire regime analysis for the C5 Forest Management Unit (FMU) and its management subregions was established using fire occurrence data from 1961 to 2003 (Rogean 2004). The C5 FMU research program outlines the next logical steps to gather additional information on the historical regime and estimate the historical fire cycle and yearly rates of forest disturbance by vegetation type and seral stages. Results from this project will provide information on the number of hectares that can be disturbed annually, and where on the landscape. The main purpose for developing a Fire Regime Analysis is to facilitate emulation of natural disturbance in the C5 Forest Management Plan (in preparation).

4. Objectives

The research objectives are aimed at the development of recommended harvesting guidelines for cutblock sizes and age-class distributions for the C5 FMU and develop FireSmart Landscapes.

1) To identify and describe the historical fire regime(s) of C5;

- 2) To assess the natural variation of fire sizes for the whole FMU, by natural subregion, management subregion and cover type;
- 3) To assess the natural variation in fire cycle (i.e. year rate of disturbance) for the whole FMU, by natural subregion, management subregion and cover type; and

1. Knowledge Creation

To increase knowledge of the positive impacts of fire by quantitatively understanding fires role on the landscape and integrating natural disturbance patterns into long-term planning on the C5 FMU. It will also provide important information to support various aspects of Alberta's forest protection and forest management programs.

1a. Beneficiaries and Impacts

Evaluation of the positive impacts of wildfire and where/how to develop fire restoration plans will be a significant addition to the new forest management document.

Designing Firesmart Landscapes and applying appropriate strategies and tactics will achieve broad social landscape objectives

Providing existing patch size distributions by natural subregion will assist TSA spatial pattern analysis

2. Demonstration

Integrate and test planned management activities such as forest harvesting and fire management in relation to natural ranges of variability.

2a. Beneficiaries and Impacts

All stakeholders will gain from landscape level decisions that incorporate the integration of fire regime data.

3. Knowledge / Technology Transfer

Fire regime analysis will serve in completing a Landscape Fire Assessment and synthesize fire regime data into forest management practices.

3a. Beneficiaries and Impacts

This knowledge will provide technical background to apply natural disturbance forest management principles and serve to mitigate large catastrophic wildfires.

The C5 management plan will be a model for the integration of fire and forest management.

4. Communications and Outreach

Make the research results available to forest management, fire management and other stakeholder groups to assist in meeting the challenges in achieving landscape objectives.

4a. Beneficiaries and Impacts

A fire regime template enhances public understanding and supports the identification of landscape objectives and assessment of both negative and positive aspects of fire. Understanding the fire environment will enable the application of appropriate strategies, where to apply them, who needs to be involved, how to apply them and when these need to be applied.

5. Policy Support

Support existing policy and to facilitate and guide future policy development in Alberta.

5a. Beneficiaries and Impacts

Enhance the capability of forest management and fire management across a wide variety of scales and landscapes.

5. Abstract of Methodology

Using fire occurrence reports from 1961 to 2003, it has already been established that more than one fire regime prevails on the C5 FMU (Rogean 2004). Fire regimes for the subalpine, the montane, and specifically the Porcupine Hills region, which seems to be more prone to fire than any other part of the Montane will be identified through this study.. The recent fire regime assessment provided information on fire occurrence by cause and month, but other fire regime parameters, such as fire size and burn area, could not be fully assessed as a result of effective fire suppression. Both fire size and burn area parameters are needed in the calculation of the fire cycle and forest disturbance rate. Other parameters that could not be assessed from the fire occurrence reports, and which also contribute to the body of knowledge of the C5 fire regimes, are burning patterns and fire intensity (surface, passive or active crown fire). Three methods can be used to address these data gaps. They consist of screening aerial photography from 1950, mapping fires that have not been overlapped by subsequent ones, and running simulations from a landscape disturbance model (Rogean 2004).

I. Air photo screening

In mountain landscapes, the aerial photography screening process is done on a watershed basis. This allows one to capture the effect of valley orientation or “valley containment” on burning patterns. Watersheds (minimum length of 6 to 10 km) will be outlined on 1:50,000 NTS maps. Using the 1948-52, black and white, 1:40,000 air photo series, each watershed will be visually screened for the following parameters:

- number of identifiable fires
- number of “recent” fires (circa 1900 - 1949)
- complexity of vegetation mosaic (very high, high, moderate, low and very low)
- estimated time since last fire
- maximum estimated forest age
- valley orientation
- fuel continuity (containment by rocky ridges or not)

Watersheds will be digitized and the above attributes will be attached.

Relationships of parameters assessed will be established with the valley orientation and fuel continuity maps. The emphasis for the valley orientation assessment is based on our knowledge that valley orientation was found to be one of the most important factors of fire distribution on the east slopes of the Canadian Rockies (Rogean . 2001.). This valley orientation map will subsequently be used for the computer modelling session and could eventually be used to test the effect of topography on fire distribution should a reliable stand origin map be available.

II. Fire Mapping Method

Using the historical aerial photography, all fires that have visible fire boundaries, and that have not been obstructed by subsequent ones, will be mapped onto 1:50,000 NTS maps. This process is usually reliable only for fires that occurred between 1900 and 1950. Depending on the complexity of burning and number of fires, this process may be applied only for burns between 1930 and 1950, similar to the Kananaskis District Fire Regime Study (Rogean 2004). The mapped fires will need to be digitized in order to calculate their size.

III. Landscape Disturbance Modeling

STANDOR is a landscape disturbance model that uses real fire regime knowledge of the landscape to model fire distribution over long periods of time to create an age mosaic similar to a stand origin map (Rogean 2004). This model was developed to resolve the problems associated with a shortage of fire history data. Following is a general description of the model.

STANDOR does not distribute fire in a random fashion over the landscape. It uses a probability of ignition model that is created using the spatial distribution of lightning strikes and distribution of lightning-caused fires by elevation strata, aspect and natural subregion. These probabilities of ignition reflect the historical fire regime conditions, prior to anthropogenic presence on the land. Up to 5 fire regimes can be modelled during one simulation. For example, one regime can represent the pre-anthropogenic era, pre-European settlements, European settlements and fire suppression era. For each regime, a different probability of ignition map is created and a different range of fire frequency is established. In the case of C5, where we are interested in understanding and emulating disturbance patterns prior to the suppression era, we are suggesting only one regime to model. It will include probabilities of ignition from lightning as well as from human presence in the most long-term use travel corridors that have been used for centuries by aboriginals, fur traders and explorers.

6. Deliverables

I. Air photo screening

1. Valley orientation
2. Number of fires per valley
3. Number of recent fires per valley
4. Vegetation complexity per valley
5. Time-since-fire per valley
6. Maximum estimated forest age per valley
7. Cross-tabulation tables of the relationship between veg. complexity and number of fires and, valley orientation and fuel continuity

II. Fire Mapping

1. "Recent" fire map (circa 1900-1950)
2. Fire size distribution per natural subregion
3. Gathering of other fire mapped information such as Delisle & Hall, 1987
4. Fire cycle value and yearly rate of forest disturbance for a period circa 1900-1950 for the entire area and perhaps by natural subregion if the data set is sufficiently large to be representative.

III. Landscape Disturbance Modeling

1. Mean stand origin map for the entire area.
2. Identify spatial distribution of seral stages by natural subregion, management subregion and fuel cover type*.
3. Natural range of % forest by age-class and natural subregion & cover type.
4. Natural range of % forest by age-class and management subregion & cover type.
5. Fire size distribution by natural subregion, management subregion and fuel cover type.
6. Natural range of fire cycle values (i.e. yearly rate of forest disturbance) by natural subregion and fuel cover type.
7. Natural range of fire cycle values (i.e. yearly rate of forest disturbance) by management subregion and fuel cover type.

IV. C5 Timber supply analysis

1. Provide a range of polygon sizes of the simulated stand origin maps
2. Complete 5 iterations using the Standor model to produce 5 stand origin maps
3. Extract the size of all polygons by age class on the landscape

All deliverables will be incorporated into the new C5 forest management plan and a summary report of the research project will be completed in 2005.

