Local Level Indicators of Sustainable Forest Management for the

foothills
MODEL FOREST
research growing into practice.

STATUS REPORT

2008

FOOTHILLS MODEL FOREST
LOCAL LEVEL INDICATORS PROJECT

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For more information about publications referenced in this report, please contact us at (780) 865-8330, or visit www.foothillsresearchinstitute.ca. Information related to this report may also be available from our partner organizations:

- Alberta Sustainable Resource Development : http://www.srd.alberta.ca/
- Hinton Wood Products (A division of West Fraser Mills Ltd): http://www.westfraser.com/hintonforestry
- Jasper National Park: http://www.pc.gc.ca/eng/pn-np/ab/jasper/index.aspx

INTRODUCTION
Foothills Model Forest
Local Level Indicators Project

About the Foothills Model Forest

Our name has changed!
While we were creating this report, we changed our name. To better reflect our new business cycle and expanded mandate, the Foothills Model Forest is now the Foothills Research Institute. To avoid confusion, this report uses our old name, "Foothills Model Forest," throughout.

Role of the Foothills Model Forest
The Foothills Model Forest has no land or resource management mandate; it is an organization designed to promote innovative thinking and support research that serves all its partners in their respective efforts to manage sustainably. Data for the Local Level Indicators Project was generally collected by agencies with land and resource management responsibilities, such as Jasper National Park, Hinton Wood Products (A division of West Fraser Mills Ltd.), and Alberta Sustainable Resource Development. Please refer to the following link for a description of our landbase: http://foothillsresearchinstitute.ca/pages/About/OurLandBase.aspx

Introduction: Measuring whether we're managing the forest sustainably

To keep our forests healthy, it's important to practice good long-term management from a number of perspectives: people should be able to harvest wood and other resources from the forest, wildlife should be able to inhabit it, the forest should be able to regenerate, and so on, for many hundreds of years into the future. This is known as "sustainable forest management."

More technically, sustainable forest management can be defined as the stewardship and use of forests and forest lands in a way, an at a rate, that maintains their biological diversity, productivity, regeneration capacity, vitality and their potential to fulfill, now and in the future, ecological, economic, and social functions (definition adapted from Food and Agriculture Organization of the United Nations, www.fao.org/docrep/003/x6896e/x6896e0e.htm, accessed July 27, 2008)

It's important to able to measure whether we're actually succeeding in practicing sustainable forest management. To do this, we use *indicators*. Indicators give us information about our performance — about whether we're reaching our goals. For example, for a healthy diet, an indicator of success might be the number of servings of vegetables consumed.

In forest management, indicators of whether we're managing the forest sustainably could for example, include the following sample indicators:

- Diversity of wildlife species
- Volume of timber harvested
- Number and severity of wildfires
- Livestock carrying capacity (forest grazing)
- Occurrence of insect infestations and other pathogens
- Rate of public participation in decision-making around forest management

To measure whether the Foothills Model Forest's landbase is being measured sustainably, the model forest and its partners developed a suite of indicators and compared them against six criteria of sustainable forest management, as set out in two landmark reports by the Canadian Council of Forest Ministers (CCFM) (Anon. 1995 and Anon. 2003a).

In its first report (Anon. 2003b), the Foothills Model Forest provided a broad statement of forest resources and conditions within its boundaries, categorized according to the CCFM's criteria. The current report builds on this work, providing detailed up-to-date information on the state of the forest and forest land uses by looking at core indicators.
When compared against local goals and national criteria, the current report should give readers confidence that forest resources in the Foothills Model Forest are being managed sustainably; it should also help Albertans make informed decisions about the management of their forest lands.

Definitions and discussion: How is progress measured?
Progress towards sustainable forest management is measured against a series of yardsticks of varying

Photo Credit: Mark Bradley, Jasper National Park

detail and complexity. These yardsticks include *criteria*, which broadly outline the conditions considered essential for sustainability.
Next come goals, which summarize more specifically what should be achieved for each criterion.

Finally, there are *indicators*, which identify the individual factors to be measured. Although goals and indicators identified by the Foothills Model Forest reflect local values, needs and conditions, they're also consistent with Canada's national framework of sustainable forest management criteria.

After releasing its initial status report in 2003, the Foothills Model Forest board of directors decided to continue with the definitions below for the current report. This ensures consistency and ease of understanding for those reading and using this report.

- ***Criteria:*** The criteria identified in the Montreal Process are the essential components of the sustainable management of forests. They include vital functions and attributes, socio-economic benefits, and the laws and regulations that constitute the forest policy framework.
  — Montreal Process, Year 2000 Progress Report
- ***Goals (objectives):*** Broad statements describing a desired state or condition. Goals are mandated by legislation and/or agreed to through a process of stakeholder input and participation.
  — Foothills Model Forest LLI Project Team
- ***Indicators:*** The Montreal Process indicators provide ways to assess or describe a criterion. Many indicators are quantitative, whereas others are qualitative or descriptive. All indicators provide information about the present conditions of forests and their use and, over time, will establish the direction of change in these variables.
  — Montreal Process, Year 2000 Progress Report

There are currently a number of stewardship-based processes for certifying a company's products as sustainable. On a voluntary basis, the forest industry can work to achieve certification for the purpose of marketing their products as coming from sustainably managed forests. These processes are all indicator-based. For more detail on these processes, please see the National Sustainable Forest Management Standard (**CSA**) (CAN/**CSA**-Z809)

The practical application of indicators
An indicator is a measureable attribute of a condition or outcome that can provide an objective insight into the state of the forest, or the degree to which a goal or objective is being met under a specific management strategy. There are two types of

indicators: *activity indicators* and *state indicators*.

Activity indicators give us a measure of the degree to which certain activities have taken place. Such indicators are often relatively easy to measure, and provide *indirect* assessments of progress towards environmental management goals. For example, the number of people attending an informational open house provides an indirect measure of public participation in decision-making.

State indicators, on the other hand, are *direct* measurements of some environmental, economic, or social condition. An example of a state indicator is timber harvest relative to annual allowable cut. Ideally, indicators are integrative, in that they are able to measure performance against more than one goal.

Criteria and indicators are tools for characterizing the state of forests and for providing information on how forest lands and uses are changing. By comparing these changes against goals, people with an interest in sustainable forest management can draw conclusions with regards to forest management, and forest resource managers can make more informed decisions.

Partnerships

Across the landbase of the Foothills Model Forest, the Alberta Government, industry, and Parks Canada exercise varying management strategies in response to their respective priorities. Despite different strategies, all Foothills Model Forest partners agree on a wide range of priorities and goals.

The Foothills Model Forest's ability to build cooperative partnerships has been especially important in developing agreement on goals and indicators for this project. Working with a multi-jurisdictional group of partners requires innovation and risk, but it's definitely a risk worth taking. Being able to refer to common goals and indicators is good news for ecological and social environments, as well as being cost-effective. The Local Level Indicators Project has drawn on a partnership consisting of over 40 organizations, principal sponsors, the Foothills Model Forest Board of Directors, and the Executive Committee.

The data

The Foothills Model Forest Activity Team has assembled scientific data to allow for the evaluation of selected indicators. The intent of the Local Level Indicator Project is to report on the results of continued monitoring, in an attempt to reflect the current state of specific attributes of the forest and the maintenance of values over time. The preparation of some of the indicator reports clearly illustrated some of the challenges of acquiring the right data to answer indicator-specific questions.

In these instances, reporting on the indicator was deferred until such time as the dataset was either complete or deemed of acceptable quality, or until enough time had passed for the dataset to reflect a meaningful change since the 2003 report (commensurate with the sensitivity of the indicator).

References

Anon. 1995. Defining sustainable forest management: A Canadian Approach to Criteria and Indicators. Canadian Council of Forest Ministers. Ottawa. March 1995. (ISBN: 1-896408-04-4)

Anon. 2003a. Defining sustainable forest management in Canada: Criteria and Indicators. Canadian Council of Forest Ministers. Ottawa. 20p. (ISBN: 0-662-34852-4). http://www.ccfm.org/ci/CI_Booklet_e.pdf

Anon. 2003b. Local Level Indicators of Sustainable Forest Management of the Foothills Model Forest: Initial Status Report. Foothills Model Forest. 106p.

Foothills Model Forest
Local Level Indicators Project
Report Indicators:

Criterion 1: Biological Diversity

Objective 1.1: Maintain viable populations of all currently occurring native species

Value: Healthy native wildlife populations on partnership landscape

Why is the Value Important? Reflects a healthy ecosystem

Indicator 1.1.6 **Adherence of Stream Crossings to Standards**

Criterion 2: Ecosystem Condition and Productivity

Objective 2.3: Conserve the forest landbase

Value: Productive landbase

Why is the Value Important? Basis for ecosystem function and continued provision of ecological goods and services

Indicator 2.3.1 **Forest Area by Protection Status (IUCN Designation)**

Indicator 2.3.2 **Forest Conversion**

Criterion 3: Soil & Water

Objective 3.4: Minimize erosion and soil losses resulting from human activities

Value: Soil

Why is the Value Important? Loss of soil results in the loss of ecosystem productivity

Indicator 3.4.1 **Adherence to Alberta Soil Conservation Guidelines**

Criterion 4: Role in Global Ecological Cycles

There were no core indicators that were completed under Criterion 4.

Criterion 5: Economic & Social Benefits

Objective 5.1: Sustainable use of biological resources

Value: Biological resources

Why is the Value Important? Society depends on biological resources for its social and economic well-being

Indicator 5.1.1 **Timber Harvest Relative to Annual Allowable Cut**

Indicator 5.1.5 **Livestock Carrying Capacity**

Criterion 5: Economic & Social Benefits

Objective 5.3: Contribute to the social and economic health of the region

Value: Sustainable communities

Why is the Value Important? Sustainable communities for people/quality of life

Indicator 5.3.3 **Regional Income Distribution**

Criterion 5: Economic & Social Benefits

Objective 5.6: Minimize threats resulting from large-scale disturbances

Value: Community health and safety

Why is the Value Important? Basis for diversity and continued provision of ecological goods and services

Indicator 5.6.1 **Occurrence and Severity of Wildfire**

Indicator 5.6.2 **Occurrence and Severity of Insect and Disease Pathogens**

Criterion 6: Society's Responsibility

Objective 6.1: Ensure landuse management and planning processes include timely, fair, open and equitable involvement

Value: Community and stakeholder engagement

Why is the Value Important? Important for informed decision-making

Indicator 6.1.1 **Activities that Allow Interested Parties to Participate in the Decision-Making Process**

Criterion 6: Society's Responsibility

Objective 6.2: Conserve historical resources

Value: Historical appreciation

Why is the Value Important? The conservation of historical resources provides a link to the past

Indicator 6.2.2 **Number of Historical Resource Sites Identified Through the Referral and Inventory Processes**

Criterion 7: Future Forest Condition

There were no core indicators identified that were for completion under Criterion 7.

Example of a stream crossing where upstream fish migration is maintained. Bridges or specialized culverts are installed at newer crossings to meet fish conservation goals.

Indicator 1.1.6

Adherence of Stream Crossings to Standards

[1] Foothills Model Forest value
Conservation of aquatic resources.

[2] Objective
To conserve aquatic resources while conducting land management activities.

[3] Statement of indicator
Adherence of stream crossings to standards.

[4] Indicator measure
Measures for this indicator are (a) level of participation (percentage of stream crossings included within an infrastructure management program); and (b) percentage of inspected stream crossings within the Hinton Wood Products forest management area (FMA) that are rated as high-risk.

Definitions:

- *Stream crossing:* The intersection of a stream with a road or railway.
- *Infrastructure management program:* A program that manages technical structures or physical networks that support society, such as *roads*, waterways, sewers, etc.[1] For this indicator, an infrastructure management program will be defined as a program that manages stream crossings.
- *High-risk stream crossing:* A crossing that presents a concern for fish passage, sedimentation, and/or public safety.

[5] Rationale for indicator

a. Significance of indicator to landscape-level management

Throughout the forest regions of North America, the two impacts from land management activities that pose the greatest risk to the conservation of aquatic resources are obstruction of fish passage and sedimentation at stream crossings. Stream crossings (bridges and culverts) are key components of the modern transportation infrastructure and are used to convey water under roads and railways. To improve the status of stream crossings at the landscape scale, we need a widely adopted management

1 Wikipedia. http://en.wikipedia.org/wiki/Infrastructure accessed April 14, 2009.

system that includes an inventory, statement of priorities, capital projects / maintenance program and follow-up monitoring.

There are approximately 2,070 locations where permanent roads cross streams within the FtMF. There are also several hundred railway crossings. Older crossings were built to the standard of the day, but for small streams, maintaining fish passage may not have been a requirement at the time. In addition, runoff from gravel roads can cause sedimentation which adversely affects aquatic invertebrates and fish. These factors warrant a system-based approach that looks for innovative and cost-effective solutions to manage environmental risks associated with stream crossings at the landscape scale.

b. Meaning of indicator

The construction and maintenance of stream crossings can affect the ability of fish to move up and downstream. Stream crossings can also have a bearing on the conservation of biological diversity, because barriers to fish movement can impact and fragment local fish populations.

Stream crossings can also affect water quality and public safety. Measure A, level of participation (percentage of stream crossings included in an infrastructure management program) provides an indication of how many crossings within the Hinton Wood Products FMA are included within an infrastructure management program. This measure is important as crossings that are not part of an infrastructure management program can negatively affect the aquatic habitat through a lack of monitoring and lack of management for water quality, sedimentation, fish habitat/ migration and public safety.

Measure B, the percentage of high risk stream crossings within the Hinton Wood Products FMA, identifies crossings that are part of an infrastructure management program, but are identified as high-risk, meaning the stream crossing poses fish passage, public safety, and/or sedimentation concerns. Essentially, this measure identifies crossings that would be a priority for management actions and/or remediation measures.

c. Relation of indicator to Foothills Model Forest and to sustainability

Protection of water quality and fish habitat is a key aspect of sustainable land management. The Stream Crossing Inspection Protocol (which was adopted in 2005) is an example of an infrastructure management program that allows for the identification of barriers to fish passage which may be fragmenting valuable habitat required by local fish at various life stages.

Using the Protocol, watersheds are prioritized based on inspection results and the potential for the presence of fish habitat. The Foothills Stream Crossing Program (FSCP) is a cooperative, voluntary effort which allows for integrated, watershed-wide remediation strategies involving many of the major stream crossing owners on the West Fraser FMA. The goal is to improve the conditions of stream crossings. The group was formed in 2004 and includes a group of energy companies, and Hinton Wood Products.

Athabasca rainbow trout inhabit many small streams within the Foothills Model Forest. Addressing fish passage and erosion risks is important to the long-term conservation of this native fish.

The resulting watershed-wide remediation plans are an important management tool for companies to manage their infrastructure in cooperation with competing companies who may have crossings on the same stream. This approach maximizes the ecological benefits to the watershed and allows companies to make investments based on sound scientific knowledge.


Example of a stream crossing rated as high risk to fish passage.

[6] Current status of indicator

a. Level of participation (percentage of crossings included within an infrastructure management program): 75% of crossings in the Hinton Wood Products FMA are included in an assessment protocol procedure (1,559 out of 2,070 road stream crossings).

Participating companies include BP Canada Energy Company, Canadian Natural Resource Ltd., Devon Energy Corporation, Talisman Energy Inc., Petro-Canada, Suncor Energy, ConocoPhillips, and Hinton Wood Products (a division of West Fraser Mills Ltd.).

b) Percentage of inspected crossings that are rated as high-risk: 26% of inspected crossings were found to be high-risk crossings.

[7] Interpretation

More than 75 organizations own stream crossings in the FtMF. Only 12% of these are participating in an infrastructure management program, but these participants own 75% of the crossings in the FtMF. It should be noted that because participation is voluntary, not all crossings are included in an assessment protocol. To conserve aquatic ecosystems, a coordinated approach among these owners is important. The two measures for this indicator are new; therefore, it is not possible to directly compare them with the previous stream crossing measures from the *Local Level Indicators, Initial Status Report 2003*.

In 2006, the energy companies that were involved completed initial inspections and Hinton Wood Products continued their ongoing monitoring program. The crossings were then categorized with a high, medium, or low-risk rating for fish passage and sedimentation. These ratings were assigned based on the procedures outlined in the Stream Crossing Inspection Manual (http://clearlakeltd.typepad.com/clearlake/SCI_Manual_2dec07.pdf).

