

## *FII Forest Research Program 2003/04 Annual Progress Report*

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The purpose of this Annual Progress Report is to communicate progress and achievements of your research project over the funding period and identify impacts or outcomes of the project. Information from this progress report is required to assess the final progress of the project in relation to the Recipient Agreement and to provide information required for FII Ltd. to report on annual achievements and funding investments for the Forest Research Program. Complete the required information in the unshaded text boxes for **Parts A to C**, (text boxes will expand).

### **Part A: General Project Information**

**The information provided under Part A will be available for immediate posting on the Internet in a project repository on the Natural Resources Information Network (NRIN) website.**

<b>Project No:</b>	R04-028
<b>Organisation:</b>	Ministry of Forests
<b>Project Contact:</b>	Michaela Waterhouse
<b>Address:</b>	200 – 640 Borland Street, Williams Lake, B.C., V2G 4T1
<b>Phone No.</b>	250 398-4409
<b>Email:</b>	<a href="mailto:Michaela.Waterhouse@gems4.gov.bc.ca">Michaela.Waterhouse@gems4.gov.bc.ca</a>
<b>Project Title:</b>	Silvicultural systems to maintain northern caribou habitat in lodgepole pine forests in central BC
<b>Final Project Abstract:</b>	<p>This is an ongoing, long-term experimental trial to develop alternative silvicultural systems in northern caribou habitat. Under the Cariboo-Chilcotin Land Use Plan, northern caribou are considered a key management species and under the federal <i>Species at Risk Act</i> they are designated as threatened (within SMNEA). The goal of this project is to develop and test silvicultural systems that maintain caribou habitat, including terrestrial and arboreal forage lichens, while extracting timber, achieving regeneration and maintaining biodiversity. Research is required to continue on this project to provide a sound scientific basis for the ‘modified harvesting options’ under the Cariboo-Chilcotin Land Use Plan. Over 181,000 ha of caribou winter range will be available for ‘modified harvesting’. Short-term deliverables are used to support and update the CCLUP Northern Caribou Strategy on an annual basis. In 2003-2004, reports were completed on windthrow, natural regeneration ingress, planted stock, and micro-climate. These reports are in various stages en route to publication. Data were collected for year 7 in the planted stock trial and the lichen in the pilot block trial. The climate stations and the permanent sample plots were maintained. A successful field tour was held in October.</p>
<b>Keywords:</b>	

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*Forest management, silvicultural systems, northern caribou, biodiversity, timber harvesting, regeneration, birds, commercial fungi*

**Part B: Project Impacts, Outcomes, Progress, and Extension**

Information provided in Part B is used to evaluate and assess the completion of the project in relation to the terms and workplan outlined in the Recipient Agreement and assess the impacts and outcomes of the project.

**B1: Workplan and Annual Progress Summary:**

Using the table below, describe the extent to which the activities and objectives identified in the workplan (Schedule A Recipient Agreement) were achieved. Indicate any changes from the original plan in bold, and indicate date of approval and brief rationale for the change. Please list extension activities and deliverables in table B5 below (“**Outputs, Deliverables, and Extension**”)

<b>Project Component or Objective</b>	<b>Activities (Tasks)</b>	<b>Extent to Which Activities have been Completed and Objective has been Achieved</b>
Lichen in pilot block	Data collection and summary	<ul style="list-style-type: none"> <li>• Data collected and summarized (hardcopy of report attached)</li> </ul>
Planted stock	Submission and revision of fifth year report  Collection and analysis of year 7 data	<ul style="list-style-type: none"> <li>• Journal article submitted to Forestry Chronicle.</li> <li>• Year 7 data collected and summarized (hardcopy of report attached)</li> </ul>
Natural regeneration ingress and growth	Writing a report for publication	<ul style="list-style-type: none"> <li>• First draft of the report has been finished.</li> </ul>
Micro-climate	Download of stations, and annual data report  Writing a draft working paper	<ul style="list-style-type: none"> <li>• Microclimate data incorporated into the planted stock journal article</li> <li>• Draft Ministry of Forests Technical Report completed – scheduled for publication in 2004-05</li> <li>• Climate stations downloaded and maintained</li> </ul>

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Fungal studies	Data collection for morels and pine mushrooms depending on the crop	<ul style="list-style-type: none"><li>• <b>Data were not collected this year due to poor mushroom production in the summer (very dry) and an early snowfall in the fall</b> (discussed in third quarter report).</li></ul>
Breeding birds	Writing a report for publication	<ul style="list-style-type: none"><li>• Analysis of variance was completed and results summarized for each year of the study <b>Report not produced due to insufficient time.</b></li></ul>
Wind throw (stand stability)	Writing and publishing an extension note	<ul style="list-style-type: none"><li>• A provincial rather than a regional extension note was finished and is ready for peer - review</li></ul>

**B2: Research Question:**

Restate the research question as per your original proposal and comment on the extent to which your research question has been answered during the current funding period.

Will alternative silvicultural systems maintain northern caribou habitat while providing for other resources such as timber, regeneration and biodiversity?