7. Timelines

Phase I: Documentation of historical fire regime

delineation of study area and valley orientation on 1:50,000 maps

air photo order and screening process

analyses, map outputs and technical report:

Phase II: Fire mapping from circa 1900 to 1950

mapping of fires

summary report: fire size distribution table, map output and fire cycle value

Phase III: Landscape disturbance modeling

data gathering

creation of specific map layers

model calibration to ensure burning patterns are representative of this landscape

run several computer simulations per natural region, management subregion and

cover types

required analyses pertaining to outlined deliverables

technical report

Phase IV: C5 Timber supply analysis

provide a range of polygon sizes of the simulated stand origin maps

complete 5 iterations using the Standor model to produce 5 stand origin maps

extract the size of all polygons by age class on the landscape

Task	2004									2005		
	A	M	J	J	A	S	O	N	D	J	F	M
Phase I					10 days	1 day						
Phase II						5 days						
Phase III							10 days	10 days	10 days			
Phase IV									2 days			

8. Site Information

C5 Forest Management Unit

9. References

Rogeu, Marie-Pierre. 2004. Fire regime study- Kananaskis District. Prepared for Spray Lakes Sawmills Ltd. And Alberta Community Development , Parks and Protected Areas. 99p. Rogeau, Marie-Pierre. 2001.

Rogeu, Marie-Pierre. 2001. Comparing two methods of fire/stand origin mapping:

AVI vs Stand Origin. Prepared for Alberta Lands and Forest Service, Forest Protection Division. 22p.

10. Scientific Review

SRD in- house review

11. Improvements to Management in Forest Ecosystems

Forests in Alberta have historically been disturbed cyclically by fire and this analysis contributes to our understanding of ecosystem integrity.

12. Amount of Money Requested From the Foothills Model Forests

13. Partner Contributions

Partner/Organisation	Cash			In-kind		
	Current Funding	Promised Contribution	Funding Pending	Current Funding	Promised Contribution	Funding Pending
Foothills Model Forest (ASRD)	\$32,140					

14. Proposed Payment Schedule

At the end of each month or when a phase is completed.

15. Subcontracted Work

Forestry Corp. for digitizing watersheds and recent fire mapping

16. Project Management

17. Additional Organisations requesting FRIAA Administered Monies

18. Other Relevant Information

Foothills Model Forest 2005-2006 Annual Work Plan

Detailed Proposal⁵

Communications and Extension

1. Prepared by

Name: Lisa Jones
Address: Box 6330, Hinton, Alberta, T7V 1X6
Phone: 780 865-8329
Fax: 780 865-8331
Email: lisa.jones@gov.ab.ca

2. Introduction

The Communications and Extension Program plays a critical role in supporting the achievement of the following three of the four Phase III Foothills Model Forest Goals.

Foothills Model Forest Goal Two:

Develop and implement mechanisms that result in a wider understanding and application of accrued knowledge and technology of sustainable forest management research.

Foothills Model Forest Goal Three:

Deliver communications and outreach programs that improve understanding of, and support for, sustainable forest management.

Foothills Model Forest Goal Four:

Support and influence policy that improves the practice of sustainable forest management.

As the organization enters its fourth year, beginning April 1, 2005 and ending March 31, 2006, emphasis must continued to be placed on developing a structured, strategic and coordinated approach to knowledge transfer. A major accomplishment would be the development of a Communications and Extension Strategy for every Foothills Model Forest research program. This work-plan. The Communications Steering Committee recommends that program leads be responsible for this strategy with support from the communications and extension manager. It should be noted that progress in the area of knowledge transfer was made in 2004/2005; however, knowledge transfer at the model forest can be described as in its infancy.

Communications and outreach continues to play a critical role in advancing sustainable forest management. Outreach will continue in areas where work has

⁵ The 2005/2006 Communications and Extension Plan is attached as an appendix to the Work-Plan. This Plan is consistent with the information included in the Work-Plan. It is a more detailed and complete document.

begun, for example collaborating with the Provincial Museum of Alberta and the expansion of GIS Day. If additional resources are secured, new projects can be initiated, for example the development of Grizzly Bear Curriculum. Communications with the public needs to increase and will primarily focus on projects such as the Hardisty Creek Restoration Project, the Highway 40 North Demonstration Project and, if established, the Caribou Conservation Association.

In 2005/2006, there will be a concerted effort to communicate with the oil and gas sector within industry and government. The primary objective of this initiative is to raise awareness and build support for the Foothills Model Forest and its projects. If this is accomplished, it is anticipated that the oil and gas sector will increase its funding to the organization. More importantly, it may lead to the sector adopting model forest knowledge and tools in its policy and operations.

In 2005/2006, the Communications and Extension Program will take an active role in fund development. At a minimum, this will occur for the Program. Potentially the Program will be central to the organizations' fund development activities. The fit is logical as fund development and communications are closely linked.

The role of the Communications and Extension Program in the arena of informing policy remains ad-hoc. The Annual Report continues to be the primary vehicle to communicate with policy makers, as well as partners and stakeholders.

Finally, the Communications and Extension Program was asked to support a comprehensive suite of communications and extension products and activities. The total budget required to deliver the requested activities and tools is \$426 700. Confirmed revenue is forecasted at \$331 000. It is estimated an additional \$53 700 may be secured through cost-recovery, cost-sharing, sponsorship or funding agencies. Therefore, an additional \$42 000 is required to deliver all proposed activities. Therefore, the 2005/2006 Communications and Extension Work-Plan includes activities where confirmed dollars are available to support these activities, as well as activities that can be supported through cost-recovery, cost-sharing, sponsorship or through outside funds.

A 2005/2006 Communications and Extension Plan was developed for the Communications Steering Committee. This Communications and Extension Plan is developed in accordance with industry standards for communications plans. It provides the details for projects included in this work-plan. Furthermore, this Plan includes the entire suite of activities that the Foothills Model Forest Communications and Extension Program was asked to support or deliver. This Plan is included as an appendix to the Work-Plan.

3. Background Information

4. Objectives

1. Knowledge Creation

Not applicable

1a. Beneficiaries and Impacts

Not applicable

2. Demonstration

Not applicable.

2a. Beneficiaries and Impacts

Not applicable

3. Knowledge / Technology Transfer

As previously noted, the 2005/2006 Communications and Extension Plan provides a larger framework for the activities proposed in 2005/2006. A copy of the 2005/2006 Communications and Extension Plan is attached as an appendix to this work-plan. However, the goals listed below identify what the program is attempting to achieve. Furthermore, each goal is supported by measurable objectives. These objectives are used to determine the tactics and strategies used to achieve each goal.

2005/2006 Communications and Extension Goal: To establish a structured and strategic approach to knowledge transfer

Objective: By June 30, 2005 all Foothills Model Forest research programs will have a communications and extension strategy.

Strategy: At the beginning of Phase III, the Foothills Model Forest Board of Directors is placed a heightened importance on the integration of the organization's accrued knowledge and tools into forest management practice and policy. Research Program's that are making notable progress towards this goal have Communications and Extension Strategies and Plans and commit resources, both financial and human, to knowledge transfer and communications. Therefore, the Communications Steering Committee recommends that all Research Programs require a Communications and Extension Strategy. It is recognized that strategies will vary dependent upon the complexity and maturity of the Research Program. The Communication Steering Committee recommends that the communications and extension manager will support and facilitate the development of the plans however Research Programs' must allocate resource to the development of the Communications and Extension Strategy.

2005/2006 Communications and Extension Goal: To build and maintain credibility and support for Foothills Model Forest research.

Objective: By December 31, 2005 update and distribute the Collection of Quicknotes.

Strategy: QuickNotes are a proven knowledge transfer tool. They raise awareness for and build the credibility of research programs. The Natural Disturbance Program's QuickNotes substantiate this. All model forest researchers are required to write two Quick Notes per year. The Communications and Extension Program will work with program leads who are not writing QuickNotes to better ensure this deliverable is met.

In 2004/2005 the Foothills Model Forest organized its existing QuickNotes into two *Collections* – one for the Natural Disturbance Program – this Program has 28 QuickNotes. The second *Collection* includes all Foothills Model Forest QuickNotes. The *Collectios of QuickNotes* will be updated annually. They are available on the website. Hard copies are available on a cost-recovery basis.

Objective: By June 30, 2005 develop a system that will notify audiences when new publications are available on Foothills Model Forest website.