High-risk ratings for fish passage are given to culverts in fish-bearing streams that may obstruct upstream fish migrations. Sedimentation risk ratings are assigned based on estimated amounts of sediment entering the stream at the crossing point. The Stream Crossing Inspection Protocol was developed by a multi-stakeholder team consisting of Alberta Sustainable Resource Development, Fisheries and Oceans Canada, and a number of companies that own stream crossings within the FtMF.

Stakeholder participants worked together to develop a method that would complement their own management systems. The protocol applies across all road classes that cross permanent streams. The Stream Crossing Inspection protocol facilitates road owners' compliance with provincial and federal environmental regulations that require conservation of fish passage and minimization of sedimentation.

[8] Rationale for allowable variance (threshold)

There is no allowable variance for this indicator.

[9] Analytical considerations

a. Calculation of indicator

These indicators were calculated using data collected within the FtMF during the 2006 field season (May-September). Risk ratings were assigned based on the inspection protocols within the Stream Crossing Inspection Manual.

The measures for the indicator are calculated as follows:

Measure A:

Percentage of crossings included within an infrastructure management program within the Hinton Wood Products FMA = Number of crossings included within an infrastructure management program *within the Hinton Wood Products FMA* / Total number of crossings within the Hinton Wood Products FMA x 100

Measure B:

Percentage of inspected high-risk crossings within the Hinton Wood Products FMA = Number of inspected high-risk crossings *within the Hinton Wood Products FMA* / Total number of inspected crossings within the Hinton Wood Products FMA x 100

b. Special considerations

It should be noted that not all stream crossings within the Hinton Wood Products FMA are part of the same infrastructure management program. For example, Hinton Wood Products tracks and assesses stream crossings independently of the Foothills Stream Crossing Association.

The Stream Crossing Inspection Manual was designed as a risk management tool for use by road owners. The risk categories do not necessarily indicate compliance versus non-compliance with regulations. High-risk crossings typically require site plans, whereas routine maintenance activities may address concerns at medium-risk sites.

Sedimentation risk levels were assessed based on observations and estimates of soil loss determined by field measures. To translate these ratings to other areas, actual values which represent high, medium, and low risks should be adjusted based on field calibrations.

The risk categories for fish passage are described in the Stream Crossing Inspection Manual (http://clearlakeltd.typepad.com/clearlake/SCI_Manual_2dec07.pdf) and are defined as follows:

Low-risk: Obstruction of fish migration is not an issue at this crossing. Future monitoring should be conducted to check for debris blockages, formation of an outlet drop, or the development of any other new obstructions.

Medium-risk: The crossing may impede passage of some species or life stages at various times of the year. A detailed fish passage assessment is recommended.

High-risk: The crossing presents a fish migration concern. A remediation or replacement design is recommended at this site. The stream will have a high probability for fish presence according to a fish probability model for the FtMF area. [2]

2 McCleary, R. and M.A. Hassan, 2008. Predictive modelling and spatial mapping of fish distributions in small streams of the Canadian Rocky Mountain Foothill. *Canadian Journal of Fisheries and Aquatic Sciences*. 65, 319-333.

[10] Responsibility
Data are presented on behalf of members of the FtMF Stream Crossing Program.

[11] Monitoring
Crossing owners are responsible for monitoring status of their crossings. Participation in the FtMF Stream Crossing Program is voluntary.

[12] General discussion
Protection of water quality and fish habitat is an important aspect of all land management activities within the FtMF. A widely adopted management system that includes an inventory, statement of priorities, capital projects/maintenance program, and follow-up monitoring is required to improve the status of stream crossings at the landscape scale. The Foothills Stream Crossing Program is currently developing multi-stakeholder, watershed-wide remediation plans for six watersheds in the West Fraser Ltd. FMA. A monitoring and maintenance follow-up program will be implemented on a watershed level.

Jasper National Park also measures aquatic connectivity (the degree to which all naturally connected streams in an area are unaffected by human-created barriers such as culverts and dams).

For more information on stream crossings within the FtMF, see *Local Level Indicators, Initial Status Report 2003*. Note that indicators in 2003 included the percentage of stream crossings meeting standards on Weldwood's FMA and the density of stream crossings on the Weldwood FMA.

Protected areas help maintain biodiversity across the Foothills Model Forest landbase and beyond to surrounding regions

Indicator 2.3.1

Forest Area by Protection Status (IUCN Designation)

[1] Foothills Model Forest value
Biological diversity.

[2] Objective
To protect biological diversity by maintaining protected areas.

[3] Statement of indicator
Land area by protection status (International Union for the Conservation of Nature and Natural Resources (IUCN) designation).

[4] Indicator measure
The measure for this indicator is the number of hectares (ha) of each IUCN protected area management category, by natural region.

[5] Rationale for indicator

a. Significance of indicator to landscape-level management
Around the world, protected areas are viewed as key tools for protecting biological diversity. They also provide society with areas for nature appreciation, spiritual enrichment and low-impact recreation. A network of permanent protected areas is integral to many commitments to which the Province of Alberta is a signatory, including the National Forest Strategy (Canada's Forest Accord, 1992), the Tri-Council Commitment to Complete Canada's Networks of Protected Areas (1992), and the Canadian Biodiversity Strategy. In order to meet international standards of protection, Alberta's protected areas program follows standards set by the International Union for the Conservation of Nature and Natural Resources (IUCN). In order to meet these standards, the collective thought is that protected areas must be permanently designated and protected.

b. Meaning of indicator
This indicator provides a measure of the area within the Foothills Model Forest (FtMF) landbase that has been legally designated as protected, and its contribution to the total area protected within the province. Moreover, it provides a summary of protected areas by natural region and subregion within the FtMF landbase (natural regions and subregions delineate the province of Alberta into broad ecological map units based on ecological criteria).

c. Relation of indicator to Foothills Model Forest and to sustainability
This indicator helps provide insight into the status of protected areas across the natural regions and subregions of the FtMF landbase. Monitoring the addition or loss of protected areas within the FtMF is important to help ensure that biodiversity and landscape values adopted by the FtMF are maintained into the future.

[6] Current status of indicator

Table 1 outlines the IUCN's six protected area management categories.

Table 1 – Protected area management categories, as defined by the IUCN

Category	Purpose
CATEGORY Ia	**Strict Nature Reserve:** Protected area managed mainly for science **Definition:** Area of land and/or sea possessing some outstanding or representative ecosystems, geological or physiological features and/or species, available primarily for scientific research and/or environmental monitoring.
CATEGORY Ib	**Wilderness Area:** Protected area managed mainly for wilderness protection **Definition:** Large area of unmodified or slightly modified land and/or sea, retaining its natural character and influence, without permanent or significant habitation, which is protected and managed so as to preserve its natural condition.
CATEGORY II	**National Park:** Protected area managed mainly for ecosystem protection and recreation **Definition:** Natural area of land and/or sea, designated to (a) protect the ecological integrity of one or more ecosystems for present and future generations; (b) exclude exploitation or occupation inimical to the purposes of designation of the area; and (c) provide a foundation for spiritual, scientific, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible.
CATEGORY III	**Natural Monument:** Protected area managed mainly for conservation of specific natural features **Definition:** Area containing one, or more, specific natural or natural/cultural feature which is of outstanding or unique value because of its inherent rarity, representative or aesthetic qualities or cultural significance.
CATEGORY IV	**Habitat/Species Management Area:** Protected area managed mainly for conservation through management intervention **Definition:** Area of land and/or sea subject to active intervention for management purposes so as to ensure the maintenance of habitats and/or to meet the requirements of specific species.
CATEGORY V	**Protected Landscape/Seascape:** Protected area managed mainly for landscape/seascape conservation and recreation **Definition:** Area of land, with coast and sea as appropriate, where the interaction of people and nature over time has produced an area of distinct character with significant aesthetic, ecological and/or cultural value, and often with high biological diversity. Safeguarding the integrity of this traditional interaction is vital to the protection, maintenance and evolution of such an area.

Protected areas provide opportunities for recreation and tourism

Table 2 summarizes protected areas within the Foothills Model Forest landbase by IUCN protected area management category for 2008.

Table 2 - Protected areas within the Foothills Model Forest: Designations by IUCN protected area management category (2008)

Type of protected area	Natural region	Protected area	IUCN category	Date established	Area (ha)
Wildland Park	Rocky Mountain, Foothills	Brazeau Canyon Wildland	II	2000	2,204.3
National Park	Rocky Mountain, Foothills	Jasper National Park of Canada	II	1907	1,122,958.4
Natural Area	Foothills	Pinto Creek Canyon Natural Area	III	2000	1,232.0
Provincial Park	Rocky Mountain, Foothills	Rock Lake Provincial Park	II	2006	3,236.8
Wildland Park	Rocky Mountain, Foothills	Rock Lake - Solomon Creek Wildland Park	Ib	2000	31,578.3
Provincial Park	Foothills	Sundance Provincial Park	II	1999	2,763.4
Wildland Park	Rocky Mountain	Whitehorse Wildland Park	Ib	1998	17,418.1
Natural Area	Foothills	Wildhay Glacial Cascades Natural Area	II	2000	2,476.0
Provincial Park	Rocky Mountain, Foothills	William A. Switzer Provincial Park	II	1958	6,095.2
Wilderness Park	Rocky Mountain, Foothills	Willmore Wilderness Park	Ib	1959	460,164.0
				Total area	1,650,126.4

Table 3 summarizes the protected areas within the Foothills Model Forest landbase by IUCN protected area management category, based on the last indicators report (2003).

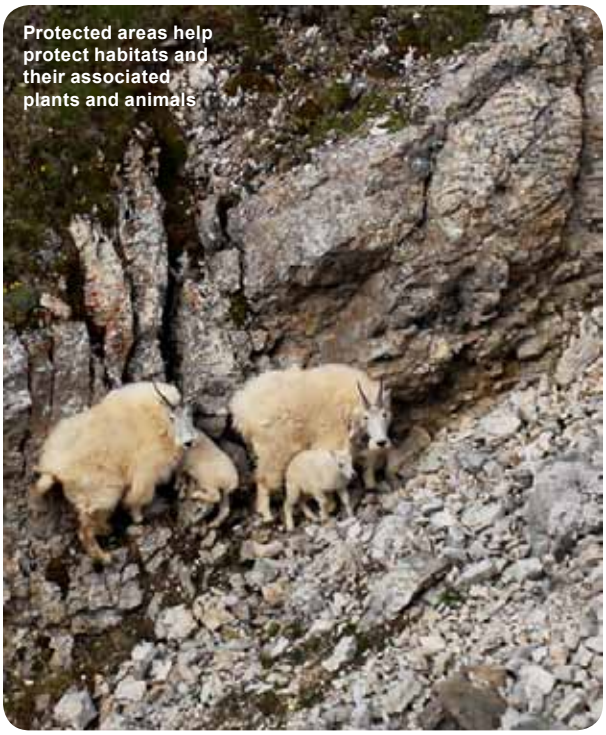
Table 3 - Protected areas within the Foothills Model Forest: Designations by IUCN protected area management category from the last indicators report (2003)

Type of protected area	Eco-region	Protected area	IUCN category	Date established	Area (ha)
Wildland Park	Montane cordillera	Brazeau Canyon Wildland	II	2,000	2,203.4
National Park	Montane cordillera	Jasper National Park of Canada	IV	1,907	1,121,485.3
Natural Area	Boreal plains	Pinto Creek Canyon Natural Area	IV	2,000	1,232.6
Wildland Park	Montane cordillera	Rock Lake - Solomon Creek Wildland Park	II	2,000	34,673.6
Provincial Park	Boreal plains	Sundance Provincial Park	II	1,999	2,763.0
Wildland Park	Montane cordillera	Whitehorse Wildland Park	II	1,998	17,504.1
Natural Area	Boreal plains	Wildhay Glacial Cascades Natural Area	IV	2,000	2,476.7
Provincial Park	Montane cordillera	William A. Switzer Provincial Park	II	1,958	6,234.9
Wilderness Park	Montane cordillera	Willmore Wilderness Park	II	1,959	459,745.4
				Total area	1,648,319.0

Table 4 summarizes the number of hectares (ha) in each IUCN protected area management category by natural region within the Foothills Model Forest landbase.

Table 4 - Number of hectares in each IUCN protected area management category by natural region within the Foothills Model Forest landbase

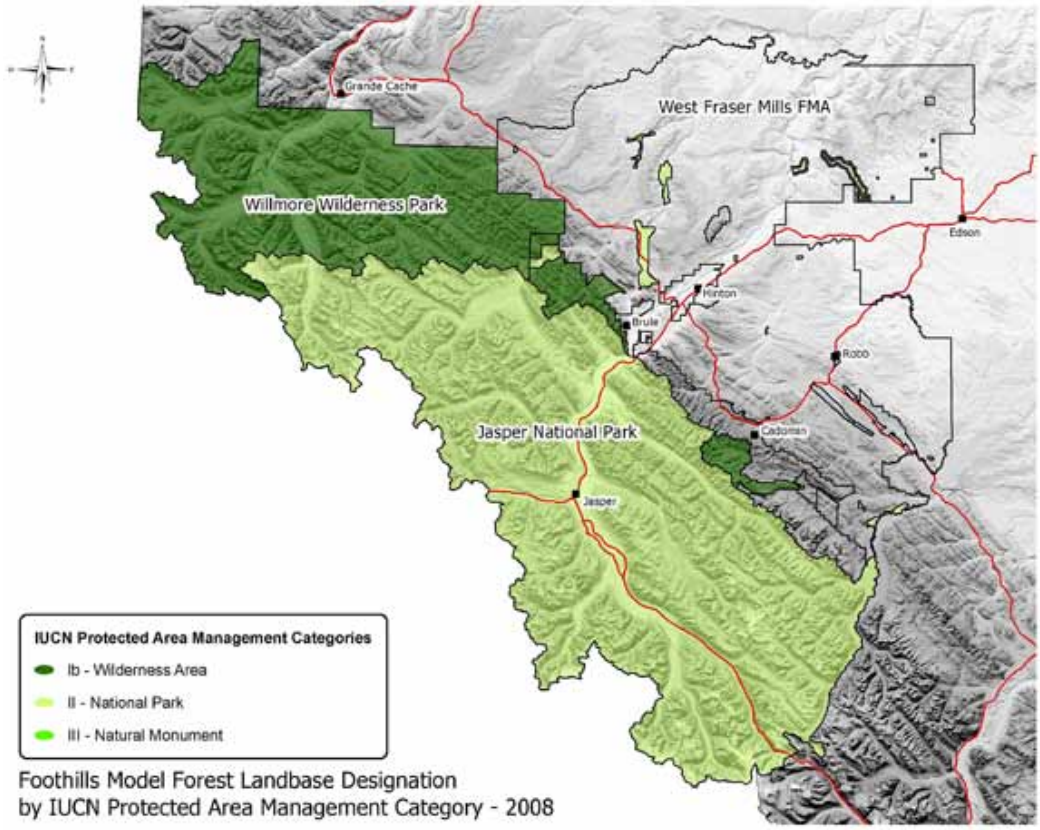
Natural region	IUCN category	Area (ha)
Foothills	Ib	31,427.0
Foothills	II	14,913.2
Foothills	III	1,232.0
	Total – Foothills	47,572.2
Rocky Mountain	Ib	477,733.4
Rocky Mountain	II	1,124,820.8
	Total – Rocky Mountain	1,602,554.2
Total by category	Ib	509,160.4
	II	1,139,734.0
	III	1,232.0
	Total area	1,650,126.4



Protected areas help protect habitats and their associated plants and animals.

Photo courtesy of Mark Bradley, Jasper National Park

Figure 1 - Map of Foothills Model Forest landbase showing designations by IUCN protected area management category (2008)



[7] Interpretation

As summarized in Table 4, within the FtMF landbase the areas protected cover 1,650,126.4 hectares, spanning the Foothills and the Rocky Mountain natural regions. As shown in Figure 1, these protected areas fall within the IUCN protected area management categories Ib (Wilderness Area), II (National Park), and III (National Monument). It should be noted that in the last indicators report (2003) the number of hectares in protected area management category was summarized by eco-region, which is a national scale of ecological classification.