This is a long-term research trial testing the implications of silvicultural systems to caribou habitat, regeneration, biodiversity, commercial mushroom production and long-term site productivity. This year we focused on consolidating results from previous years and producing final products.

**Key results from reports and field research undertaken this year:**

*Planted stock*

There was 94% survival of pine and similar height growth in the partial cuts and clearcuts. Diameter growth was lower in the partial cuts but sufficient to replace harvested trees given the extended rotations associated with these silvicultural systems. Spruce performance was variable but was consistently better in the partial cuts in the MS. The journal article includes recommendations to managers on species selection, and effects of opening size on growth and survival in the MS and SBPS. Year 7 results were similar to year 5. Data are available to examine current free growing guidelines.

*Windthrow*

After five years of measurement, we conclude that windthrow does not pose an economic or forest health risk. There were no significant differences in rates of windthrow between the unlogged and partially cut treatments. It provides foresters and managers with information on the rates and types of windthrow to expect in partially cut and uncut forests.

*Pilot block lichen assessment*

Terrestrial lichen abundance has been stable in the forested part of treatments and controls since the project was established. From the first year post-harvest, lichen has increased in the 70% harvested treatment (with residual trees left scattered), though it remains below the amounts found in the forest. Lichen has remained at low abundance in the clearcut and openings. Based on this data collection full trial will be measured in 2004-05.

*Natural regeneration ingress*

The report, summarizing the main results, will be submitted to a journal for publication in 2004-05. It contains information to managers and foresters regarding natural regeneration of partial cuts in the MS and SBPS – seven years post harvest. The small openings can be successfully regenerated in the SBPS and at lower elevations of the MS, but the higher elevation sites in the MS are problematic.

*Micro-climate studies*

Data were collected for 2003 and all data were synthesized from 1997-2003 into a draft technical report. Partial cutting decreased frost events, decreased growing degree days, and decreased mean soil temperature compared to clearcuts. The microclimate has had a strong effect on planted stock survival and performance.

*Extension*

A successful field tour was held in October. There were 35 participants including foresters, biologists, First Nations and researchers from across BC. The project was updated on the FERNS website. All signs were checked. Previously published material continues to be available from the Ministry of Forests websites for the Southern Interior Region and Research Branch. A project summary was put o file with NRIN.

**B3: Impacts and Outcomes:**

Describe the impacts and outcomes of the research and how the research has benefited or improved sustainable forest management. Where possible, provide quantifiable outcomes associated with this research (i.e., volume gain in terms of m<sup>3</sup>; cost savings due to improved access, etc.).

The Cariboo-Chilcotin Land Use Plan set aside 181,000 ha of forest land to be cut through ‘modified’ harvesting systems. These are the silvicultural systems are being tested in this trial. The use of modified harvesting systems will also be a key component of the Recovery Action Plan required by the *Species at Risk* legislation for caribou in the Southern Mountain National Ecological Area. Research over the last ten years has measured impacts on lichen, biodiversity, climate, long-term site productivity, commercial mushroom production, natural regeneration and planted stock. Overall, these silvicultural systems maintain caribou habitat (lichen), regenerate well, and conserve biodiversity. Long-term site productivity is discussed in a separate trial. Commercial mushroom production has been inconsistent from year to year. In some years there has been very high morel and truffle production. Results to date support continued timber harvesting in areas designated for ‘modified’ harvesting.

**B4: Users and Application of Results:**

List the user group and describe the realised or expected benefit of your research (eg, researchers, technical experts, planners, foresters,

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practitioners, regulators, decision makers, public). If results or information derived from the research have been used, provide the name of the individual and organisation and describe how the information has been applied.

<b>User/User Group</b>	<b>Realised/Expected Benefit</b>
Practitioners, researchers	Continued support to implement the silvicultural systems operationally (Ian Lanki – Riverside Forest Products Ltd., Williams Lake). Also, Riverside is continuing to fund the adaptive management component of the trial.
Foresters, researchers	They can expect good survival and growth of planted stock in the openings created through partial cutting. There is little information published in the literature on this topic so will be of interest across Canada. There may also be application of the research to regeneration of mountain pine beetle infested areas.
Decision makers	The modified harvesting options maintain habitat for caribou while still allowing for timber harvesting. Continued information is required as the northern caribou recovery action plan is being written (Northern Caribou Technical Advisory Committee, Northern Caribou Recovery Recovery Implementation Group) and to support the CCLUP Northern Caribou Strategy – contact Harold Armleder (MOF –SIR)
Foresters, decision makers, researchers	Partial cutting does not pose an economic or forest health risk due to windthrow.
Researchers	The pilot block plots were re-assessed for lichen abundance (8 year post harvest), and results indicate we should re-sample the whole replicated trial.
Foresters, planners, researchers	For clearcuts, the current strategy is to plant in the MS but naturally regenerate SBPS blocks. This holds true for partially cut blocks.
Foresters, researchers	Microclimate studies are used to understand responses of lichen, regeneration, mushrooms etc. to partial cutting and clearcutting treatments.