Strategy: In 2005/2006 the Foothills Model Forest will invest in a database management tool that will electronically distribute the work-plan to partners and those who subscribe. This activity is budgeted for in dollars allocated to the website.

Objective: Support to the Canadian Model Forest Network's website by ensuring all Foothills Model Forest publications and events are posted to it in a timely manner.

Objective: In 2005/2006 distribute two newsletters to keep Foothills Model Forest R&D and events at the forefront of the target audience's minds.

Strategy: In 2004/2005 the Foothills Model Forest newsletter moved from a "newsy" tool targeted at a general audience to a knowledge transfer tool. The newsletter is the first step in the knowledge transfer process. It creates and maintains awareness about the organization, its programs and research. The newsletter focuses on a single program area. In 2005/2006 the Social Sciences (Spring 2005 Edition) and the Fish and Watershed Program (Fall 2005) will be featured.

Objective: Submit three articles to the *Forestry Chronicle* for inclusion in the Canadian Model Forest Network section of the journal.

Strategy: The *Forestry Chronicle* dedicates space to the Canadian Model Forest Network. Foothills Model Forest will submit three articles per year to the publication. Where possible, existing text, for example a newsletter article, will be submitted to the *Forestry Chronicle*.

Objective: In 2005/2006 develop and implement a communications plan targeted at Alberta's oil and gas sector.

Strategy: The Foothills Model Forest needs to make a concerted effort to communicate with Alberta's energy sector. There are many reasons for this including:

The Foothills Model Forest landbase is under increasing exploration and development by energy companies.

Foothills Model Forest knowledge and tools expand beyond the boundaries of the landbase.

Foothills Model Forest has knowledge and tools that are relevant to oil and gas exploration and development, and if incorporated into landuse planning, practice and, perhaps, policy, would advance the manner in which Alberta's resources are managed.

In 2005/2006 a communications plan targeted at this sector will be developed and implemented.

Objective: In 2005/2006 deliver tours to groups who will use Foothills Model Forest knowledge and tools in sustainable forest management practice and policy.

Strategy: Foothills Model Forest receives many requests to conduct tours. Where appropriate, the Foothills Model Forest will cover costs associated with tours such as meeting rooms, meals and transportation. The Foothills Model Forest will review tour requests on an individual basis to determine if model forest resources should support the tour.

Objective: By March 31, 2006 develop a template and signage for Foothills Model Forest-related project or activities.

Strategy: In 2005/2006 the Communications and Extension Program was asked to support the Fish and Watershed Program through development of information signs to be placed at the Anderson Creek Stream Crossing. This stream crossing is frequently visited and used for field tour stops. Signage at this location will provide a mechanism for improved interpretation and education surrounding remediation work at this stream crossing. This sign will serve as a template for future signs that may be installed in the forest to demonstrate how research is being integrated into practice.

2005/2006 Communications and Extension Goal: To provide resource managers and practitioners with scientifically credible information that is accessible and useable, therefore can be integrated into forest management practice and policy.

Objective: By June 30, 2005 evaluate the effectiveness of the Natural Disturbance Interpretive Note and develop a recommendation for the future direction of this tool.

Strategy: "Interpretive Notes" bridge existing one-page "Quick Notes" and research reports. "Interpretive Note" would be similar to the BC Ministry of

Forest's Extension Notes. The "Interpretive Note" would condense research reports into operative examples. Each "Interpretive Note" would be two to eight pages in length and include simple interpretations about research findings. They would include many images.

In 2004/2005, one Natural Disturbance "Interpretive Notes" will be produced. This Interpretive Note will be evaluated, and a recommendation will be brought forward on how to proceed (or not) with this product for other Foothills Model Forest research programs.

Objective: By March 31, 2006 produce and distribute two Interpretive Notes.

Strategy: The Communications and Extension Program does not have the resources to produce Interpretive Notes. However, through the evaluation the effectiveness of this tool can be assessed. If the tool is effective and deemed a priority resources will be reallocated or sourced to fund this tool.

2005/2006 Communications & Extension Goal: The Foothills Model Forest website will efficiently and effectively distribute Foothills Model Forest knowledge. The website will track, evaluate and report on the transfer of Foothills Model Forest knowledge outwards.

Objective: On a quarterly basis, report the amount and nature of knowledge being transferred from the Foothills Model Forest web site outwards.

Objective: By June 30, 2005 develop a system that will notify target audience when new publications are available on Foothills Model Forest website.

Objective: Support the Canadian Model Forest Network's website by ensuring all Foothills Model Forest publications and events are posted to it in a timely manner.

Strategy: In 2004/2005 significant improvements were made to the Foothills Model Forest website resulting in it operating efficiently and effectively. A logical, next step for the website is to purchase a third-party tool to manage a subscription list and distribute notices when new publications are posted on the website. Once the capital cost is incurred, the maintenance of this tool (\$125/month) is affordable.

The Foothills Model Forest will need to invest time into ensuring its website and its presence on the Canadian Model Forest Network website are current.

2005/2006 Communications and Extension Goal: Conduct knowledge and technology transfer sessions that lead to the integration of Foothills Model Forest knowledge and tools into forest management practice and policy.

Objective: In 2005/2006 provide support to workshops that introduce Foothills Model Forest knowledge and tools to partners and potential users.

Strategy: In 2005/2006 the Communications and Extension Program will support the delivery of the following knowledge transfer sessions:

Introduction of grizzly bear tools and knowledge to consultants and environmental groups.

Introduction of grizzly bear tools to mining industry.

Caribou Conference in Manitoba

It is foreseen that these sessions will require follow-up. This adheres to true extension. It is also anticipated that opportunities for future sessions will arise therefore the Communications and Extension Program will support requests that may lead to the integration of Foothills R&D into practice.

As per the approved Phase III Communications and Extension Strategy, knowledge transfer sessions will be delivered on a cost-recovery, cost-sharing or sponsorship basis.

Objective: In 2005/2006 work with the Natural Disturbance and Grizzly Bear Research Programs to develop short-courses, or similar training, on Foothills Model Forest knowledge and tools.

Strategy: In order for Foothills Model Forest research to be integrated into policy short-courses or other training methods are Natural Disturbance, Social Sciences and Grizzly Bear. In 2004/2005 development began on the *Introduction to Natural Disturbance* short-course. Upon course delivery, focus groups will solicit feedback and guide future knowledge transfer activities. Furthermore, in 2004/2005 the forest industry, oil and gas and Alberta Sustainable Resource Development were introduced to the planning tools developed by the Grizzly Bear Research Program. It is anticipated that short-courses would accelerate knowledge transfer for these Research Programs. The Communications and Extension Program has budgeted \$20 000 for short-course development. Ideally the Program could commit \$40 000 in 2005/2006 however due to limited resources a total of \$20 000 from the Program's budget are committed to this activity.

Objective: By March 31, 2006 deliver inter-disciplinary workshop on post-harvest stand development.

Strategy: The goal of this workshop is to integrate knowledge from the Foothills Growth and Yield Association with the knowledge of the Alberta Forest Genetics Resources Council. The FRIAA Open Funds Proposal details the specifics of this workshop and is available for those that are interested. The time of the communications and extension manager and the communications assistant is required for this workshop.

2005/2006 Communications and Extension Goal: To develop a common understanding of the natural disturbance approach to forest management among Foothills Model Forest sponsoring partners and Natural Disturbance program partners.

Objective: By May 31, 2005 develop a business plan for Introduction to Natural Disturbance short course.

Objective: By June 30, 2005 deliver a pilot of the *Introduction to Natural Disturbance* short-course.

Objective: By March 31, 2006 deliver the *Introduction to Natural Disturbance* Short-Course in Alberta and Saskatchewan.

Objective: By March 31, 2006 develop a plan for future and additional Natural Disturbance Short-Courses or knowledge transfer.

The Natural Disturbance Program and the Communications and Extension Program are working with the Saskatchewan Institute of Applied Science and Technology to develop a Natural Disturbance short-course. The course is scheduled to be complete by May 31, 2005 and a pilot to be delivered shortly thereafter. At a minimum the course will be delivered in Alberta in 2005/2006. Ideally it will also be delivered in British Columbia, Manitoba, Saskatchewan and Ontario this year. The \$10 000 is SEED Capital to market the course and for its initial delivery. Delivery will be conducted on a cost-recovery basis and development costs will be recovered over time. Feedback from the short-course will provide direction to future knowledge transfer for the Natural Disturbance Program which may include additional short-courses.