In this report, this number is presented by natural region to reflect the provincial scale for ecological landscape classification within Alberta. This does not affect the total number of hectares in each protected area management category, since this is just an alternate method of summarizing the information. Since the last report (Local Level Indicators of Sustainable Forest Management for the Foothills Model Forest - Initial Status Report, published in 2003), some protected areas have been assigned a different IUCN category; for example, Jasper National Park of Canada was changed from category IV to II. This was done to more closely match the IUCN classification for protected areas that is used by the Parks Division of Alberta Tourism, Parks and Recreation.

Protected areas are critically important in contributing to the maintenance of biological diversity. Biological diversity helps ensure sustainability and the maintenance of a wide range of ecosystem, species, genetic and social values. This indicator measures the amount of protected area by natural region within the FtMF landbase, and can help provide insight on progress made on the identification and protection of areas that contain or support unique species, ecosystems, or landscape features across natural regions. Protected areas throughout the Foothills and Rocky Mountain natural regions contribute to the sustainability of biodiversity at the landscape level.

It will be important to monitor this indicator over time to ensure protected areas are adequately represented through the natural regions and associated sub-regions. Coupled with information from the Alberta Biodiversity Monitoring Initiative, this indicator will provide insight into the effectiveness of maintaining biodiversity throughout the FtMF landbase and beyond.

[8] Rationale for allowable variance (threshold)

No allowable variance has been assigned to this indicator.

[9] Analytical considerations

a. Calculation of indicator

For Table 2, area (hectares) for each protected area listed was derived from the protected area's spatial data. For each protected area type, the areas were added together and summarized by natural region, resulting in Table 4 (this was created through using a spatial overlay within a geographic information system (GIS)). To obtain the total number of hectares for all protected areas, the following calculation was used:

Total Protected Area (ha) = Rocky Mountains Protected Area (ha) + Foothills Protected Area (ha)

b. Special Considerations

The area (hectares) of each protected area may differ when calculated, depending on the origin of the spatial layer and the date of the spatial data. At the time of writing, the most recent geographic information systems (GIS) shapefile layer from the website of Alberta Tourism, Parks and Recreation (http://tpr.alberta.ca/parks/landreferencemanual/default.aspx) was used to calculate the size of protected areas (September 22, 2008).

When researching the protected areas boundary changes for this current report, a classification error was discovered in the last indicators report (2003). Cadomin Cave Natural Area, Cardinal Divide Natural Area, and Grave Flats Natural Area were incorrectly classified as natural areas. These three areas should have been classified as Crown reservations and should not have been included in any calculations. A Crown reservation is a registered interest in land(s) by the Parks Division, to which conditions to industrial activity may apply.[1] Crown reservations are not linked to the IUCN protected area management categories because

1 Tourism, Parks, and Recreation 2008. Land Reference Manual. http://tpr.alberta.a/parks/landreferencemanual/default.aspx Accessed January 21, 2009.

these areas can accommodate resource use and are not protected areas. Therefore, to reflect the fact that this error has been corrected, the total area presented in Table 2 does not include Cadomin Cave, Cardinal Divide, and Grave Flats.

IUCN categories were updated for Table 2 of this indicator; therefore, some protected areas may have a different IUCN classification in Table 2 than they do in Table 3, which draws from the last indicators report (2003). This will affect the results of the calculations in Table 4, as some protected areas were classified as a different IUCN category in the last 2003 report.

For the purposes of this report, provincial recreation areas are not included in any of the calculations. They are not linked to IUCN protected area management categories because the main goals of these areas are to support outdoor recreation and tourism.

It is important to note that for the calculation of this indicator, spatial GIS data was used to obtain the final areas (ha) of the protected areas. Official Land Reference Manual OC (Order in Council) area figures were not used; therefore, areas will differ slightly due to measurement differences in how OC area totals are calculated. Unclassified areas may occur in Table 4 due to boundary differences in the Alberta natural region spatial data layer and the protected area spatial layers, resulting in a negligible area of land that was not classified as a natural region (unclassified).

[10] Responsibility
The protected areas data for this indicator was obtained by downloading the Alberta protected areas digital data shapefile from the Alberta Parks, Recreation and Tourism website (http://tpr.alberta.ca/parks/landreferencemanual/default.aspx), and through discussion and e-mail with the land description contact person. The 2005 Natural Regions and Subregions of Alberta spatial data was downloaded through the ASRD Lands Division website (www.srd.gov.ab.ca/lands/geographicinformation/resourcedataproductcatalogue/2005naturalregionssubregions.aspx).

[11] Monitoring
This indicator is a status indicator and can be updated as new GIS data layers become available. No statistical analysis is required.

[12] General Discussion
The total number of hectares of protected areas from the last report was 1,648,319.0 (Table 3). The total number of hectares of protected areas for this report is 1,650,126.4 (Table 2). This represents a gain of approximately 1807.4 hectares of protected areas within the FtMF landbase.

The following is a summary of the most significant changes in protected areas within the FtMF landbase since the last report:

- Jasper National Park gained approximately 1,473.1 hectares. This is due to improved measurement of boundaries, including height of land.
- Rock Lake Provincial Recreation Area became Rock Lake Provincial Park in 2006. This provincial recreation area was not included in the last report because it did not have an IUCN rank. It should be noted that land was removed from Rock Lake-Solomon Creek Wildland Park and added to the newly created Rock Lake Provincial Park. Rock Lake Solomon Creek Wildland decreased approximately 3,095.3 hectares. Further differences in these boundaries may be attributed to the differences in the delineation of the shared height of land boundary with Jasper National Park.
- Whitehorse Wildland Park lost approximately 86.0 hectares. This is due to improved measurement of boundaries including height of land.
- William A. Switzer Provincial Park lost approximately 139.7 hectares. This is due to improved representation of plan exclusions from the park
- Willmore Wilderness Parks gained approximately 418.6 hectares. This is due to improved measurement of boundaries, including height of land.

Other subtle differences in the total area of each individual protected area listed in Table 2 may be attributed to changes and/or updates in the boundaries since the last report, and may also depend on the source and date of the protected area spatial data layer used to derive the areas.

Coal operations located near Cadomin, Alberta

Indicator 2.3.2
Forest Conversion

[1] Foothills Model Forest value
The forest landbase: i.e., land within the Foothills Model Forest (FtMF) landbase that is forested (and considered productive).

[2] Objective
To conserve the productive forest landbase.

[3] Statement of indicator
Additions and deletions to the forest landbase (total percentage of area changed).

[4] Indicator measure
This indicator provides a summary of the forested land within the landbase that has been converted to a non-forested use, or non-forested land that has been converted back to forested land. Examples of forest land being converted to non-forest use include forest land that has been developed for permanent structures such as roads, pipelines, power lines, mines, well-sites, and gravel pits. Conversely, non-forested land (both industrial land and natural features such as brushy meadows) can also be converted to forested land by the processes of reclamation, rehabilitation, and regeneration (primarily thorough planting trees).

[5] Rationale for indicator

a. Significance of indicator to landscape-level management
Productive forest land (i.e., land that is capable of growing trees) is one of the most important resources that we manage, both at the landscape level and the stand level – there is a finite supply, so we must manage this resource very carefully. Activities such as road-building, open-pit mining, and pipeline construction reduce the area of forested land; therefore, they must be measured, coordinated, and impacts mitigated, wherever possible.

With this indicator, the issue of cumulative impacts becomes an important consideration. On its own, a single impact may have only a small effect on the forest landbase. However, when multiple impacts are considered across all the other users of the landbase, the cumulative landscape-level effect can be significant.

In measuring this indicator, the objective is to be aware of the amount of land on the Foothills Model Forest landbase that is being

converted to uses not compatible to growing trees. Because of economic benefits such as those associated with the oil and gas and coal-mining industries, it is unrealistic to expect all land to remain in a completely forested state. It must be understood, however, that much of this conversion is temporary, and that rehabilitation efforts can return the land to productivity at a future date.

b. Meaning of indicator

This indicator reveals trends in the change in size of the forested landbase as industrial activity occurs; trends showing significant reductions in the landbase over time should be cause for concern for maintaining sustainability for forest values.

c. Relation of indicator to Foothills Model Forest and to sustainability

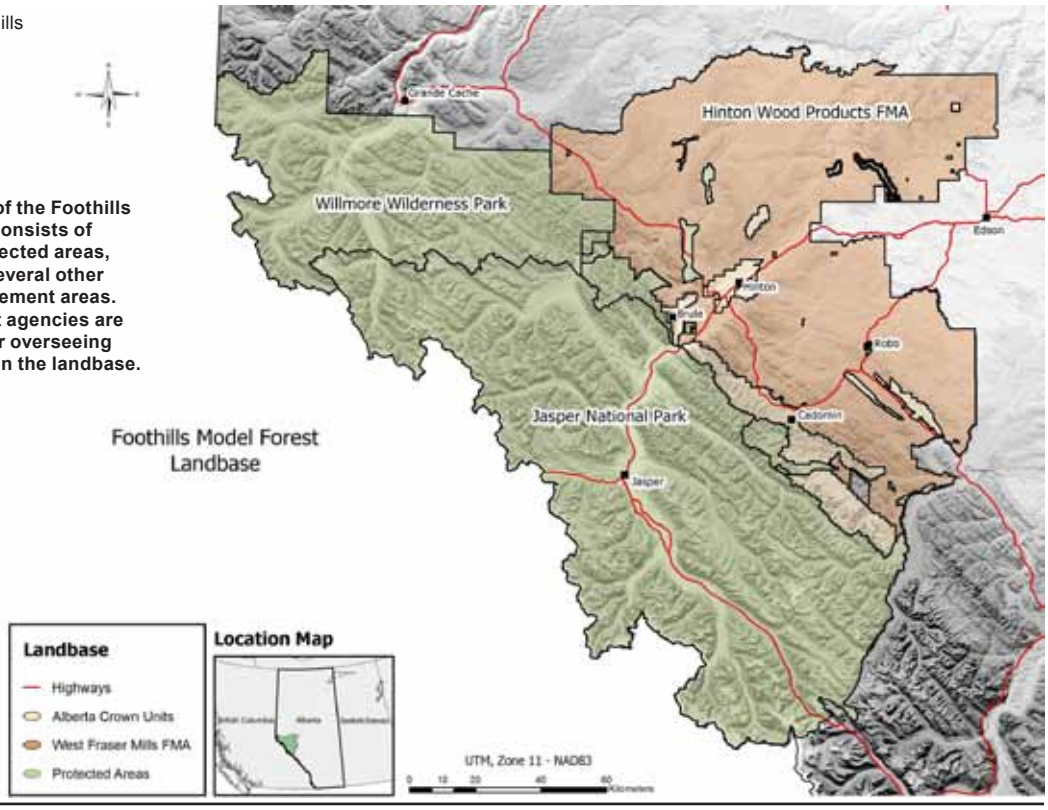
This indicator is a very important measure of sustainable forest management. While loss of forest land may continue as the oil and gas and mining industries exploit underground resources, at some point these non-renewable resources will be deleted. Then, as the footprint of these industries is reclaimed, the productive forest landbase will begin to increase again. Keeping track of the losses and gains in the infinite forest landbase helps to identify trends and allows for changes in management activities to be made thus ensure conversions to non forest uses are maintained within threshold levels.

[6] Current status of indicator

The landbase of the FtMF consists of the Hinton Wood Products' Forest Management Area (which also has a number of provincial protected areas embedded within it), Jasper National Park, and Willmore Wilderness Park (Figure 1). It also includes some smaller provincial Crown forest management units and the Hinton Training Centre's Cache Percotte Training Forest. Each of these areas has one main agency responsible for the overall coordination of the development within that landbase.

Figure 1 - Foothills Model Forest Landbase

The landbase of the Foothills Model Forest consists of two parks protected areas, an FMA, and several other special management areas. Three different agencies are responsible for overseeing development on the landbase.



Hinton Wood Products, a division of West Fraser Mills Ltd., is the licensee within the boundaries of the FtMF and is responsible for all forest management activities. However, approval for all projects is provided by Alberta Sustainable Resource Development (ASRD). For Jasper National Park, Parks Canada is the coordinating agency, while for Willmore Wilderness Park (and other smaller provincial protected areas within the FtMF landbase), Alberta Tourism, Parks, and Recreation is the responsible agency. ASRD is responsible for the Cache Percotte Training Forest and the remaining Crown management units.

The sections below summarize the amount of forest land that has been converted to non-forest land, and the amount of non-forest land converted back to forest land, for each of the four landbase types in the FtMF.

Hinton Wood Products FMA

Industrial activities carried out by Hinton Wood Products and other commercial users can reduce the productive landbase through road-building, seismic exploration for oil and gas, pipeline construction, and well site development. When these industrial dispositions are no longer required, it is desirable to have them reforested where appropriate, and returned to a productive forest state as quickly as possible. However, not all returned industrial lands are appropriate for reforestation, as they may be located in wetlands, on barren rock, or in other non-productive ecotypes. Also, in certain areas, some of the current ecotypes classified as non-productive were actually previously forested, and can in fact be reforested again with the appropriate treatment – this is called afforestation.

In order to ensure that the minimum amount of forest land is converted to non-forest land, Hinton Wood Products has developed a number of initiatives to coordinate development with other industrial users in the FMA landbase. Table 1 outlines the deletions and additions to the Hinton FMA since 1998 due to forest conversion. Although forestry and oil and gas deletions are combined in one column, the vast majority of the land conversion since 2000 has been due to oil and gas activities (e.g., pipelines, well-sites, etc.)

Table 1 – Forest Landbase Conversion:Hinton FMA (2000 - June 2006)

Year	Deletions/ Additions	Industrial (ha.)*				Crown uses (ha.)				Total change	Total FMA landbase (ha.)	Net Change (ha.)
		Forestry	Oil and Gas	Mining	Sub-total	Special places**	Indian Reserve**	Other	Sub-total			
1999						0	0	Starting net landbase			985,446	0
2000	Deletions	0	-855	-271	-1,126	-10,123	0	-5	-10128	-11,254	974,192	-11,254
	Additions	0	132	0	132	0	0	0	0	132	974,324	-11,122
2001	Deletions	-11	-1,246	-565	-1,811	0	0	-1	-1	-1,812	972,512	-12,934
	Additions	0	131	0	131	0	0	0	0	131	972,643	-12,803
2002	Deletions	0	-1,630	0	-1,630	0	0	-18	-18	-1,648	970,995	-14,451
	Additions	0	88	0	88	0	0	0	0	88	971,083	-14,363
2003	Deletions	-10	-1,737	0	-1,737	0	0	0	0	-1,737	969,346	-16,100
	Additions	0	277	0	277	0	0	0	0	277	969,623	-15,823
2004	Deletions	0	-2,693	-486	-3,179	0	0	0	0	-3,179	966,444	-19,002
	Additions	0	316	0	316	0	0	0	0	316	966,760	-18,686
2005***	Deletions	0	-2900	-1762	-4,662	0	0	-144	-144	-4,806	961,954	-23,492
	Additions	0	146	0	146	0	0	7	7	153	962,107	-23,339
Total change (ha.)		-21	-9,971	-3,084	-13,055	-10,123	0	-161	-10,284	-23,339		
% change		0%	-1.01%	-0.31%	-1.32%	-1.03%	0%	-0.02%	-1.04%	-2.37%		

** These are forest landbase conversions (some temporary and some permanent)*

*** "Special Places" are areas that have been protected by provincial legislation under the Alberta government's Special Places 2000 program (an initiative to increase protected areas in the province). These are not forest land conversions, but are deletions from the FMA.*

**** This covers the timeframe from June 15, 2005 to June 14, 2006 (this timeframe is the same for every year in the table). This information is based on the FMA anniversary report that is generated by the Alberta government.*

Jasper National Park

Jasper National Park (JNP) has not experienced any significant forest conversion since the last Local Level Indicator (LLI) report issued by the Foothills Model Forest (2000). However, JNP acknowledges there has been some very minor land conversion – for example, involving some unofficial trail systems -- but as these are similar to game trails it is probably not appropriate to include them they really can't be counted. However, in 2007 a major new pipeline was being constructed adjacent to Highway 16 through JNP, which resulted in some forest conversion.