**B5: Outputs, Deliverables, and Extension**

List the deliverables or extension products developed from the research during the 2003/04 funding period. Please identify a) the type of deliverable (TYPE), b) the deliverable citation, and c) whether it is (Y) or is not (N) included as part of this Annual Progress Report submission (INCL).

<b>TYPE</b>	<b>CITATION (Extension products in progress)</b>	<b>INCL (Y/N)</b>
JOU	Daintith, N.M., M.J. Waterhouse, and H.M. Armleder. 2004. Seedling performance in partially cut lodgepole pine stands in west-central British Columbia – submitted to Forestry Chronicle	Y
EXT	Waterhouse, M.J. and H.M. Armleder. 2004. Windthrow in partial cutting in lodgepole pine forests on the Chilcotin	Y

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	Plateau of British Columbia. Ready for peer review for the Min. Forests Research Branch Ext. Note Series.	
JOU	Steen, O.A. et al. 2005. Natural regeneration of lodgepole pine following partial harvesting on northern caribou winter range in west-central British Columbia. Draft completed for peer review	Y
TEC	Sagar, R.M., M.J. Waterhouse and B.K. Chapman. 2005. Microclimate studies in alternative silvicultural systems on the Chilcotin Plateau of British Columbia: The Itcha-Ilgachuz project (1997-2003). Draft completed for peer review.	Y
WEB	Updates to website: <a href="http://www.pfc.cfs.nrcan.gc.ca/ecology/ferns/itcha/index_e.html">http://www.pfc.cfs.nrcan.gc.ca/ecology/ferns/itcha/index_e.html</a>	
ORA	Field tour – organized by FORREX and MOF – all aspects of the project were presented to a group of 35. October 7	

**Deliverable Type Legend**

<b>TYPE</b>	<b>OUTPUT DESCRIPTION</b>	<b>TYPE</b>	<b>OUTPUT DESCRIPTION</b>
TEC	Technical Report	FGM	Field Guide or Manual
JOU	Peer Reviewed Journal Article	ORA	Oral Presentation
EXT	Extension Note or Newsletter Article	POS	Poster Presentation
NEW	Newsletter	WEB	Website
BOK	Book or Book Chapter	OTH	Other

**Part C: Additional Project Information**

Information provided in Part C will be used to report out on the overall investments of the Research Program during the 2003/04 funding period.

**C1: Multi-year Projects:** If the project is part of a multi-year research initiative, indicate in the statement below where the current funding period (2003/04) lies within the longer term research program:

The 2003/04 fiscal period represents year 9 of a 25 or longer year research program/project.

**C2: Research Focus:** Select (by placing an X in the preceding box) the primary category that would best categorize the focus of research

Silvicultural Systems - (harvesting systems – shelterwood, clear-cut, etc.)	Natural Disturbance Dynamics (fire, wind, etc.)	Site Rehabilitation and Restoration
Growth and Yield (modeling, site index work)	Ecosystem Dynamics (classification, inventory, PEM, ecosystem research)	Forest Genetics
Biodiversity/Habitat Management (SAR, habitat requirements, habitat supply modeling)	Wood Quality (assessment, wood properties and potential applications)	Other – Please specify
Forest health (pests and pathogens)	Soil Conservation, Health, and Productivity	
Riparian and Aquatic Management (buffers, CWD)	x Integrated Resource Management (land use planning)	

**C3: Biogeoclimatic Ecosystem Classification:** Identify (by placing an X in the preceding box) the BEC zone(s) to which the research applies.

Alpine Tundra	Engelmann Spruce-Subalpine Fir	Ponderosa Pine
Boreal White and Black Spruce	Interior Cedar-Hemlock	Spruce-Willow-Birch
Bunchgrass	Interior Douglas-Fir	Sub-Boreal Spruce
Coastal Douglas-Fir	x Montane Spruce	Not applicable
Coastal Western Hemlock	Mountain Hemlock	x Sub-boreal Pine Spruce

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**C4: FII's Objectives and Strategies:** With respect to FII's objectives and strategies listed below, identify (by placing an X in the preceding box) which of the following strategies **best** represents the overall objective and approach of your research project.

<b>Objectives and Strategies</b>	
<b>Objective: To support more effective policies, regulations, and guidelines</b>	
<b>x</b>	Support policy, regulatory and guideline development, evaluation and adjustment
	Enhance quality of decision making through improved knowledge base
	Empowered decision makers to employ practical adaptive management approaches
	Support greater certainty in planning and decision making for all forest resources values
<b>Objective: To enhance the value of timber and forest land assets</b>	
	More effective and efficient use of forest resources
	Reducing costs of timber production
	Reducing forest health risks through improved management practices
	Enhancing timber quality and resulting products
	Increasing available volume and value through productivity enhancements, increased utilisation and better realisation of inherent site potential
	Increasing available timber volume through management of access constraints
<b>Objective: To improve stewardship and market acceptability of BC forest practices and forest products</b>	
	Promoting new or adapted forest practices which give BC an edge in the world forest product marketplace
	Improving sustainable forestry practices in terms of planning, management, monitoring, analysis, reporting and adjustment
	Enabling and accelerating certification practices