3a. Beneficiaries and Impacts

Each Phase III Foothills Model Forest and Communications and Extension Goal relates to a specific audience. This section identifies lists the target audience for knowledge transfer. The 2005/2006 Communications and Extension Plan identifies audiences for each tactic. Furthermore, when new projects and activities are undertaken, effort will be invested to ensure the primary and secondary audiences are targeted. The list below is not exhaustive or prioritized.

Sustainable forest management professionals. The Foothills Model Forest Communications and Extension Program defines sustainable forest management professionals are those individuals involved in forest and land management planning and include foresters, biologists, GIS specialists, etc.

Foothills Model Forest sponsoring partners including Alberta Sustainable Resource Development, Canadian Forest Service, Jasper National Park and Hinton Wood Products, a Division of West Fraser Mills.

Foothills Model Forest forestry partners.

Foothills Model Forest oil and gas partners.

Forest management agreement holders in Alberta.
Oil and gas companies and consultants exploring or developing along Alberta's northeast slopes.
Provincial government ministries involved in land and resource planning and management along Alberta's northeast slopes including Alberta Environment; Alberta Community and Development, Parks and Protected Areas; Energy; Aboriginal Affairs and Northern Development.
Federal government ministries involved in land and resource planning and management along Alberta's northeast slopes including Department of Fisheries and Oceans and Parks Canada.
Canadian Model Forest Network and their partners.
Industry associations including Alberta Forest Products Association; Forest Engineering Research Institute of Canada (FERIC; Forintek; Forest Products Association of Canada (FPAC); Council of Forest Industries; Forest Alliance of British Columbia; Canadian Institute of Forestry; Canadian Association of Petroleum Producers.
Leading researchers and academia.
Environmental groups.

Expected Benefits:

The benefit of the Foothills Model Forest conducting and increasing its knowledge transfer is the integration of research in resource management planning and practice. Ultimately, the integration of Foothills Model Forest knowledge and tools will contribute to improved resource management and the long-term sustainability of the forest, its ecology, its wildlife as well as long-term economic and community health.

4. Communications and Outreach

Communications and outreach is important in the advancement of SFM (informed public are a criterion of the Canadian Council of Forest Ministers' Criteria & Indicators), and is, therefore, an important element of the Foothills Model Forest. As outlined in the Phase III Strategy, communications and outreach will be done in a collaborative manner with other organizations, such as the Provincial Museum of Alberta, Inside Education and our sponsoring partners.

Communications and outreach will target audiences that are interested in sustainable forest management issues, as opposed to undertaking large campaigns in an effort to change public opinion on a broad basis. As a result, communications and outreach activities will communicate messages that are consistent with the desired outcomes of knowledge and technology transfer activities taking place at the Foothills Model Forest. For example, in 2005/2006 a strong focus is being placed on developing a common understanding of natural disturbance concepts and terminology among forest practitioners and policy makers. The messages communicated to the general public will support these efforts.

2005/2006 Communications and Extension Goal: Foothills Model Forest research findings will be used in classrooms of Alberta.

To provide twenty teachers with a bias balanced view of sustainable forest management issues, encouraging them to integrate FtMF research findings into their lesson plans.

To develop and promote educational resources that link directly to Alberta Learning's science curriculum.

2005/2006 Communications and Extension Goal: Increase awareness and support among interested general public within the Foothills Model Forest land base for sustainable forest management generally and the application of Foothills Model Forest research specifically.

Support Hardisty Creek Restoration Project through communications activities.

Annually, secure funding for the maintenance and management of the Natural Resources Interpretive Park and interpretive signs at CN crossing.

Support community events in Hinton and Jasper.

Work with local media to produce stories about the Foothills Model Forest quarterly in the Hinton Parklander and Jasper Booster.

2005/2006 Communications and Extension Goal: Increase awareness and support among interested general public beyond Foothills Model Forest land base of Foothills Model Forest research and support for sustainable forest management.

Respond to inquiries from provincial and national media in a timely manner.

Continue to develop a presence at the Provincial Museum of Alberta.

In 2005/06 promote and exhibit *Within Growling Distance Museum Exhibit* at the Exhibits Musée Héritage Museum in St. Albert, Alberta.

2005/2006 Communications and Extension Goal: To increase awareness of the Foothills Model Forest and build support for sustainable forest management research and application among visitors to Jasper National Park and William A. Switzer Provincial Park.

In the summer of 2005 deliver summer interpretive programs to 4,000 visitors of Jasper National Park and William A. Switzer Provincial Park.

Deliver the Foothills Model Forest interpretive programs and guided hikes within the Grande Yellowhead region.

2005/2006 Communications and Extension Goal: To increase awareness and build support for the Foothills Model Forest, its research and partners among the forest companies' public advisory groups.

By October 31, 2005 organize a weekend seminar for members from Alberta's forest industry public advisory groups, which includes a tour of the Foothills Model Forest.

2005/2006 Communications and Extension Goal: Encourage partners to use Foothills Model Forest programs and projects in their communications products and activities.

By March 31, 2006 deliver a workshop and distribute a communications kit to Foothills Model Forest partners' public relations professionals.

4a. Beneficiaries and Impacts

Audiences:

Alberta school teachers (elementary, junior and senior high)

Alberta school students (elementary, junior and senior high)

Interested general public (visitors to Jasper National Park and William A. Switzer Provincial Park, membership holders and drop-in visitors to Science Centers and Museums)

Local and Provincial Media (readership/viewers/listeners)

Agency Staff (science centers, museums, non-profit groups)

Expected Benefits:

The Communications and Extension Program at the Foothills Model Forest has adopted a multi-pronged approach toward communication and outreach. Its first prong aims to assist Alberta school teachers to understand and integrate Foothills Model Forest research findings into their lesson plans. If successful, Foothills Model Forest research findings will reach public school students in a systemic way, forming a foundational awareness and understanding of sustainable forest management. Ultimately, this approach will set the framework for understanding and support for sustainable forest management among the general public in the long-term.

Considerable effort has been made to communicate Foothills Model Forest research findings to the interested general public. These efforts have focused on capturing and informing audience members through interpretive programs, presentations and public forms, and setting up display booths at community events. These activities have proven effective, and will continue in the future. However, greater emphasis is being placed on communications and outreach activities targeting visitors to science centers and museums. These facilities present unique opportunities to bring Model Forest messages to the public, rather than attempting to bring the public to us. This approach will be supplemented by a regular presence in local, regional and provincial media. By bringing the Model Forest to the public, it is anticipated that the key messages of the Foothills Model

Forest will take-on a more immediate place in the minds of Albertans and Canadians.

The final prong in our communications and outreach approach is to target agency staff from organizations like Inside Education and the Provincial Museum of Alberta. It is anticipated that by bringing agency staff up-to-date on Foothills Model Forest research findings and key messages these agencies will communicate our key messages to their audiences more regularly and with a higher degree of accuracy.

5. Policy Support

A Phase III goal is to inform and support policy. The Foothills Model Forest Communications and Extension Program can provide support to the Board of Directors, General Manager and program leaders in their efforts to achieve this objective. The two initiatives that the Communications and Extension Program will lead are the development of the annual report and a regular series of talks targeted at policy makers from industry and government.

2005/2006 Communications and Extension Goal: To encourage the use of Foothills Model Forest R&D in the policy of resource industries, federal and provincial governments.

Objective: By July 31, 2004 produce and distribute the 2004/2005 Annual Report that links Foothills Model Forest R&D to current policy issues.

Strategy: The Foothills Model Forest Annual Report continues to be the tool used to communicate with senior managers from industry and government. The 2003/2004 Annual Report was well-received and its circulation was higher than anticipated. The Foothills Model Forest 2004/2005 Annual Report will take a similar approach to the 2003/2004 Annual Report and a minimum of 1 250 copies will be printed. The annual report will be written and managed in-house but the design and printing will be contracted to a design firm.