Alberta Tourism, Parks, and Recreation

Alberta Tourism, Parks, and Recreation, a ministry of the provincial government, is responsible for the management of provincial protected areas within the FtMF. This includes Willmore Wilderness Area, as well as the smaller provincial protected area adjacent and within the Hinton FMA, such as Switzer Provincial Park, Sundance Provincial Park, and the various provincial recreation areas (campgrounds). Since the last LLI report, there has been no reportable forest conversion within the provincial protected area network of the FtMF landbase.

Tree seedlings like these can be used to regenerate non-forested land

Alberta Sustainable Resource Development

Alberta Sustainable Resource Development reports on forest conversion within the FtMF landbase that is outside the Hinton FMA, Jasper National Park, and the provincial protected areas. This primarily means forest conversion within the Crown Forest Management Units adjacent to the Hinton FMA and JNP, as well as the Cache Percotte Forest near Hinton. Table 2 outlines the forest conversion within the ASRD's reporting areas.

Table 2 – Forest Landbase Conversion:Hinton FMA (2000 - June 2006)

Year	Deletion/ Additions	Industrial (ha.)*			Total change	Total FMA landbase (ha.)	Net Change (ha.)
		Oil and Gas	Mining	Other			
1999	Deletions	-2104		-63	-2,166	162,060	-2,453
	Additions				0	162,060	-2,453
2000	Deletions	-15		-424	-439	161,621	-2,892
	Additions				0	161,621	-2,892
2001	Deletions	-7		-25	-32	161,589	-2,924
	Additions				0	161,589	-2,924
2002	Deletions	-9		-48	-58	161,531	-2,982
	Additions				0	161,531	-2,982
2003	Deletions	0		-159	-160	161,371	-3,142
	Additions				0	161,371	-3,142
2004	Deletions	-4		-24	-28	161,343	-3,170
	Additions				0	161,343	-3,170
2005	Deletions			-973	-973	160,370	-4,143
	Additions				0	160,370	-4,143
2006	Deletions	-30		-346	-375	159,995	-4,518
	Additions				0	159,995	-4,518
Total Change (ha)		-2,169	0	-2,062	-4,231		
% Change		-1.34%	0.00%	-1.27%	-2.61%		

** These are forest landbase conversions (some temporary and some permanent)*

[7] Interpretation
As expected, the protected area portions of the FtMF landbase (Jasper National Park and the provincial protected areas) experienced nominal levels of forest conversion. However, portions of the FtMF landbase not within the protected area network have undergone a higher degree of forest conversion. The data show that deletions of forested land related to oil and gas have increased significantly since 2000 (the time of the last LLI report). This correlates with an overall increase in oil and gas activity on the Alberta landscape during a time period when the price of oil and gas rose dramatically.

[8] Rationale for allowable variance (threshold)
There is no allowable variance for this indicator.

[9] Analytical considerations

a. Calculation of indicator
The measure is calculated as follows:

$$\text{Conversion of productive landbase (\%)} = \frac{\text{Net productive forest land (ha.)}}{\text{Total Area of Landbase (ha.)}} \times 100$$

b. Special considerations
It should be noted that the calculation does not take into account landbase attributes such as water and rock (the indicator is productive forest land (i.e., land that is capable of growing trees).

[10] Responsibility
The following organizations are responsible for monitoring, collecting, and reporting on forest conversion data: Hinton Wood Products, Alberta Sustainable Resource Development, Alberta Tourism, Parks, and Recreation, and Jasper National Park (Parks Canada).

[11] Monitoring
Annual reporting of forest conversion is currently carried out only by Hinton Wood Products, as part of their annual Stewardship Report. This report is available on their website (www.westfraser.com/hintonforestry). None of the other organizations currently report annually on forest conversion, although this information is tracked.

It is anticipated that moving forward; forest conversion will now be monitored and reported on by all relevant organizations in this Local Level Indicators report. This indicator could be calculated on an annual basis in relation to measuring and managing the forest landbase conversion footprint.

[12] General discussion
Forest conversion is a critical consideration when evaluating sustainability and therefore, is an important indicator. The loss of productive forest land to non-forest uses results in a landscape that has less capacity to sustain the flow of environmental goods and services (water, habitat, fibre, etc.) However, while analysing this data, one must also keep in mind that not all forest conversion is permanent. In other words, areas reported as being converted from forest land to non-productive land may still be returned to productivity at a future date. With proper rehabilitation techniques, well sites, roads, mines, and pipelines all may be converted back into productive forest land. The oil and gas industry has a significant impact on the landbase in the short term, but in the long term after oil reserves have been depleted, the infrastructure required to access them (e.g., pipelines, well sites, roads etc.) can be reclaimed and brought back into productivity.

This satellite photo clearly shows that many small forest conversions can have a large cumulative effect. The lighter patches are areas where the forest has been converted to non-forest uses

Forest harvesting operations being carried out by Hinton Wood Products in western Alberta

Indicator 3.4.1

Adherence to Alberta Soil Conservation Guidelines

[1] Foothills Model Forest value
Soil productivity.

[2] Objective
To minimize erosion and soil losses resulting from human disturbances.

[3] Statement of indicator
Adherence to Alberta soil conservation guidelines.

[4] Indicator measure
The percentage of cutblocks logged by Hinton Wood Products (HWP) within their Forest Management Area (FMA) that are in compliance with Alberta soil conservation guidelines.

[5] Rationale for indicator

a. Significance of indicator to landscape-level management
Because soils support tree and plant growth, as well as other biological processes, conservation of soil productivity is critical to sustainable forest management. Therefore, maintenance of soil productivity through best practices is essential, and remains an important outcome of forest harvesting. Applying currently accepted management practices, such as those outlined in Alberta's forest soils conservation guidelines, is an indicator of an effective management activity in this area.

b. Meaning of indicator
The Alberta soil conservation guidelines were developed by a joint task force of the Alberta Forest Products Association and Alberta Sustainable Resource Development (ASRD). The guidelines are applicable to temporary roads and decking areas, harvesting/skidding, and reforestation. Two of the major objectives of the guidelines are to keep rutting to less than 2% of the block areas (as measured by linear transects), and to limit temporary roads, bared landing areas and displaced soils to less than

Adherence to guidelines developed jointly by government and industry helps protect the soil

5% of the cutblock area (unless justified in an Annual Operating Plan). Within the Hinton FMA, all blocks are inspected as part of the company's regular block inspection process. In addition, Hinton Wood Products also performs internal and external audits on harvest and reforestation operations. However, if a visual inspection shows soil damage in excess of that outlined in the Alberta soil conservation guidelines, the company and ASRD will carry out a joint survey (as per the guidelines), to determine the actual percentage of damage.

c. Relation of indicator to Foothills Model Forest and to sustainability

This indicator relates only to the landbase being managed by Hinton Wood Products. Portions of the Foothills Model Forest's landbase that are outside the Hinton FMA (e.g., Jasper National Park, Willmore Wilderness Area) are not included in this measurement, as little logging is undertaken outside the FMA.

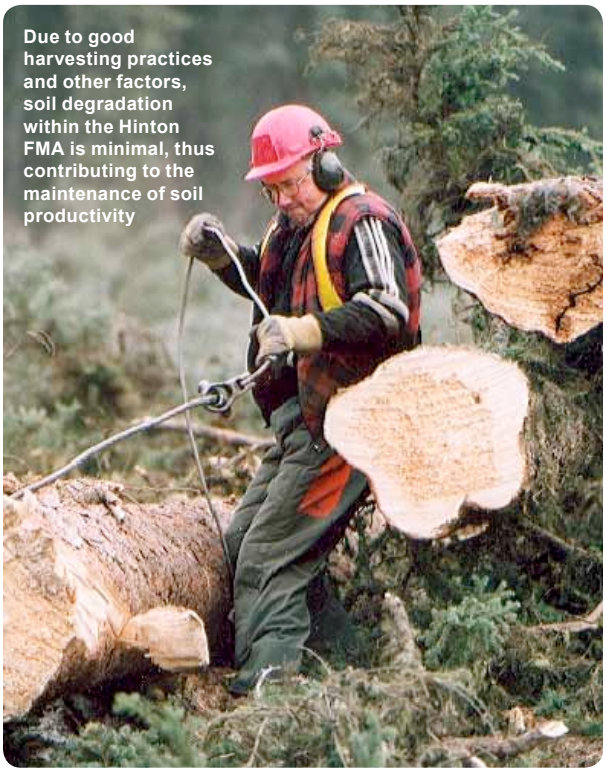
The relationship between soil productivity and sustainable forest management is clear – productive soil is the basis for tree growth; soils with compromised productivity (by compaction, destruction of soil structure, or change in soil water characteristics) are less able to grow trees, resulting in an overall reduction in the sustainability of the forest.

[6] Current status of indicator

Table 1 outlines Hinton Wood Products' compliance since 2000 with the Alberta soil conservation guidelines, against the number of hectares harvested.

[7] Interpretation

From 1994 to 1999, there were only three reported contraventions of the Alberta soil conservation guidelines on the Hinton FMA – a compliance rate of over 99%. In the current reporting period (2000 to 2006) there were no incidents, reflecting 100% compliance. Any non-conformance with the Alberta soil conservation guidelines is reported to ASRD. High compliance with the Alberta soil conservation guidelines means alteration of soil productivity on cutblocks harvested by Hinton Wood Products did not exceed guidelines during the reporting period of 2000 – 2006.



Due to good harvesting practices and other factors, soil degradation within the Hinton FMA is minimal, thus contributing to the maintenance of soil productivity

Table 1 – Compliance with Alberta soil conservation guidelines 2000-2006

Category*	2000	2001	2002	2003	2004	2005	2006
Total Area Harvested (hectares)	6564	8121	7520	8453	7236	7865	4714
Number of Cutblocks Harvested	338	344	342	423	338	267	126
Soil Conservation Incidents	0	0	0	0	0	0	0
Percent Compliance	100	100	100	100	100	100	100

** Includes only cutblocks that have been skid-cleared during the operating year (e.g., 2006 blocks include all cutblocks skid-cleared from May 1, 2006, through April 30, 2007).*

[8] Rationale for allowable variance (threshold)

There is no allowable variance for this indicator.

[9] Analytical considerations

a. Calculation of indicator

The indicator is based on data from harvesting operations on Hinton Wood Products' FMA; the measure is calculated as follows:

$$\text{Percentage in compliance} = \frac{(\text{Total number of cutblocks} - \text{number of cutblocks in contravention})}{\text{Total number of cutblocks}} \times 100$$

b. Special considerations

While other minor harvesting operations have taken place within the landbase of the Foothills Model Forest (such as FireSmart operations around Hinton and Jasper), the majority of the activities for which the soil conservation guidelines apply take place on the Hinton FMA. Therefore, only those harvesting activities which occur on the Hinton FMA for HWP are included in the calculation.

[10] Responsibility

Hinton Wood Products was responsible for providing all the data for the calculation of this indicator.

[11] Monitoring

The monitoring of all persons working for Hinton Wood Products for their adherence to the Alberta soil conservation guidelines is the company's responsibility. Staff from ASRD also conduct periodic field inspections of cutblocks and may take further action if it appears the guidelines may have been, or might be, contravened.

Monitoring Alberta soil conservation guidelines on the FtMF's landbase is restricted to forestry operations only. These occur primarily through HWP, but there is also a small volume (10,000 m3) removed from the Hinton FMA each year through ASRD's Community Timber Program. The Alberta soil conservation guidelines do not apply to oil and gas dispositions.

[12] General discussion

Since the last report, there has been slight improvement in this indicator: compliance has moved from 99.8% (1994-1999) to 100% (2000-2006). In general, it's fair to say that within the Hinton FMA, soil degradation as a result of harvesting operations is low. Therefore, it could be concluded that the productive capacity of cutblocks, based on consideration of soil disturbance, has not been diminished beyond amounts allowable under the guidelines.

This probably reflects a combination of factors, including good harvesting practises, good supervision, and generally advantageous operating conditions (i.e., low rainfall, gentle terrain, favourable soil types, and the ability to operate on frozen soil for part of the year).

Productive soil is the basis for tree growth

Harvesting on the "working forest" portion of the Foothills Model Forest

Indicator 5.1.1
Timber Harvest Relative to Annual Allowable Cut

[1] Foothills Model Forest value
Sustainable use of biological resources.

[2] Objective
For the "working forest"[1] portion of the Foothills Model Forest, it is essential that the harvest of wood fibre does not exceed levels approved by the Government of Alberta. The Annual Allowable Cut (AAC) represents the amount of wood fibre that can be sustainably removed each year, in perpetuity. The objective, therefore, is to ensure that the annual harvest does not exceed the AAC.

[3] Statement of indicator
The annual harvest (in cubic metres per year) as a ratio of the annual allowable cut (in cubic metres per year), expressed as a percentage.

[4] Indicator measure
Annual harvest of fibre (in cubic metres) expressed as a percentage of the allowable annual harvest (in cubic metres).

[5] Rationale for indicator

a. Significance of indicator to landscape-level management
The basic tenet of sustainable resource management is that renewable resources should be managed so that there is a consistent flow of goods and services from the landscape, in perpetuity. Resources must be managed intelligently, based on the principles of ecological integrity and appreciation for all values of the landscape. With respect to the "working forest" portion of the Foothills Model Forest, it is essential that the annual harvest is within the limits of the approved annual harvest. Due to extenuating circumstances, the harvest in any year could exceed the annual allowable cut; however, any differences must be reconciled in subsequent years.

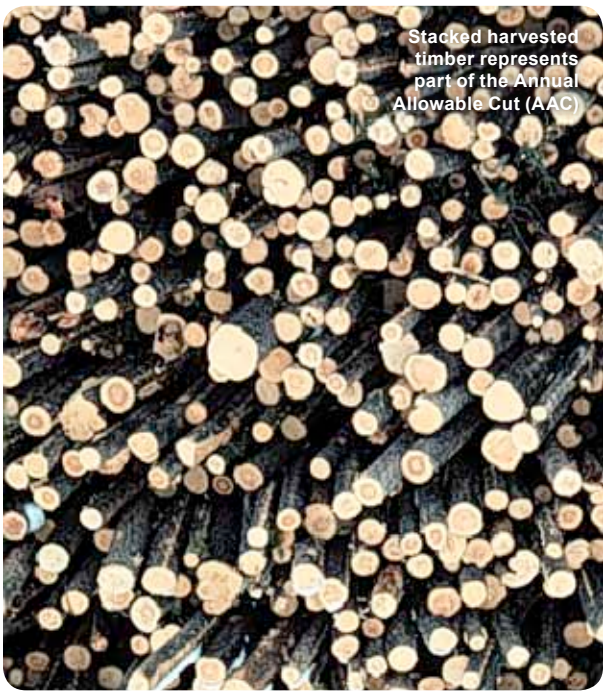
b. Meaning of indicator
The Annual Allowable Cut is a volume of either coniferous or deciduous fibre, approved

[1]That portion of the forested landbase specifically allocated to the production of timber, and for the achievement of other socially acceptable objectives

by the Government of Alberta, which may be harvested from a particular forest management unit each year. Each AAC is normally associated with some type of tenure agreement between the government and a forest company. The two most common tenures in Alberta are the Forest Management Agreement and the Timber Quota.

c. Relation of indicator to Foothills Model Forest and to sustainability

The Foothills Model Forest endorses the principles of managing sustainably. Sustainable forest management implies that management activities directed towards providing the flow of goods and services to the community must occur without negative impacts on the resource. Maintaining the productive capacity of the landbase for future generations is paramount.



Stacked harvested timber represents part of the Annual Allowable Cut (AAC)

[6] Current status of indicator

Table 1 - Harvest statistics for Hinton Wood Products – A division of West Fraser Mills Ltd., for the period 1993 to 2008, as provided by Alberta Sustainable Resource Development

Cut control number	Cut control period[2]	Species group	Annual Allowable Cut (AAC) (m^3)[3]	Periodic allowable cut (m^3)[4]	Audited production (m^3)[5]	Percentage of AAC produced
1	15-Jun-88 to 14-Jun-93	Conifer	1,740,000	8,700,000	5,385,436	61.9%
		Deciduous	181,200	906,000	291,360	32.2%
2	15-Jun-93 to 14-Jun-98	Conifer	1,900,000	9,718,525	11,024,309	113.4%
		Deciduous	126,000	630,000	610,229	96.9%
3	15-Jun-98 to 14-Jun-03	Conifer	2,236,129	11,180,645	10,845,578	97.00%
		Deciduous	169,449	847,245	730,796	86.3%
4	15-Jun-03 to April 30, 2006	Conifer	2,236,1295	10,462,399	6,840,444 (to April 30, 2006)	65.4% (to April 30, 2006)
		Deciduous	169,449	963,694	488,391 (to April 30, 2006)	50.7% (to April 30, 2006)

[7] Interpretation

The social well-being of forest-based communities and the financial health of the forest industry depend on a

[2]A period of five consecutive forest management operating years or other period agreed to by the Minister. It is the period during which the AAC is applied.

[3]The volume of timber that can be harvested under sustained-yield management in any one year, as stipulated in the pertinent approved forest management plan. In Alberta it is the quadrant cut divided by the number of years in that quadrant, usually five.

[4]The total annual allowable cut over a five-year period, or as determined by the Minister.

[5]That which has been confirmed by audit.

[6]The AAC is the sum of designated AAC plus a "carry forward" amount that represents unused AAC which is being captured in the respective cut control period. As inventories are refined, a new AAC will be determined.

uniform flow of values from the forest. While annual harvests may vary, they must balance over time. If harvests continually exceeded the AAC, the capacity of the forest to provide a sustainable flow of fibre might decline, resulting in diminished ecological integrity. At extreme levels, serious impacts might arise for wildlife, water quality and quantity, and communities' economic stability.

Harvest levels over time are a major determinant of sustainability. Current data indicate that harvests from 1988 to 2006 in the Foothills Model Forest were sustainable; i.e., trends were consistent with or below annual allowable cuts.

[8] Rationale for allowable variance (threshold)
Variances in harvest levels can be attributed to a myriad of factors, ranging from insect control and fire salvage to new industrial development. Economic circumstances also play a role in decisions that determine the level of harvest; however, to maintain sustainable forest management, there must ultimately be a balance.

[9] Analytical considerations

a. Calculation of indicator
The determination of the Annual Allowable Cut is based on inventories, growing stock, rates of growth and the amount of available productive landbase. Accounting procedures are used to record actual harvests and validate harvested volumes.

The measure for this indicator is calculated as follows:

$$\text{Timber harvest relative to AAC (\%)} = \frac{\text{Annual harvest (cubic metres per year)}}{\text{AAC (cubic metres per year)}} \times 100$$

b. Special considerations
There are no special considerations for this indicator.

[10] Responsibility
Data comes from the FMA holder or Alberta Sustainable Resource Development.

[11] Monitoring
Records of harvesting can be accessed through Alberta Sustainable Resource Development. Apart from the determination of percentage of AAC achieved, there are no other statistics required for the reporting of this indicator.

[12] General discussion
Inconsistencies in data may be encountered depending on when the data become available, relative to the cut control periods. However, these are immaterial, as consistency over time and magnitude of variation are most important in evaluating sustainability.

Maintaining the annual harvest below the annual allowable cut (AAC) helps ensure a consistent flow of goods and services from the landscape, and also helps preserve its ecological integrity

Forest grazing is a longstanding and sustainable use of forest ecosystems in the Foothills Model Forest's landbase

Indicator 5.1.5
Livestock Carrying Capacity

[1] Foothills Model Forest value
Multiple benefits to society.

[2] Objective
To provide benefits to society through sustainable forest grazing.

[3] Statement of indicator
Livestock carrying capacity (maximum supportable limit) in relation to grazing.

[4] Indicator measure
The measure for this indicator is the carrying capacity of a disposition, expressed in Animal Unit Months (AUMs).

An AUM is the amount of forage required by one animal unit for 30 days. One animal unit is equal to a 1000 lb (455 kg) cow with an unweaned calf up to 6 months of age. It is often expressed as a stocking rate (AUM/ha or acre). Generally, one AUM will require 1000 lbs (455 kg) of dry matter per month, which includes a 25% forage loss due to trampling. When the animal unit is larger than the standard size, an adjustment is made. For example, a 1300 lb. cow is equivalent to 1.3 animal units.

[5] Rationale for indicator

a. Significance of indicator to landscape-level management
Forest grazing has been a longstanding use of forested ecosystems dating back to the early 1900s. In Alberta, forest grazing is carefully managed and regulated, ensuring that riparian areas, wildlife habitat, and timber production are managed for sustainable use.

b. Meaning of indicator
Grazing is approved on public land through the issuance of a variety of dispositions. In the Foothills Model Forest landbase, these include grazing leases, grazing licenses and head tax permits. Carrying capacities are set by Alberta Sustainable Resource Development (ASRD) for each disposition type.

As well, for each plant community described in its Range Plant Community Type Guides, ASRD suggests an ecologically sustainable stocking rate (ESSR). This represents a balance between plant production, the ecology of the site, and livestock's monthly forage requirements. The ESSR reflects the maximum number of livestock (AUM/ha or acre) that

can be supported by the plant community, given inherent biophysical constraints and the ecological goals of sustainable health and proper functioning of the plant community.

When the ESSR is expressed for the area of a plant community polygon (for example, per hectare), the result is termed carrying capacity (CC), and is written in AUMs. Total AUMs represent the carrying capacity or the long-term average grazing available in an average year, on a disposition with good management. Carrying capacities are determined using data from range surveys, ecological classification, mapping, grazing, and plant community clipping studies. Carrying capacity calculations include consideration of livestock and wildlife forage needs, as well as the need for adequate protection of the plants and soil. Long-term carrying capacity is established at a level that will maintain forage vigour and productivity, and rangeland health.

c. Relation of indicator to Foothills Model Forest and to sustainability

It is important to manage and monitor grazing to ensure long-term rangeland ecosystem health within the Foothills Model Forest. When not properly managed, grazing can negatively affect rangeland health and ecosystem sustainability through soil erosion, loss of plant species diversity, and the depletion of nutrients. Active and flexible management of forest grazing helps ensure a sustainable level of forage for livestock grazing while balancing other values within this landbase such as timber, wildlife, and recreational and tourism resources.

Active and flexible grazing management helps maintain plant species diversity and reduce the potential for weed invasion

[6] Current status of indicator

Figure 1 illustrates the total animal unit months (AUMS) from 2000 to 2006 in the Foothills Model Forest landbase.

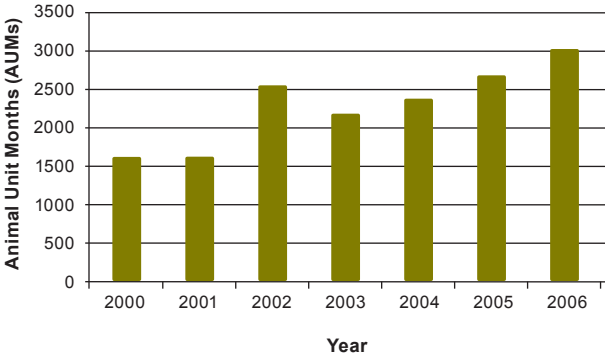


Figure 1 – Total Animal Unit Months (AUMs) from 2000 to 2006 in the Foothills Model Forest landbase

[7] Interpretation

Depending on climatic conditions, forage production can vary considerably from year to year. Figure 1 shows an increase in total AUMs from 2001 through 2006 (carrying capacity is based on average production over a period of time). In Figure 1, the AUMs used per year from 2000 to 2006 have been less than the total carrying capacity (~3,250 AUMs). In addition, if range health declines, the actual use will be adjusted through changing practices to maintain health and carrying capacity.

[8] Rationale for allowable variance (threshold)

Livestock use can be reduced when forage production for a given year is below the long-term average. Grazing at CC during times of drought and other disturbances can create range health problems and may require serious destocking if continued. Adjusting the CC for weather and other factors will maintain range health and carrying capacity.

[9] Analytical considerations

a. Calculation of indicator

Many years of research have resulted in

the creation of detailed guides on carrying capacity and range plant communities for several sub-regions within the province. These include the lower foothills, upper foothills, montane, and subalpine regions. These guides are available through Alberta Sustainable Resource Development (see http://srd.alberta.ca:80/lands/managingpublicland/rangemanagement/classificationecology.aspx).

The concept is to ecologically classify the landbase along with plant community classifications to determine ecologically sustainable stocking rates. These guides outline the species composition, forage production and suggested stocking rate of each range plant community within a given subregion. Additionally, ASRD carries out long-term monitoring of the range resource at over 180 reference area sites in the province. The primary objective of this monitoring is to determine range health and long-term range trends for species composition and forage productivity in the presence and absence of grazing disturbance. This monitoring allows us to detect changes in rangeland diversity that exceed the range of natural variation.

b. Special considerations

When ASRD assigns dispositions, there is normally a delay of a year or two before the new disposition holder uses the disposition. When grazing dispositions are to be renewed, ASRD inspects them at or before the renewal date.

Range health is one of the criteria used to determine the good standing of the disposition and renewal for another term. If the disposition is not in good standing, ASRD will work with the disposition holder to make the necessary changes. Failure to make the changes may result in compliance and enforcement actions, including decisions to reduce the term or not to renew the disposition. Regional forage availability fluctuates each year depending on many factors, including the number of dispositions.

It should be noted that incidental grazing occurs through commercial trail riding permits within Willmore Wilderness Park and Jasper National Park. These are administered by Alberta Tourism, Parks, and Recreation and Parks Canada, respectively.

[10] Responsibility

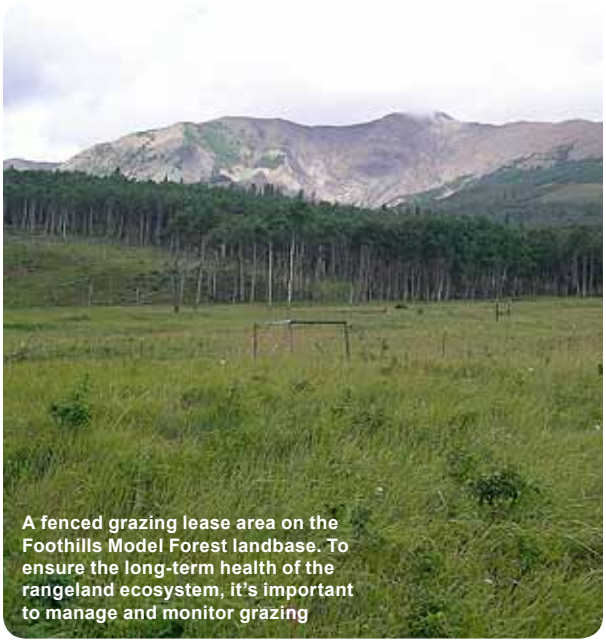
Alberta Sustainable Resource Development was responsible for providing all the data for the calculation of this indicator.

[11] Monitoring

Carrying capacities are determined at the time of disposition issuance and at times of renewal. Yearly monitoring is done when disposition holders submit annual stock return forms. Monitoring is an important component of rangeland management, as it lets us track whether goals are being achieved and maintained and if management adjustments are necessary.

[12] General discussion

Since the last report, grazing has been maintained in sustainable limits in the Foothills Model Forest landbase. Climatic and environmental conditions may cause variances from year to year in the amount of forage produced. Drought and insects can also negatively affect the quantity of forage. The disposition holder has a responsibility not to overstock the disposition, and must adjust usage to reflect yearly forage production. In essence, when properly managed to protect the rangeland resource and to sustain economic, social and environmental values, grazing is a sustainable and acceptable use of rangeland resources within the Foothills Model Forest landbase.



A fenced grazing lease area on the Foothills Model Forest landbase. To ensure the long-term health of the rangeland ecosystem, it's important to manage and monitor grazing

Indicator 5.3.3
Regional Income Distribution

[1] Foothills Model Forest value
Multiple benefits for society.

[2] Objective
To contribute to the social and economic health of the Foothills Model Forest region.

[3] Statement of indicator
Regional income distribution.

[4] Indicator measure
The measures for this indicator are median household income, range of income, and incidence of low income by region. This indicator is updated every five years based on the Census of Canada. Data from the 2006 Census of Canada became available after the first quarter of 2008; however, it was not available at the time of writing.

Income is reported for three jurisdictions in the Foothills region: Hinton, Jasper, and Yellowhead County (YHC), the organized rural municipality outside these two towns.

[5] Rationale for indicator

a. Significance of indicator to landscape-level management
Policies that support certain kinds of landscape management, such as large-scale industrial tenures or smallholder leases, result in a variety of employment opportunities and economic benefits that are derived locally. These decisions about how landscapes and natural resources are managed have implications for who can participate in the local economy, the nature and extent of local employment opportunities, and the distribution of employment income within the region.

b. Meaning of indicator
Household income refers to the income of a person or a group of persons occupying the same dwelling, or that of a group of unrelated persons occupying the same dwelling, or that of one person living alone. Income distribution is the percentage of total households reporting total income within a discrete range or category (in $10,000 increments). An economic family is defined as a group of two or more persons who live in the same dwelling and are related to each other by blood, marriage, common law or adoption. Low income is the proportion or percentage of economic families in a given classification below the low income cut-off (which varies by size of family and size of community).

c. Relation of indicator to Foothills Model Forest and to sustainability
The distribution of material resources within a given community is one way of measuring equity. Therefore, an assessment of income distribution allows us to examine concentrations and deficiencies in wealth. If employment income is seen to be evenly distributed, then it is likely that a larger proportion of the community is benefiting from the local economy. On the other hand, if employment income is concentrated among a small proportion of residents, then questions may arise regarding equity and long-term community well-being.

Median household income across Foothills Model Forest regions, as well as across Alberta and Canada, increased substantially from 1981 to 2001

[6] Current Status of indicator

The figures below illustrate changes in several economic measures during the period from 1981 to 2001.

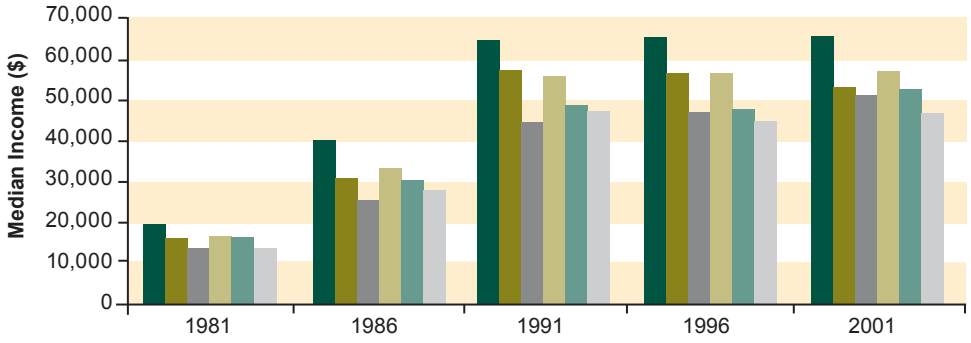


Figure 1 – Median household income, 1981-2001

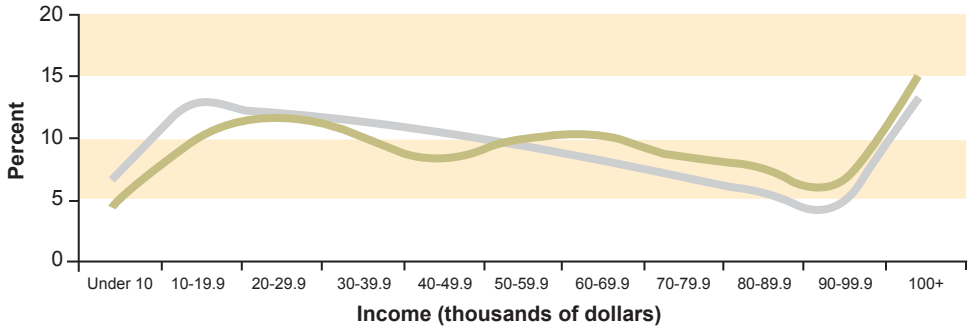


Figure 2 – Household income distribution for Foothills Model Forest region and Canada, 2001

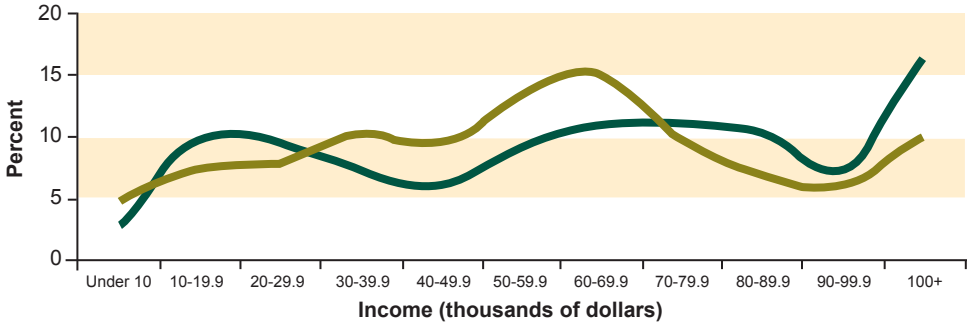


Figure 3 – Household income distribution, Hinton, 1996 and 2001

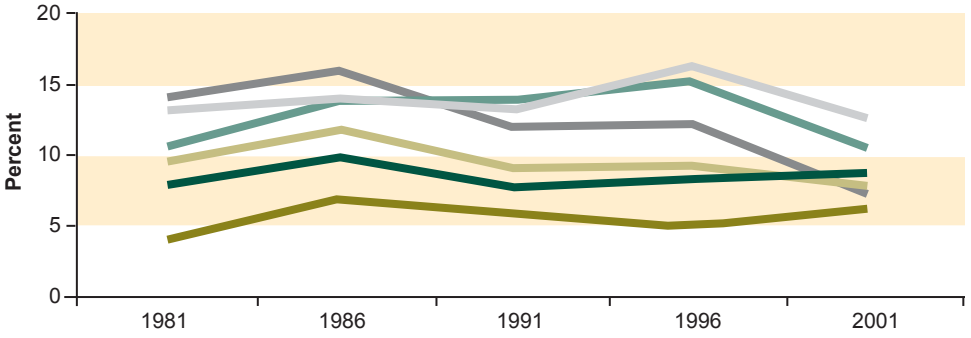


Figure 4 – Proportion of economic families classified as low income, 1981-2001

[7] Interpretation
As expected, median income in 2001 across Foothills Model Forest regions, as well as across Alberta and Canada, is substantially higher than in 1981. Figure 1 demonstrates that the increase in median household income was less dramatic between 1991 and 2001, with very little growth during this period. In all years, Hinton has the highest median income, and the gap between median income for this jurisdiction and the nation as a whole becomes wider after 1981. Jasper has the lowest median income, and, unlike Yellowhead County (YHC) and Hinton, experienced a slight drop in median income between 1996 and 2001.