Objective: On a quarterly basis a Foothills Model Forest program leader will present and meet with senior management from industry (forestry and oil and gas) and government.

Strategy: Face-to-face meetings are the most effective form of communication. For Foothills Model Forest R&D to inform and support policy, those who make policy must be made aware on a regular basis about the organization and its work. The Executive Series meetings will provide structure and organization to face-to-face communication with policy makers. The Communications and Extension Program will facilitate and support these meetings. The manager will consult with key board members and program leaders on a meeting-by-meeting basis.

5a. Beneficiaries

This list is not exhaustive or prioritized.

Provincial Minister, Deputy Minister, Assistant Deputy Minister and directors from Community Development, Energy, Environment, Sustainable Resource Development, Aboriginal Affairs and Northern Development, Innovation and Science.

Standing Policy Committee on Sustainable Resource Development and Energy
Senior executives from forestry and oil and gas sector.

Federal Minister, Deputy Minister, Assistant Deputy Minister and senior bureaucrats from Environment, Natural Resources Canada, Parks Canada, Department of Fisheries and Ocean and Industry 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, Sustainable Forest Management Network.

Environmental groups.

Impacts

Communicating with policy makers should achieve the following:

Build support for the integration of Foothills Model Forest knowledge and tools in resource management policy and practice.

Maintain support for the Foothills Model Forest, its goals, objectives and programs.

5. Abstract of Methodology

Not applicable

6. Deliverables

1.) Knowledge Creation

Not applicable

2.) Demonstration

Not applicable

3.) Knowledge / Technology Transfer

Communications and Extension Strategies for each model forest program area – June 30, 2005.

Hard copy and pdf file of Collection of Natural Disturbance Quicknotes – December 31, 2005

Hard copy and pdf file of Collection of Foothills Model Forest Quicknotes – December 31, 2005

Subscription tool on website by June 30, 2005

Database with subscribers, ongoing

Hard copy, pdf and html files of two newsletters by May 31, 2005 and September 30, 2005

Three articles in the Canadian Model Forest Network section of the Forestry Chronicle

Communications Plan targeted at communicating with Alberta's oil and gas sector.

Report that summarizes tours.

Evaluation document of Interpretive Notes by June 30, 2005.

Report that summarizes website statistics on a quarterly basis.

Foothills Model Forest publications on Canadian Model Forest Network website – Determined by launch date of Canadian Model Forest Network website.

Report that summarizes distribution of publications through Canadian Model Forest Network website on a quarterly basis once new Canadian Model Forest Network website is launched.

Follow-Up Action Items from Grizzly Bear Workshops to Incorporate into Grizzly Bear Knowledge Transfer Plan – Ongoing

Summary of Workshops – Quarterly

Second Natural Disturbance Short-Course by March 31, 2006

Short-Course or Training Program for Grizzly Bear Knowledge and Tools by March 31, 2006.

Interdisciplinary Workshop on Post-Harvest Stand Development Pre-conference Assessment by April 30, 2005

Interdisciplinary Workshop on Post-Harvest Stand Development Update document by June 30, 2005

Interdisciplinary Workshop on Post-Harvest Stand Development Workshop Proceedings by March 31, 2006

Business Plan for Introduction to Natural Disturbance Short-Course by May 31, 2005

Introduction to Natural Disturbance Short-Course by June 30, 2005

Plan for Future Natural Disturbance Knowledge Transfer by March 31, 2006

4.) Communications and Outreach

The Foothills Model Forest will deliver three presentations during the Spring EcoTour in April 2005;

A gap analysis will be completed identifying areas where FtMF research findings can be integrated into CPAWS Grizzly Bears Forever campaign. This analysis will be presented to CPAWS by September 1, 2005;

GIS Day will be delivered to a minimum of five jr. and sr. high school classes in FtMF by June 2006;

GIS Day will be delivered to a minimum of two jr. and sr. high school classes beyond FtMF boundaries by June 2006;

One discovery box will be developed and provided to the Provincial Museum of Alberta as part of their field station program by September 1, 2005;

Two grant applications will be submitted by September 15, 2005 to raise funds for the development of a Fresh Water Curriculum that will promote the Hardisty Creek Restoration Project;

The first Fresh Water Curriculum lesson plans will be developed and tested in schools within the FtMF land base by November 30, 2006;

The Foothills Model Forest will host a 1.5-hour workshop at the GEOEC Conference promoting GIS Day on April 23, 2005;

The FtMF communications plan for Hardisty Creek will be fully implemented By March 31, 2006;
 Interpretive signs will be fabricated and installed at the CN stream crossing on Hardisty Creek by August 30, 2005;
 \$18000 in funding will be raised through grant applications for the Kinsmen Park Redevelopment component of Hardisty Creek by March 31, 2006;
 A minimum of two grants will be submitted for funding to promote maintenance of CN and Natural Resources Interpretive Park signs by September 30, 2005;
 Two signs will be developed and installed at the Anderson Creek Stream Crossing by March 31, 2006;
 The FtMF will host a minimum of 6 display booths at community events in the FtMF land base by December 1, 2005;
 The Hardisty Creek Restoration Project will appear in the local media 6 times. The FtMF will appear in provincial media three times by March 31, 2006;
 The Provincial Museum of Alberta mini-strategy will be fully implemented by September 1, 2005;
 Within Growling Distance will be displayed at one science center by March 31, 2006 and bookings will be secured for 2006/07 fiscal year;
 8 interpretive programs will be delivered in Jasper National Park, attracting at least 3500 people by August 31, 2005;
 A new interpretive program will be developed promoting the Natural Disturbance Research Program by June 30, 2005;
 5 interpretive programs will be delivered in William A. Switzer Provincial Park by August 31, 2005;
 The FtMF will participate in Parks Day Events in Jasper and Switzer Parks on July 16, 2005;
 Four guided hikes will be offered in Jasper and Switzer Provincial Parks by August 31, 2005.

5.) Policy Support
 Annual report by July 31, 2005

7. Timelines

Task	2005									2006		
	A	M	J	J	A	S	O	N	D	J	F	M
Communications and Extension Strategy for Program Areas	X	X	X									
Compile and Distribute Collection of Quicknotes								X	X			
Addition of Subscription Tool to Foothills Model Forest website	X	X	X									
Two Newsletters	X			X	X	X					X	X
Three articles to Forestry Chronicle	X					X					X	
Develop and implement communications plan targeted at oil and gas sector	X	X	X	X	X	X	X	X	X	X	X	X

Task	2005										2006		
	A	M	J	J	A	S	O	N	D	J	F	M	
Tours	X	X	X	X	X	X							
Evaluate Interpretive Notes	X	X	X										
Report on website statistics			X			X			X			X	
Support Canadian Model Forest Network website	X	X	X	X	X	X	X	X	X	X	X	X	
Support workshops	X	X	X	X	X	X	X	X	X	X	X	X	
Develop short courses	X	X	X	X	X	X	X	X	X	X	X	X	
Organize and delivery Inter-disciplinary workshop on post-harvest stand development	X	X	X	X	X	X	X	X	X	X	X	X	
Deliver Introduction to Natural Disturbance Short-Course				X			X	X	X		X	X	
Inside Education Spring Eco-tour	X												
Grizzly Bears Forever Curriculum	X	X	X	X	X	X							
GIS Day	X	X	X			X	X	X	X	X	X	X	
Discovery Box for Provincial Museum of Alberta	X	X	X	X	X	X							
Grant Applications	X	X	X	X	X	X	X	X	X	X	X	X	
Fresh Water Curriculum	X	X	X	X	X	X							
GEOEC Conference	X												
Hardisty Creek Restoration Project Communications Plan Implementation	X	X	X	X	X	X	X	X	X	X	X	X	
Interpretive Signs for CN	X	X	X	X	X								
Kinsmen Park Interpretive Signs							X	X	X	X	X	X	
Press Releases in Local Media	X		X		X		X		X		X		
Interpretive Programs				X	X								
Annual Report	X	X	X	X									

8. Site Information

Not applicable

9. References

Not applicable

10. Scientific Review

Not applicable

11. Improvements to Management in Forest Ecosystems

Through the activities of the Communications and Extension Program, forest ecosystems will be managed using current knowledge and tools. Furthermore, the public will be better informed about the forest ecosystem and how Foothills Model Forest tools and knowledge are being incorporated into land and resource management.