According to Figure 2, the income distribution for the Foothills Model Forest region is slightly different than the national trend, as most curves have three, rather than two, distinct high points. These high points are represented by the following income categories: $10,000--$29,999, $69,999 --$79,999, and $100,000 or more. Household income distribution has changed significantly from 1996, especially for Hinton and Yellowhead County.

In Figure 3 we see that between 1996 and 2001 there has been an increase in the number of Hinton households earning $10,000--$19,999, a significant drop in households earning $40,000--$69,999, and a significant increase in households earning over $70,000. This indicates a hollowing-out of the middle class within the community, as a larger proportion of households find themselves in the lower or upper reaches of the income distribution.

Figure 4 shows that between 1996 and 2001, the incidence of low-income economic families dropped in all jurisdictions, with the exception of Jasper and Hinton, where it increased slightly. Jasper reports the lowest incidence of low-income economic families, at just over 5% for the period between 1986 and 2001.

[8] Rationale for allowable variance (threshold)
No variance threshold exists for this indicator. Triggers for management response depend on socially acceptable limits of change. Sharp increases or decreases in income distribution or the incidence of low income, however, will trigger dialogue and the possibility for strategic response within the region.

[9] Analytical considerations

a. Calculation of indicator
Graphs were generated from Census of Canada data from 1981 to 2001. Averages and totals were identified for each census period and reported in tabular and graphical format.

b. Special considerations
There are no special considerations for this indicator.

[10] Responsibility
Canadian Forest Service

[11] Monitoring
This indicator is updated every five years from Census of Canada data. Data from the 2006 Census of Canada became available after the first quarter of 2008; however, it was not available at the time of writing.

[12] General discussion
In the initial status report, median household income and income distribution for 1996 were reported for towns and counties in and around the Foothills Model Forest. This report includes information on household income, income distribution and the incidence of low income. Information is reported graphically and trends are established between census years. Although average household incomes in the Foothills Model Forest continue to outpace provincial and national averages (particularly in Hinton), there are indications in the data that social equality is declining, with a larger proportion of households in both the lower income brackets and the higher income brackets. This decrease in middle class households has implications for the social sustainability of communities, and for issues such as social segregation and social fragmentation.

Details and background for this indicator can be found at 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://foothillsresearchinstitute.ca/Content_Files/Files/SS/SS_report6.pdf

Fire plays a critical role in habitat renewal. Here, young seedlings regenerate the forest after a fire

Indicator 5.6.1
Occurrence and Severity of Wildfire

[1] Foothills Model Forest value
Natural processes.

[2] Objective
To maintain natural processes such as wildfire while minimizing the threat to societal values.

[3] Statement of indicator
Occurrence and severity of wildfire.

[4] Indicator measure
The measure for this indicator is the number of fires by class and by decade for the Foothills Model Forest landbase.

[5] Rationale for indicator

a. Significance of indicator to landscape-level management
Because of its ability to impact large areas of a landscape in a relatively short period of time, wildfire is a significant disturbance mechanism. Its evolving occurrence and severity through time impact many other indicators, such as stand age class, species composition and distribution, and water and soil qualities, and can even influence the contribution of forests to global ecological cycles.

b. Meaning of indicator
The occurrence and severity of wildfire directly impact the forested landscape. The quickest method of analyzing wildfire as an indicator is through size and frequency of occurrence. Even though size is not a perfect indicator of severity, we can assume that for wildfires of size class D or larger (see Table 1), the fire hazard for that specific area on the landscape is high enough to support the occurrence of large wildfires. The Canadian Forest Fire Danger Rating System (CFFDRS) is a science-based system that determines wildfire hazard on the landscape within Canadian forest cover types. This system can determine, document, and measure wildfire potential and severity; it bears out the use of size as a viable indicator for severity. It should be noted that most of the wildfires on the provincial landbase would also have undergone suppression efforts. This indicates that for class D or larger wildfires, fire danger was strong enough to have caused initial suppression efforts to fail. This supports the generalization that the larger the wildfire, the greater the severity.

Table 1 – Fire size classes

Class of fire	Size (ha)
Class B	0.11 – 4 hectares
Class C	4.1 – 40.0 hectares
Class D	40.1 – 200.0 hectares
Class E	200.1 hectares and greater

c. Relation of indicator to Foothills Model Forest and to sustainability

Wildfire on the landscape can be seen as having both positive and negative impacts on sustainability. As a natural disturbance process, wildfire is one of the most effective tools for renewing naturally forested landscapes. The challenge occurs when there are human-caused disturbances present on the landscape along with natural disturbance processes such as fire, insects, and disease. It could be argued that human-caused fires are also a significant cause of disturbance, and that the suppression of wildfire has an artificial impact on landscape disturbance. For all these reasons, and because it is related to the sustainability of the forest and to many forest values, wildfire must be managed to balance the impacts of disturbance on the landscape.

[6] Current status of indicator

Table 2 – Number of fires in the Foothills Model Forest, by class and decade

Lightning-caused				
Decade	**Class B**	**Class C**	**Class D**	**Class E**
1960s	22	2	1	2
1970s	15	2	1	2
1980s	34	3	5	2
1990s	21	1	0	0
2000s*	23	8	1	7

Human-caused				
Decade	**Class B**	**Class C**	**Class D**	**Class E**
1960s	30	1	2	0
1970s	53	5	25	0
1980s	57	13	2	4
1990s	45	11	5	2
2000s*	45	12	2	5

**Includes fires from 2000 to 2006.*

The 2006 Southesk wildfire was caused by lightning and was about 1500 hectares in size

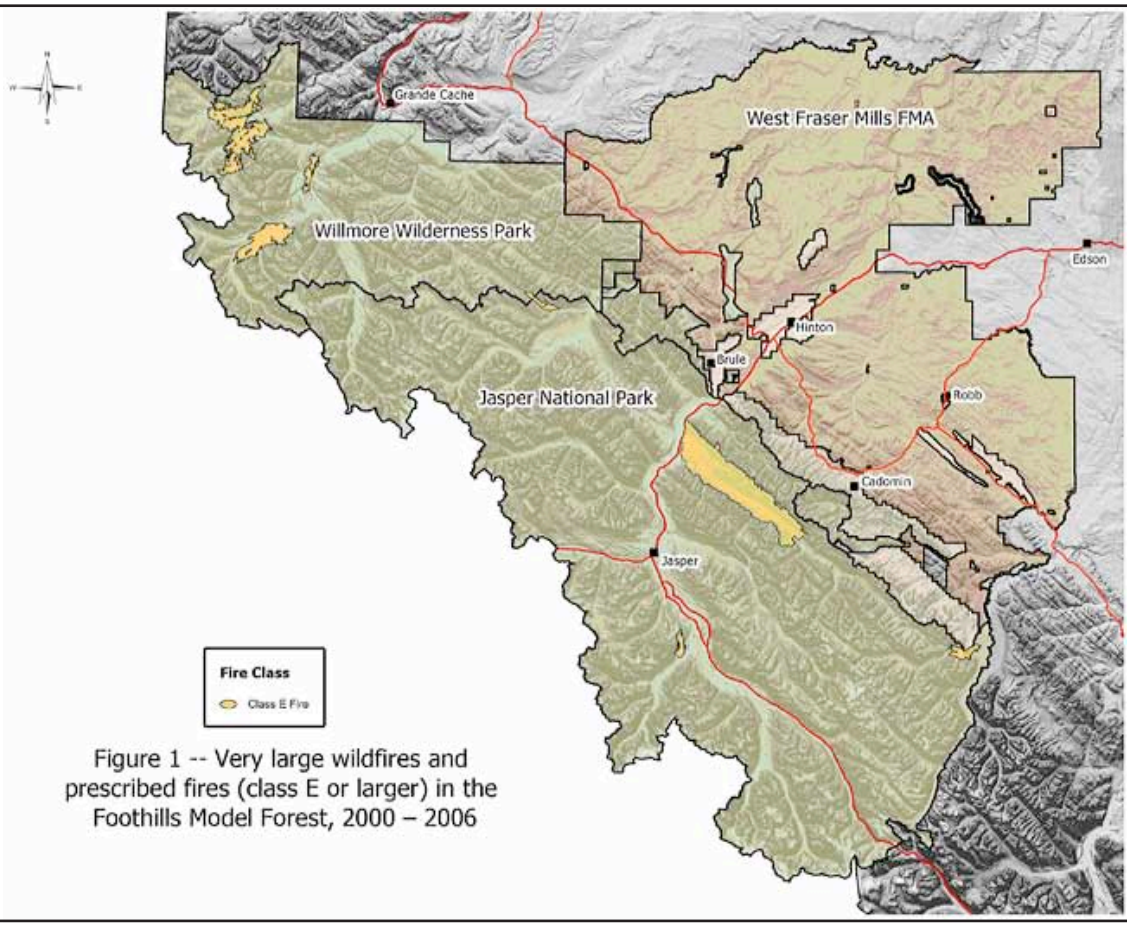


Figure 1 -- Very large wildfires and prescribed fires (class E or larger) in the Foothills Model Forest, 2000 – 2006

[7] Interpretation

There is historical wildfire data for Alberta, including Jasper National Park, dating back to 1931. However, for the Foothills Model Forest landbase, readily retrievable information for all fire sizes is only available back to 1961. These fires were classified by size and ignition source, but more in-depth detail and data is also available if needed.

For the purposes of this report, this information is enough to let us determine significant trends within the indicator. Early in the fire history of the area, railroad fires were the most frequent type of fires caused by people; however, overall there were more lightning-caused fires than human-caused fires.

However, with a growing population, increased vehicle access, the advent of all-terrain vehicles, and increased recreational and industrial activities, human-caused fires now well exceed lightning-caused fires in the Foothills Model Forest landbase. The number and area of fires caused by people versus lightning is an indication of the extent to which natural ecological processes may have been disrupted by humankind's influence.

Large wildfires can change local ecosystems, soils, and water, and impact many species, but the effects are not entirely negative. Disturbance at large and small scales can provide renewal and other opportunities for the ecosystem. The challenge is managing the impacts of fire together with other disturbances on the landscape so as to maintain and enhance ecosystem productivity.

Where there is little human-caused disturbance, wildfire can be a great tool to revitalize the forested landscape and provide a balanced mosaic within complex systems. Prescribed (planned) fire has and will continued to be used as a management tool in Jasper National Park and Willmore Wilderness Park to enable controlled disturbance without the challenges of a potentially out-of-control wildfire.

When fire occurs on the landscape as a prescribed fire, a concerted effort is undertaken to design the prescription with a low drought code (meaning that ignition in the deep compact organic layers in the floor of the forest is very unlikely). This ensures that the severity of the prescribed fire remains relatively low. Prescribed fire gives us an opportunity to renew the forest in a process that is more natural than traditional forest harvesting methods. Harvesting can also be limited in its ability to renew the forest, due to the need to focus primarily on the merchantable timber land base. In areas with multiple stakeholders and high land use, wildfire must be managed to protect values at risk and reduce its environmental, social, and economic impacts.

Fire size can work as a measure for severity, although it may not directly reflect the severity of each specific fire. At the landscape level, fire size can indicate the impacts that the fire may have. The determination of severity at a micro level is very challenging. In terms of severity, each fire can vary widely. Factors such as slope, aspect, fuel type, and time of day all influence the burn severity within each specific fire. This is why size is a suitable indicator for a fire's impact on ecosystem productivity and maintenance.

The most significant change in the last decade is the increase of large landscape class E fires (Figure 1). Many of these large fires have occurred in the upper foothills, sub-alpine, and alpine natural subregions. There have been naturally occurring wildfires and key prescribed fires within the last decade, but all the contributing factors to the wildfires have yet to be determined.

All that can be gathered at this time is that these fires occurred more frequently in the last decade (2000 – 2006), and coincide with some of the more significant fire seasons in Alberta. There are probably many reasons why there were more large wildfires during this period, but that discussion is beyond the scope of this document. The key point is that wildfire management has, and will continue to have, a critical role in the maintenance and enhancement of the condition and productivity forested ecosystems.

[8] Rationale for allowable variance (threshold)
There is no allowable variance for this indicator.

[9] Analytical considerations

a. Calculation of indicator
This indicator was calculated from numbers derived from spatial datasets for fires from both Alberta Sustainable Resource Development and Jasper National Park. Queries were generated to summarize the number of lightning- and human-caused fires for the last decade for fire size classes B to E for both datasets.

b. Special considerations
It should be noted that the fire data itself has limitations: the more historic the data is, the more potential there is for inaccuracies. Historical data can also contain less detail than we might wish to see today.

These limitations are why fire size and cause are used as a measure for this indicator -- this information is the most readily available over the longest historical time period. There may also be variations in how fires are measured. For example, through the history of recorded wildfires, random campfires in Alberta were not always consistently given a fire number; therefore, information on class A wildfires has been left out of this report (and the previous report), as the record is incomplete.

Whether to include prescribed fires in this indicator is another issue; currently, the assumption is that they should be included within the other fire data, but this could change in the future. As prescribed wildfire becomes more widely used within the Foothills Model Forest landbase, its significance may need to be demonstrated separately. Currently, the Jasper National Park prescribed fire program has been the most active in the last decade.

[10] Responsibility
Alberta Sustainable Resource Development and Jasper National Park are responsible for providing the data for this indicator.

[11] Monitoring
Alberta Sustainable Resource Development and Jasper National Park are responsible for monitoring this indicator. Because they're planned, prescribed fires always have a much more in-depth monitoring process. If a more complex analysis of this indicator is needed in the future, improved monitoring and documentation of both wildfire and prescribed fire will facilitate a more in-depth investigation.

[12] General discussion
Many of the general discussion points have been

covered in other sections of this indicator. One of the most significant issues is of that of the exclusion of class A wildfires – those that are less than 0.1 ha (less than 50 metres by 20 metres). Class A fires can also include abandoned campfires and single-tree lightning strikes. Class A fires are currently excluded from Table 2 because there hasn't been enough consistency in recording them, and the existing data may not properly reflect the changes over time.

Although this information is not included in Table 2, it's significant to note that there seems to have been a steady increase in human-caused fires over the years. Class A fires would reflect the largest differences in this area, possibly due to increased random camping and other recreational activities in forested areas. As human population increases, it stands to reason that there are growing pressures on the landscape for multiple uses, including recreation.

The last decade has seen 212 human-caused and 53 lightning-caused class A fires in the Foothills Model Forest landbase. A few years of current data have not yet been included, so the true numbers are probably much higher. Even though the class A fires (<0.1 ha) are very small and may not appear to be ecologically significant, their numbers do demonstrate the significant risk of fire disturbance in the Foothills Model Forest landbase. There has been a movement towards allowing more fire on the landscape, but with increasing pressures for multiple uses on the landscape, planners and land managers will be challenged to balance the need for disturbance with the needs of the other users of the forest.

The changing landscape has also seen an increase in threat from the mountain pine beetle. If the beetle (a significant long-term disturbance agent) is as successful in Alberta as it has been in British Columbia, there will be a significant increase in wildfire risk. Wildfires in beetle-infested stands of pine may result in more dramatic fire behaviour (depending on the stage of stand), and it's expected that as a result there will be more out-of-control fires.

Throughout the infested areas, there will be a large risk of wildfire risk: early reports from wildfires in BC's infected areas state that affected pine stands can show fire growth similar to that seen in boreal black spruce stands. The typical boreal black spruce stand is referenced in the Canadian Forest Fire Behaviour Prediction System as having a structure and composition that exhibit some of the most extreme fire behaviour and rates of spread that can occur in a standing timber type on flat terrain.

So in simple terms, in ideal conditions black spruce can exhibit extreme fire behavior and rates of spread. This means that for infested pine stands, we can expect faster rates of spread and higher fire intensities as compared to uninfested mature pine stands. Numerous ongoing studies on this topic are currently taking place; the results should soon shed more light on potential landscape impacts for the Foothills Model Forest landbase.

Noteworthy events for wildfire within the Foothills Model Forest landbase in the last decade include the following:

- Jasper National Park's signing off their Fire Management Plan
- Significant prescribed fires in Jasper National Park (Rock Creek and Syncline)
- The Willmore Wilderness Wildfire Management Plan (signed off in 2006)
- An increase in large class E landscape fires.

All of the above events have contributed to a healthy forested landbase that has maintained and enhanced long-term forest ecosystem productivity in the areas which they have taken place.

There has also been strong movement in the areas of community protection within the Foothills Model Forest landbase, as shown by the creation of community protection plans for areas in the landbase or those directly adjacent to it. Jasper, Grande Cache, Hinton (including the Yellowhead Corridor), and Robb now all have community protection plans developed in co-operation with the public, forest industry, local governments, and many other stakeholders.

FireSmart is a proactive fire prevention program that has been used in Alberta since the 1990s. Using FireSmart principles to reduce the wildfire threat and severity potential around communities has been a key success story in wildfire management for the Foothills Model Forest.

FireSmart techniques such as thinning, pruning, harvesting, and prescribed fire have all been used to enhance the forest ecosystems around the communities and to help protect people and their values at risk. Values at risk are human structures that are important to protect and save from wildfire, such as residences, settlements, historic buildings, campgrounds, cabins, and so on. FireSmart activities are ongoing within many projects; they all continue to help maintain and protect the forested areas in which people live and work.

Indicator 5.6.2
Occurrence and Severity of Insect and Disease Pathogens

[1] Foothills Model Forest value
Healthy landscapes.

[2] Objective
To minimize the impact of forest insects and diseases of concern.

[3] Statement of indicator
Occurrence and severity of insect and disease pathogens.

[4] Indicator measure
Measures for this indicator are (a) the number of infested trees that were surveyed and controlled for mountain pine beetle in the Foothills Model Forest area from 2001-2006; and (b) the severity of aspen defoliation in the Foothills Model Forest area during the same period.

Definitions:
- Infested trees: Trees that have live mountain pine beetle present, also known as hit trees.

- Controlled trees: Trees where the live mountain pine beetle within the tree is destroyed.

- Severity of aspen defoliation: The level of loss of green leaves for aspen trees.

[5] Rationale for indicator

a. Significance of indicator to landscape-level management
Forest insects and disease are present in all forest ecosystems and are a natural process within the Foothills Model Forest (FtMF) landbase. A disease is a condition harmful to a tree, caused by fungi, bacteria, viruses, or parasitic flowering plants. A healthy forest includes endemic (static) levels of forest insects and disease as key components of a resilient forest ecosystem. Insects and disease remove weak trees, allowing the remaining healthy components of the forest to flourish with increased availability of light, nutrients, and water.

When forest insects or disease increase to the point of affecting healthy trees, this balance is compromised and the forest as a whole is no longer healthy. Mountain pine beetle (*Dendroctonus ponderosae*) and aspen defoliators can quickly increase from endemic levels. This creates an unbalanced forest ecosystem that compromises the social, economical and environmental values provided by a healthy, sustainable forest landscape.

b. Meaning of indicator
Within the FtMF, the proportion of lodgepole pine in the forest is significant. Mountain pine beetle numbers can increase greatly from one year to the next, and significant stands of mature lodgepole pine are conducive to this expansion. The level of mountain pine beetle activity on the landscape is a direct indicator of the health of these pine-dominated forests. A higher level of mountain pine beetle activity leads to exponential growth in beetle numbers and a corresponding increased rate of tree death. (For an overview of mountain pine beetle ecology, please refer to the section entitled “General discussion,” below.)

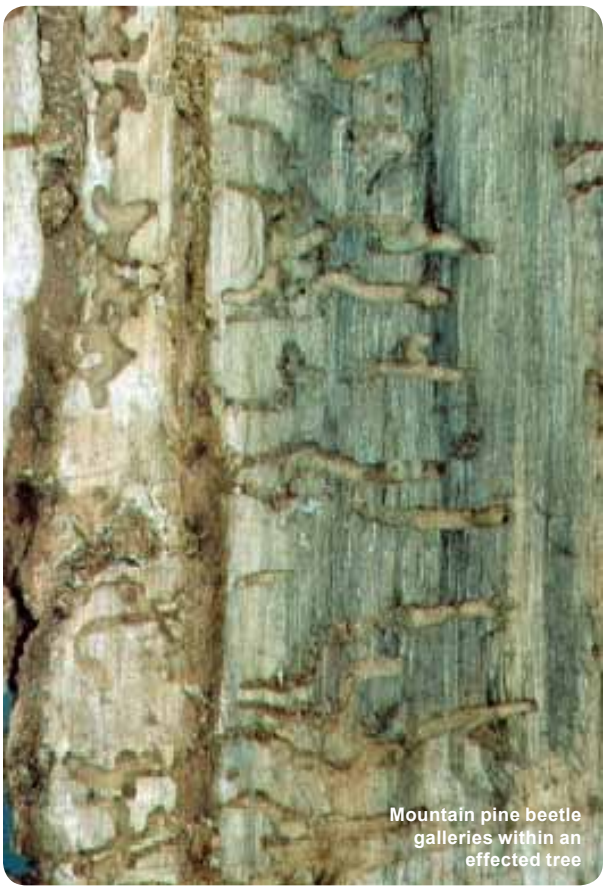
While aspen is not a significant component of the forest within the FtMF landbase, it is by far the most predominant deciduous species. Deciduous stands generally have high biodiversity and are an important contributor to the values provided by a balanced forest ecosystem. Defoliators such as forest tent caterpillar (*Malacosoma* spp.), large aspen tortrix (*Choristoneura conflictana*) and Bruce spanworm (*Operophtera bruceata*) are present on the landscape and are capable of rapid and widespread population growth. Monitoring the level of severity and the hectares affected by defoliators provides a reliable picture of the health of the deciduous component of the forest. Defoliators are the most widespread agents of change in the deciduous forest.

While other forest insects and diseases are also present in the FtMF landbase, levels are generally consistently low and therefore difficult to monitor.

c. Relation of indicator to Foothills Model Forest and to sustainability
The mountain pine beetle is the most destructive insect pest of mature pine in

western North America to date. It can be devastating to forests, and in turn, to communities that depend on forests for their economic, social, and environmental values. Due to pine's dominance on the landscape, the long-term sustainability of the local forest industry relies heavily on a healthy pine component of the forest. Therefore, mountain pine beetle population levels are a key indicator of forest health.

While not highly economically important, healthy aspen trees do contribute to the local economy and also provide social and environmental values. Unlike mountain pine beetle, the defoliation of aspen will not cause the outright death of the tree, but a sustained attack over several years can cause mortality and an immediate decrease in growth. This growth loss can have impacts on the long-term sustainability of the aspen forest.



Mountain pine beetle galleries within an effected tree

[6] Current Status of indicator

Table 1 presents the number of hit trees – trees with live mountain pine beetle present – that were surveyed and controlled in provincial lands within the Foothills Model Forest landbase from 2001 to 2006. Surveyed refers to what is identified on ground; controlled means that the live mountain pine beetle within the tree is destroyed.

Table 1 – Mountain pine beetle survey and control, 2001-2006, as monitored by Alberta Sustainable Resource Development

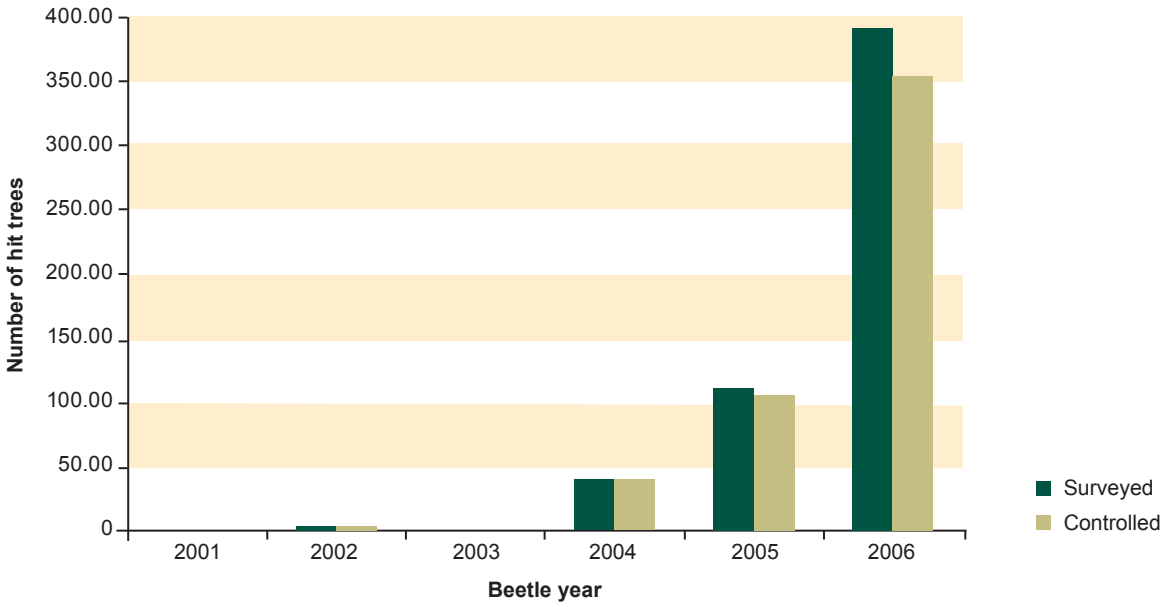


Table 2 describes the area (hectares) of aspen defoliation severity level (light, moderate, severe) by year for provincial land within the Foothills Model Forest landbase.

Table 2 – Severity of aspen defoliation, 2001-2006, as monitored by Alberta Sustainable Resource Development

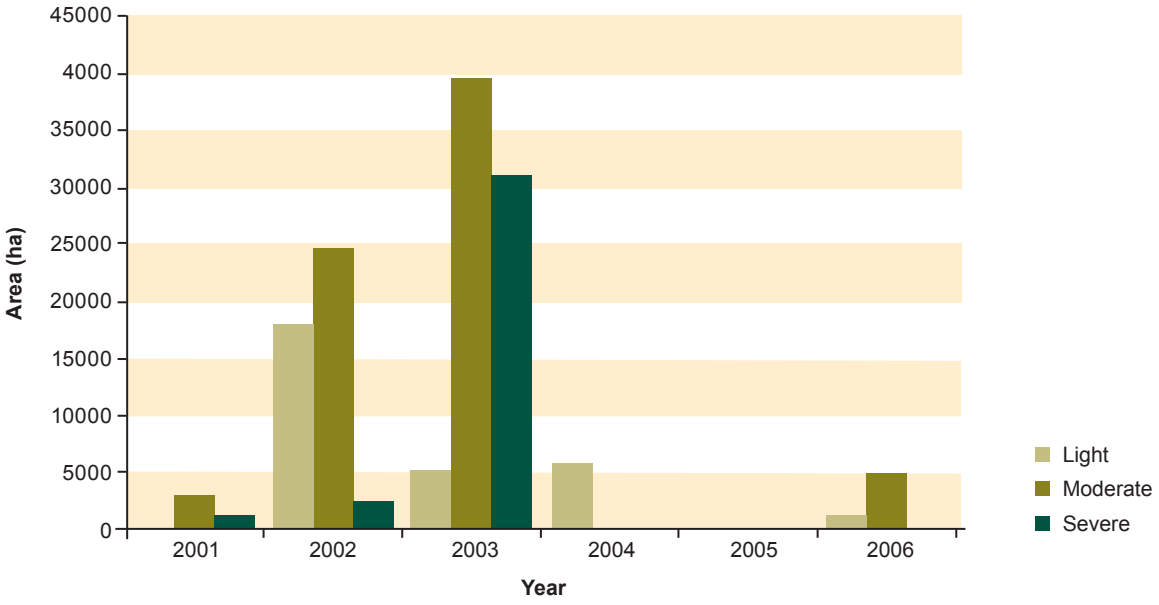


Table 3 describes aerial and ground surveys completed in the Smokey and Miette/Athabasca valleys in Jasper National Park from 1999 to 2007. All trees discovered and surveyed as "green" for mountain pine beetle were controlled – in other words, the beetles in those trees were killed.

"Green" indicates a current live attack brood of mountain pine beetle, and "red" means there is a non-current attack on the tree; i.e., a live brood is not present. Red trees have usually been killed by mountain pine beetles. Please note that in the Miette and Athabasca Valleys, mountain pine beetle surveys began in 2003 and were not conducted before its discovery.

Table 3 – Jasper National Park of Canada: Aerial and ground mountain pine beetle surveys

Year	Smokey Valley		Miette / Athabasca Valleys	
	Green	Red	Green	Red
1999	26	19	Not surveyed	Not surveyed
2000	23	15	Not surveyed	Not surveyed
2001	14	12	Not surveyed	Not surveyed
2002	9	17	Not surveyed	Not surveyed
2003	Unknown	32	126	108
2004	Unknown	19	282	139
2005	Unknown	24	265	54
2006	Unknown	10	192	8
2007	Unknown	200	58	77

Figures 1 through 7 provide a picture of the effects of the mountain pine beetle and aspen defoliation in the Foothills Model Forest area from 2001 through 2007. The rapid expansion of the pine beetle infestation is particularly striking.