12. Amount of Money Requested From the Foothills Model Forest

13. Partner Contributions

Partner/Organisation	Cash			In-kind		
	Current Funding	Promised Contribution	Funding Pending	Current Funding	Promised Contribution	Funding Pending
Foothills Model Forest	\$245 000					
FtMF – Administration’s Portion of Fran Hanington’s salary	11 500					
Carry-Over: Inside Education EcoTour	7 500					
Carry-Over: Interpretive Signs at CN Culvert	8 000					
Carry-Over: \$\$ for Seasonal Interpreter	4 000					
Open FRIAA Funding: Interdisciplinary Workshop on Post-Harvest Stand Development		55 000				
Season Interpreter: Apply for outside funding			9 000			
Natural Disturbance Program to support HWY 40 North Demo Project Communications: Dependent upon Natural Disturbance Program			5 000			
Canadian Model Forest Network: Requested that the Network covers shipping costs and translation of museum panels			2 700			
Grizzly Bear Educational Curriculum – Applying to outside funding grants			10 000			
Public Advisory Group Tour –			5 000			

Requires financial support of programs that wish to participated in the tour						
Communications Kit and Workshops – Cost Recovery			2 000			
SEED Capital for Marketing and Initial Delivery of Natural Disturbance Short-Course: Cost-recovery			10 000			
Caribou Conservation Association – It is recommended that a communications plan be developed for this initiative. A portion of the membership fees would be required to support the implementation of the plan. It is estimated a minimum of \$5 000 is required however the plan would include a budget.			5 000			
Knowledge Transfer Sessions – Aim to recover 50% of session costs			5 000			

14. Proposed Payment Schedule

The Communications and Extension Program spends its fund equally over the course of the year.

15. Subcontracted Work

The Communications and Extension Program will subcontract the following services for the Interdisciplinary Workshop on Post-Harvest Stand Development:
 Conference Coordinator: A conference coordinator will be retained and is contracts and their terms were used for budgeting purposes.
 Pre-Conference Assessment: Previous contracts with IPSOS-REID and FORREX for similar services were used for budgeting purposes.

Workshop Proceedings: Previous experience and contracts were used to budget \$2 500 for the writing and compilation of the Workshop Proceedings. A printing estimate was obtained for 100 copies, 100 pages, black and white inside pages, colour covers. The estimate was \$3 000.

Moderator: An experienced moderator has a per diem of \$1 000.

Other services which are typically contracted out include:

Design, layout and printing of communications products

Writing

Website maintenance and feature development

16. Project Management

Lisa Jones

17. Additional Organisations requesting FRIAA Administered Monies

18. Other Relevant Information

Foothills Model Forest 2005-2006 Annual Work Plan

Detailed Proposal

Forest History Project:

“A Case Study of Policies and Practices Leading to Adaptive Forest Management”

1. Prepared by

Name: Bob Udell
Address: Foothills Model Forest
Box 6330
Hinton, AB, T7V 1X6
Phone: 780-865-4532
Fax: 780-865-4532
Email: rjudell@telusplanet.net

2. Introduction

In 1996, Weldwood (now Hinton Wood Products, a Division of West Fraser Mills) initiated a history and case study of its sustainable forest management program at Hinton. This initial study was expanded at the suggestion of Model Forest board member Dennis Quintilio to encompass the model forest landbase and, in 1997 the model forest accepted the revised program as a model forest project.

By March 31, 2002, final draft reports had received for all five volumes in the history series and these were submitted to FRIAA, which also supplied considerable funding for the project.

Two of the final reports – “A Hard Road to Travel”, and “Learnings from the Forest” were proposed for publication in book form in 2003/04. “Learnings” was published by Fifth House in July 2003 and has been well received. “Hard Road” is not yet published. The remaining reports are posted on the model forest website.

The 2004/05 workplan proposed the publication of two volumes in the History Series.

3. Background Information

Five reports have been completed for the history series, and one more is pending. These are:

Volume 1. To Be Published – in .pdf form

A Hard Road to Travel: Land, Forests and People in the Upper Athabasca Region to 1955.

By: PJ Murphy with Bob Stevenson and Bob Udell

This volume describes the history of the largely unmanaged forest prior to 1955, including the larger landbase which is Foothills Model Forest. It traces early explorations, the historic role of fires and aboriginal peoples in the area, early

days in forestry including the establishment of dominion forestry reserves and the transfer of resources to the Province in 1930. Generally, it examines the history and ecology of the largely unmanaged state of nature that existed before 1955.

“Hard Road” was sent for external review in 2003, and then reworked to expand on certain elements of early forest history, and reduce overlap with “Learning from the Forest”. In 2004/05 the Forest History Society agreed to collaborate with Foothills Model Forest in the production of this book. Funds are available in 2004/05 to complete the revised book, assemble and pay for publishing rights for the photos and take the book to final design stage. Unfortunately, this will exhaust available funding and printing and publishing the book, which is proposed for 2005/06 will depend on raising the funds for this purpose – estimated at around \$40,000 (subject to final estimate from printers). Alternatively, if funding is unavailable, the book can be posted on the model forest website.

Volume 2. *The Hinton Forest : A Case Study in Sustainable Forest Management*

By: PJ Murphy, Bob Udell, Bob Stevenson and Bob Bott

This volume examines the evolution of forest practices on the Hinton FMA from early days to 2001. Individual chapters examine 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. One of the major contributions of the Company was its demonstrated commitment to forest renewal and silviculture. It was both a precedent-setting and significant achievement.

Volume 3. *Evolution of the Forest Management Agreements -- A Policy Review and analysis*

By: PJ Murphy, M. Luckert

Originally proposed as a component of Volume 2, this stand-alone document describes, from a policy perspective, how the Forest Management Agreement evolved from its concept in the 1949 Forests Act to the first Agreement with North Western Pulp & Power Ltd. signed by Robert Ruben in 1951, then through successive re-negotiations to 1998. As well, discussions are included about the major events -- both successes and disappointments -- that took place along the way. The story ends with the start of re-negotiations for a new FMA started during the fall of 2000.

Volume 4. *Development of Adaptive Forest Management in Protected Areas of the Foothills Model Forest*

By: M den Otter

This provides a history and evaluation of the progression of policy and adaptive management practice in three protected areas within the Foothills Model Forest landbase -- Jasper National Park, Willmore Wilderness and Switzer Provincial Park -- and makes comparisons among them. This volume was prepared by Michael

den Otter, a graduate student in the Department of Rural Economy, studying under direction of Marty Luckert at the time this work began.

The project was initially structured to serve as a Masters-level thesis study. He conducted literature reviews and interviews during 2000, wrote his thesis, and successfully defended it late fall 1999. The thesis formed the basis for this report, completed at the end of 2000, comprising 122 pages.

Volume 5. *Learning from the Forest: A Fifty-Year Journey towards Sustainable Forest Management*

By: R. Bott, PJ Murphy, R. Udell

This book is an illustrated, user-friendly synopsis of the practice of forest management at Hinton, based on material written specifically for it. The goals of this work were (a) to tell the story in an engaging fashion and (b) to illustrate the principles and practices of adaptive management as applied to a specific land base. Work on this report started late fall 1999.

A foreword by Dr. Gordon Baskerville provides an overview of the significance of the book and its importance to forestry practitioners and others (see attached).

Fifth House/ Fitzhenry and Whiteside published the book in July 2003.

Volume 6: *Mountain Trails: The Story of an Early Alberta Forest Ranger*

This report was originally published in serial form in the Western Producer magazine, beginning in 1969. It describes the work and social life on an early Alberta Forest Service ranger who worked out of Entrance, Alberta from 1920 to 1942, starting in the Dominion Forestry Branch days and spanning the transition to the Alberta Forest Service. The family of Jack Glen, the author, has kindly agreed to allow Foothills Model Forest to re-publish the works and have also supplied the complete manuscript upon which the serials were based, as well as his extensive photo collection from the period.

In 2004, Rob Mueller of Sustainable Resource Development joined the team and reworked "Mountain Trails" to include details from the original manuscript that were excluded from the Western Producer serials. Discussions late in the year also brought Cliff Henderson and Bruce Mayer into the team working on this report. In 2005, we propose to add this work to the model forest history series, supplemented by photos from the period – as provided by Jack Glen's family or from the Alberta Forest Protection historical photo series. We also propose to include maps chronicling his travel routes during the period, with the support of the model forest GIS team.

Other Projects – Future Years/ Date Unknown

Volume 7. The Evolution of Silviculture Practice at Hinton – a 40 Year Journey 1955-1995.

A draft of this report was prepared by Lorne Brace in 1999, and reviewed by Jack Wright. Bob Udell will complete this report in 2006, with assistance from Hinton Wood Products, Woodlands.

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 Model Forest Adaptive Forest Management/ History Program, was a great success at the conference in Edmonton. A DVD of this forum is on hand, and is suitable for production and distribution. It is proposed to do this in cooperation with Alberta SRD and the Alberta Forest History Society. This may happen in 2005.

4. Objectives

1. Knowledge Creation

The series of reports in the history series provide insights into all aspects of sustainable forest management, drawing on the history of the model forest landbase. Volumes, 2, 3 and 4 are complete. Work in 2005-06 will complete the first six volumes of the project.

Volume one – Hard Road to Travel – provides little-known detail – some never published - on the history and evolution of forestry in the area in early days. This is of particular interest to students of history, especially forestry history in Alberta. There has been no other such comprehensive examination of this fascinating history.

Volume six – Mountain Trails – is a republication, with additional material including text, photos and maps of the journals of an early Alberta government forest ranger whose experiences working out of Entrance, Alberta, spanned the transition between the federal and provincial government s in the ownership and management of the forest resources in Alberta.

1a. Beneficiaries and Impacts

These reports will provide adequate information for general readers and for students and practitioners of forestry, resource management, ecology and related disciplines. They will also be of high value to students of the early history of Alberta and western Canada. They will be essential reference for practitioners, educators and regulators considering where we have come from, and how that has shaped where we are today.

2. Demonstration

Some of the information presented in these reports is still discernable in the landbase of the Foothills Model Forest, and could be the basis for field demonstration and historical tours in the model forest landscape.

2a. Beneficiaries and Impacts

N/A – there will be no field elements of this project, although the information provided is also reflected in components of some of the FtMF demonstration projects – e.g. Firesmart, Integrated Land Management, Landscape Disturbance.

3. Knowledge / Technology Transfer

See preceding discussion.

3a. Beneficiaries and Impacts

Educators, historians, practitioners, regulators and interested members of the public.

4. Communications and Outreach

These reports provide a fascinating insight into the evolution of forest policy and forest practice in both protected areas as well as the working landscape in the foothills of Alberta. Furthermore, they highlight the pivotal role played by this area as the pre-eminent trading route for western Canada in the 19th century, bringing together in one book the stories of many pioneers of that era.

4a. Beneficiaries and Impacts

Preliminary reviews of drafts of these reports by forest historians as well as informed members of the public and forestry community indicate that these books are making a significant contribution to improved knowledge and forest practice.

5. Policy Support

The books will provide insights for policy makers by providing a comprehensive overview of how forest policies and practices have evolved in this area from the earliest times.

5a. Beneficiaries and Impacts

A must read for provincial regulators and forestry practitioners in Alberta.

5. Abstract of Methodology

Of the major reports, one is published, and three are on the model forest. “A Hard Road to Travel” is currently being finished up, some map work and photo selection remaining. Next stages are to complete the final edits, do the design work, print a limited run of copies, solicit funding for publication or – failing that – posting it on the model forest website.

Production of “Mountain Trails” in 2006 may take a number of forms, not yet determined.

6. Deliverables

The publication of two books on forest history - one from the view of a ranger on the ground, one a more comprehensive review of lands, people and forests in west central Alberta for the period before 1955. Elements of the books cover all aspects of the 5 broad goals of Foothills Model Forest listed below.

- 1.) **Knowledge Creation**
- 2.) **Demonstration**
- 3.) **Knowledge / Technology Transfer**
- 4.) **Communications and Outreach**
- 5.) **Policy Support**

7. **Timelines**

Task	2005									2006		
	A	M	J	J	A	S	O	N	D	J	F	M
“A Hard Road to Travel” on website, produce limited editions								X				
Complete edits to “Mountain Trails”	X											
Design work “Mountain Trails”				X								
Post “Mountain Trails” on website, produce limited editions						X						

8. **Site Information**

The books cover the complete landbase of Foothills Model Forest and relevant activities/events beyond the model forest area.

9. **References**

10. **Scientific Review**

These books are not scientific studies per se, merely reports of history, activities and learnings over time.

11. **Improvements to Management in Forest Ecosystems**

These books will make a significant contribution to the literature.

12. **Amount of Money Requested From the Foothills Model Forest**

Original Budget for “Learning” and “Hard Road” was \$90,000. Production of “Learning” and completion of documentation and design for “Hard Road” will have exhausted or committed this funding.

Partner contributions will be solicited when the final costs of publication have been identified.

13. Partner Contributions

To date, over \$250,000 has been spent on bringing five of the seven volume history series to the final report stage and Hinton Wood Products has been continuing to support the project through direct and indirect funding throughout the project.

No funding is requested from the model forest, other than that already committed in the 2004-05 operating budget, and these funds will either be expended or committed under contract at the end of the current fiscal year.

Additional funding for remaining projects will be solicited when costs and timelines become more evident.

14. Proposed Payment Schedule

15. Subcontracted Work

Design and printing.

16. Project Management

Bob Udell will remain as project manager.

17. Additional Organisations requesting FRIAA Administered Monies

18. Other Relevant Information

Foothills Model Forest 2005-2006 Annual Work Plan

Detailed Proposal

Estimating and Mapping Biomass of Alberta Forestlands

1. Prepared by

Name: Shongming Huang and Dave Morgan
Address: 8th floor, 9920-108 Street, ASRD
Phone: (780) 422-5295 (Dave); 422-5281 (Shongming)
Fax: (780) 427-0084
Email: Shongming.huang@gov.ab.ca; Dave.morgan@gov.ab.ca

2. Introduction

Spatially explicit estimates of forest biomass have become critical for enabling us to model carbon budgets, to calculate carbon credits, and to predict the effects of global climate change. Because tree dry biomass density is nearly 50% carbon, the ability to track biomass change would provide us with the potential to determine if Alberta's forests should be considered to be a carbon source (via burning, decay and deforestation) or a sink (via growth and reforestation) for greenhouse gases. Biomass estimates are also needed to supply information on international accords such as Criteria and Indicators on Sustainable Forest Management in Canada. Quantification of forest biomass would provide a new means for estimating the amount of available forest resources and for understanding and predicting changes in forest structure resulting from forest succession and management activities. Forest biomass estimation is also needed for determining forest fuels components, a concern of growing importance in forest-fire hazard management and suppression. Thus, information on forest biomass is increasingly needed to support sustainable forest resource management.

3. Background Information

Our ability to estimate forest biomass is limited by the lack of data for individual tree components. Traditional forest inventories focus on developing estimates of tree bole volume (often to some merchantability limit) and ignore tree bark, branch, needle and root volumes, all of which are needed to develop tree biomass estimates. Biomass data for non-tree vegetation is similarly lacking. The Canadian Forest Service has collected some data for mature trees (under the Energy from the Forest Program that ended in 1985). Unfortunately little of that data came from Alberta sources. Also, the data can't be related to stand/inventory parameters since no associated stand attribute data was recorded.

Most attempts at regional or national biomass inventories fall into two approaches: conversion of existing volume inventories to biomass based on broad strata or direct sampling to measure biomass. Converting existing vegetation inventories to biomass inventories takes advantage of existing information, but all attempts to date suffer from some of the same weaknesses—the need to estimate

all the forest biomass components (including non-merchantable parts of the tree stem, understorey, and roots) from stemwood volume. In some other parts of the world, the approach of using plot data to derive volume to biomass conversion factors based on the predominant species, stocking, and maturity class of the stand has been used with success. The stem volume and area in each of these broad classes are then obtained from the inventory and converted to biomass components.

A growing source of information on forest biomass and productivity is forest inventory programs and permanent sample plot (PSP) networks. Monserud and Huang (2003) assembled over 1000 Alberta permanent sample plots (PSP) from both public and private sources to predict and map lodgepole pine (*Pinus contorta* var. *latifolia* Engelm.) site productivity across Alberta. Fournier et al. (2003) used a large inventory plot network to estimate and map biomass across Newfoundland and Quebec. Kurz et al. (2002) relied on inventory plots to estimate biomass and eventually net primary productivity across Canada. Biomass on a given sample unit is estimated either from existing biomass component equations for each tree (e.g., Singh 1982; Alemdag 1984) or from conversion factors using volume estimates (Kurz et al. 2002) from stand simulation models such as GYPSY (Huang et al. 2001).

4. Objectives

Our objectives are to first validate existing biomass models and, if necessary, develop new biomass models to estimate forest biomass for forest stands across Alberta, and then to map the resulting biomass isoclines within and bordering the natural range of Alberta tree species. We propose a staged approach to achieve these objectives:

Stage-1: Review biomass literature;

Stage-2: Develop a data collection protocol for validating and developing biomass equations;

Stage-3: Data collection;

Stage-4: Model validation and model development.

Alberta Environment provided funding (\$35,000) to cover Stages 1, 2 and part of Stage 3 of this project. Alberta Sustainable Resource Development and Alberta Environment will jointly fund the remaining part of Stage 3 and Stage 4. Details are being worked out now.

The 2005/2006 work plan described here is designed to meet the objectives spelled out in Stages 1, 2 and 3.

5. **Abstract of Methodology**

We will begin by review biomass literature and developing a data collection protocol for validating and developing biomass equations, then collecting biomass data, developing biomass models for each of the tree components, and assembling a database of longitude, latitude, elevation, and biomass from an extensive network of plots. Biomass at each sample location will be estimated using the summation of component biomass models for each tree. We will then use a thin-plate smoothing spline program ANUSPLIN (Hutchinson 2002) to fit this biomass surface as a function of the three topographic variables: longitude, latitude, and elevation. Finally, we will combine this fitted surface with a province-wide digital elevation model (DEM) to predict isoclines of biomass for the entire range of tree species in Alberta. We will convert biomass to carbon using the established procedure of Monserud and Huang (2003). Map products will be produced using the ArcView geographic information system.

For this study, white spruce, lodgepole pine and aspen were chosen as the target species for the first step of the project. A total of 100 stands will tentatively be selected across central Alberta. Actual sample stands will be selected in the office prior to the commencement of fieldwork. The criteria used for the preliminary selection of sample stands include: (1) stand cover type (preferably based on a recent inventory) is known (or sufficiently known to provide a description of general crown closure and predominant overstorey type; old air photos may be used if Alberta Vegetation Inventory coverage is unavailable); (2) stands are large enough to provide for a 30 m buffer; and (3) the stands already contain a sample plot for which the data are available to reduce field sampling costs.

A 300m² large tree plot will be established at each of the 100 sample plot locations, with the small tree plot and regeneration tree plot nested in this large plot. The exact plot locations are to be determined from a tie point that will be a relatively permanent land feature (e.g., road intersection, well site corner, etc.). All plot location information will be recorded on the standard Alberta Sustainable Resource Development plot location tally sheet. GPS co-ordinates of the plot will be recorded. Three to six trees will be selected according to a pre-defined procedure and cut into one metre pieces.

6. **Deliverables**

1.) Knowledge Creation

Biomass literature review report, by August 30, 2005

2.) Demonstration

Biomass data collection field procedures manual, by December 30, 2005

Biomass data collection report preparation, by March 30, 2006

Foothills Model Forest will receive a copy of the raw plot data GPS locations. This information may be applied in other applications.

3.) Knowledge / Technology Transfer

New biomass equations will be developed. These new equations will be summarized in a quick note to be used by government and industry for carbon budget modelling.

4.) Communications and Outreach

A more detailed technical report on the development of the new biomass equations will be prepared jointly with project collaborators. It will be presented at a suitable conference or workshop within a year after the project is completed. When requested, updates of the project will be provided to Foothills Model Forest for use on its web site.

5.) Policy Support

Carbon budget modeling requires data and models on above ground biomass, particularly for trees; they constitute one of the largest renewable resources in Alberta. Currently there is little data available on this resource. The federal government plans to use biomass equations developed from data largely collected in other parts of Canada for Alberta carbon budget modeling. Alberta must necessarily use the same equations since we currently lack the data required to develop Alberta-based models. This project calls for a partnership approach to the development of biomass equations that can be used for carbon budget and forest fuel modeling including the modeling of the emissions given off by wild fires. Completion of this project will support Alberta's Climate Change Strategy. It will also support one of ASRD's main goals of "the values Albertans receive from forests and forest landscapes are sustained and enhanced for future generations".

Alberta Government executives are updated on this project on an irregular basis. Both ASRD and Albert Environment fully support this project. Alberta Environment has recently agreed to provide additional funding (\$50,000) for this project for the current fiscal year 2005/06. It is expected that the new biomass equations will be the basis for estimating Alberta's carbon budget.

7. Timelines

Task	2005									2006		
	A	M	J	J	A	S	O	N	D	J	F	M
Literature Review	x	x	x									
Prepare field procedures manual			x	x	x							
Field work					x	x	x	x				
Data management								x	x	x	x	x

8. Site Information

Site selections to be done in August 2005, once the field procedures manual is prepared.

9. References

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10. Scientific Review

Dr. Robert Monserud, Chief Biometrician

USDA Forest Service

Pacific Northwest Research Station

620 SW Main St., Suite 400

Portland, Oregon, USA 97205.

Tel: (503) 808-2059. Email: rmonserud@fs.fed.us

Dr. Peter L. Marshall, Professor and Associate Dean

Faculty of Forestry

The University of British Columbia

#2005 - 2424 Main Mall

Vancouver, British Columbia, Canada V6T 1Z4

Phone: (604) 822-4918. Email: peter.marshall@ubc.ca

Dr. Victor Lieffers, Professor
 Department of Renewable Resources
 442 ESB, University of Alberta
 Edmonton, Alberta, Canada T6G 2H1
 Tel: (780) 492-2852. Email: victor.lieffers@ualberta.ca

Dr. Ron J. Hall, Research Scientist
 Northern Forestry Centre, Canadian Forest Service
 Natural Resources Canada
 5320-122 Street
 Edmonton, Alberta, Canada T6H 3S5
 Tel: (780) 435 7209. Email: rhall@nrcan.gc.ca

Dr. Yuqing Yang, Research Scientist,
 Forest Management Branch
 Alberta Sustainable Resource Development
 8th floor, 9920 – 108 Street
 Edmonton, Alberta, Canada T5K 2M4
 Tel: (780) 422-5250 Fax: (780) 427-0084
 Email: yuqing.yang@gov.ab.ca

11. Improvements to Management in Forest Ecosystems

As stated in Introduction, since tree dry biomass density is nearly 50% carbon, the ability to track biomass change would provide us with the potential to determine if Alberta’s forests should be considered to be a carbon source (via burning, decay and deforestation) or a sink (via growth and reforestation) for greenhouse gases. Accurate quantification of forest biomass would provide a new means for estimating the amount of available forest resources and for understanding and predicting changes in forest structure resulting from forest succession and management activities. It is increasingly needed to support sustainable forest resource management.

12. Amount of Money Requested From the Foothills Model Forest

N/A

13. Partner Contributions

Partner/Organisation	Cash			In-kind		
	Current Funding	Promised Contributions	Funding Pending	Current Funding	Promised Contributions	Funding Pending
Foothills Model Forest						

No additional funding is requested at this time from other organizations.

14. Proposed Payment Schedule

August 30, 2005 - \$8,000, for the preparation of field procedures manual
 December 30, 2005 - \$15,000, data collection (part-1)
 March 30, 2005 - \$12,000, data collection (part-2) and report preparation

- 15. Subcontracted Work**
(1). Preparation of field procedures manual
(2). Data collection (part-1)
(3). Data collection (part-2) and report preparation
- 16. Project Management**
Same as section #1
- 17. Additional Organisations requesting FRIAA Administered Monies**
N/A
- 18. Other Relevant Information**
N/A