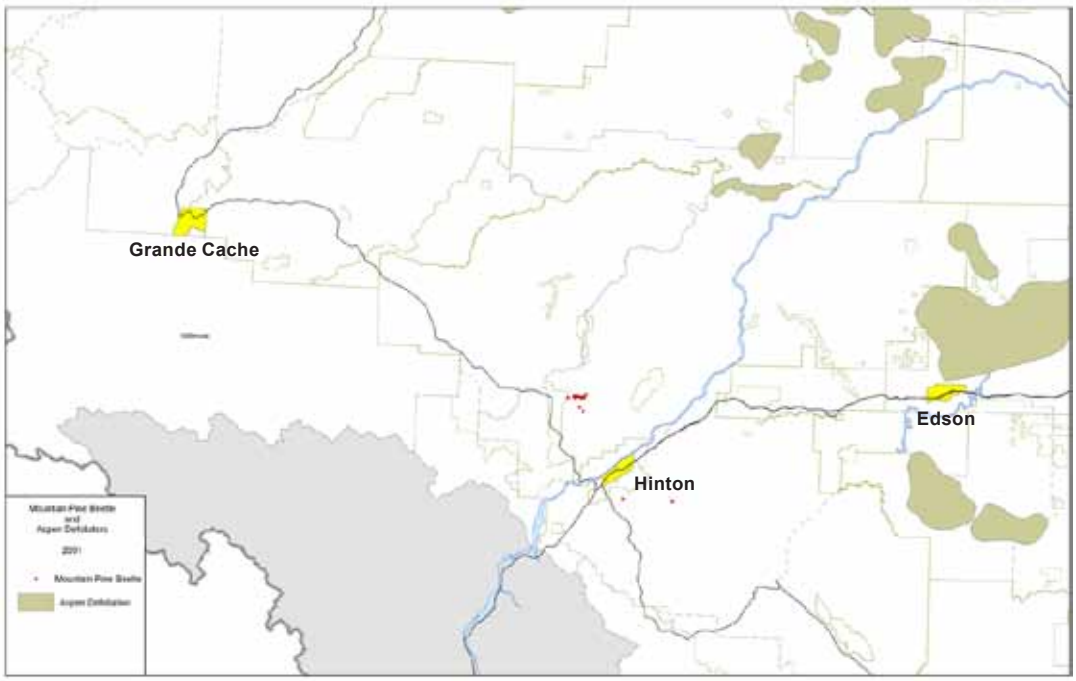


Figure 1 - Mountain pine beetle and aspen defoliation in the Foothills Model Forest area in 2001

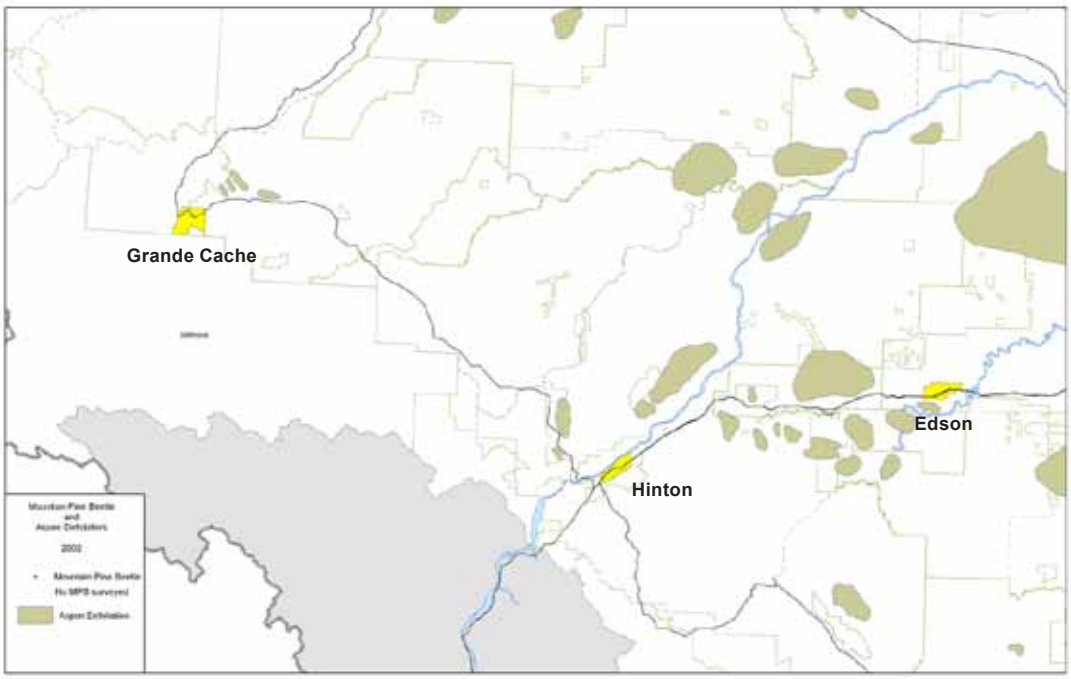


Figure 2 - Mountain pine beetle and aspen defoliation in the Foothills Model Forest area in 2002

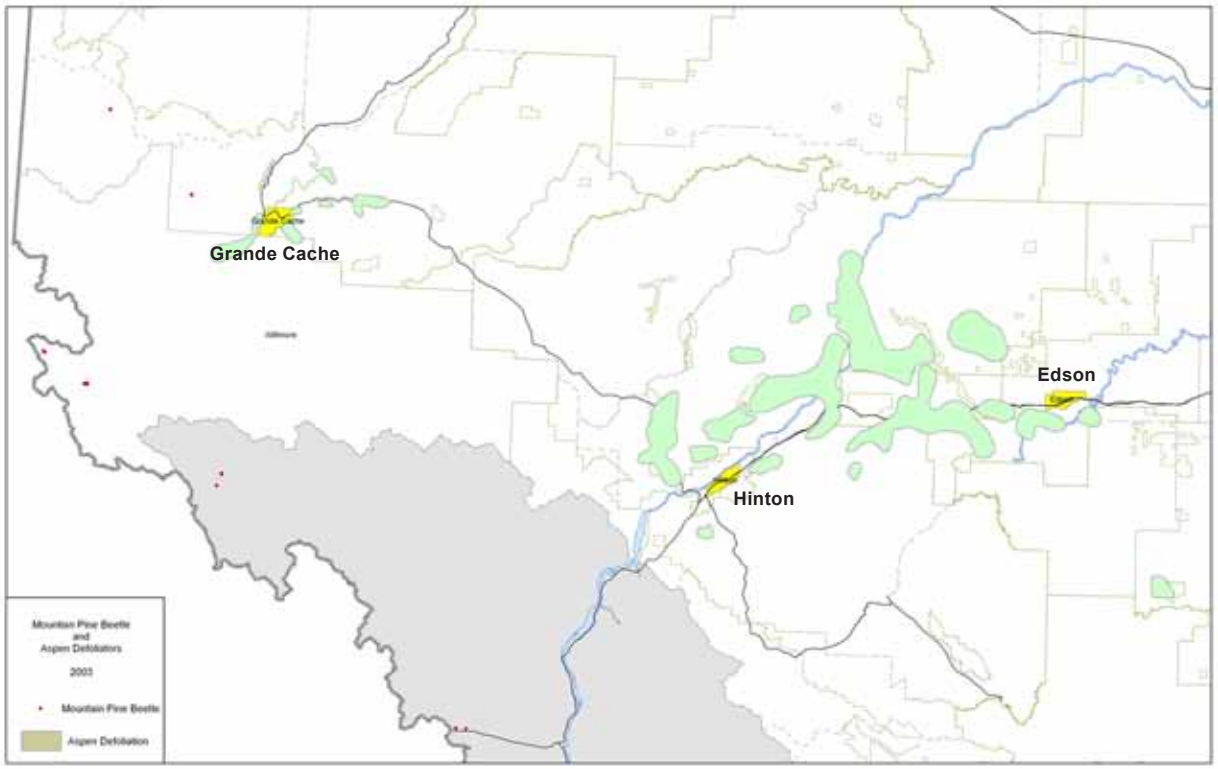


Figure 3 - Mountain pine beetle and aspen defoliation in the Foothills Model Forest area in 2003

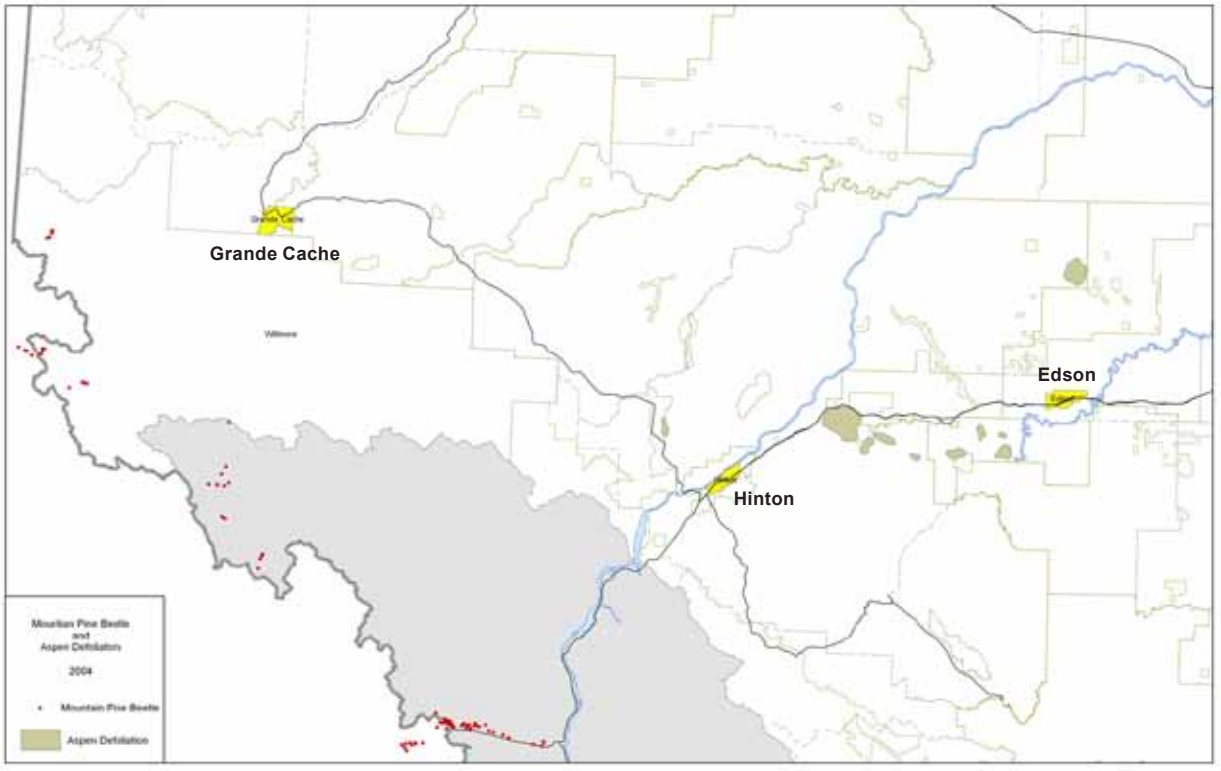


Figure 4 - Mountain pine beetle and aspen defoliation in the Foothills Model Forest area in 2004

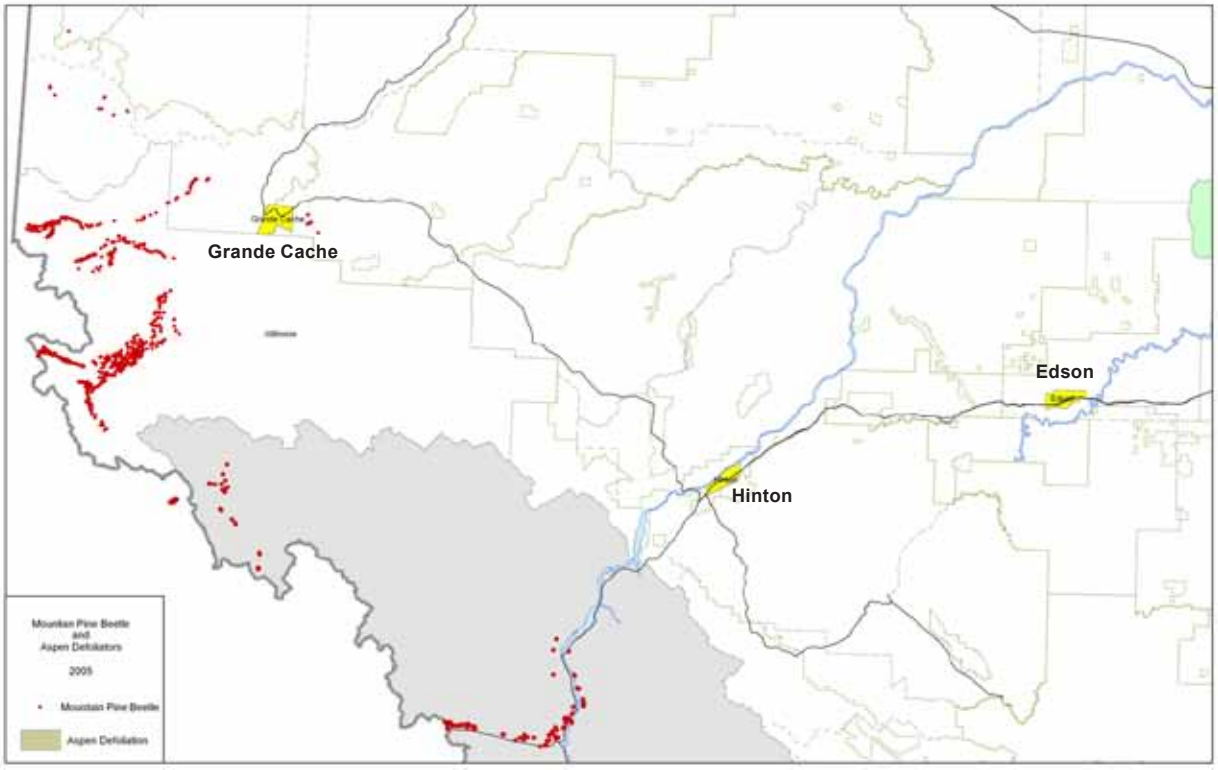


Figure 5 - Mountain pine beetle and aspen defoliation in the Foothills Model Forest area in 2005

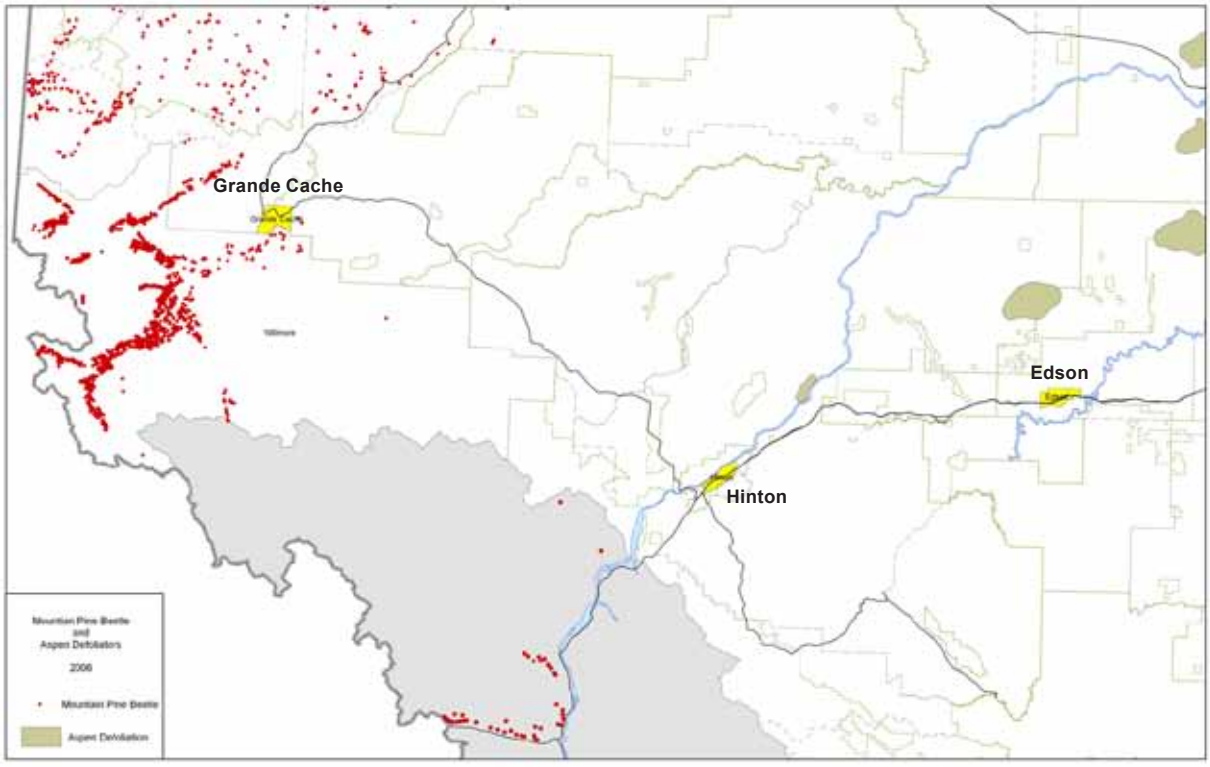


Figure 6 - Mountain pine beetle and aspen defoliation in the Foothills Model Forest area in 2006

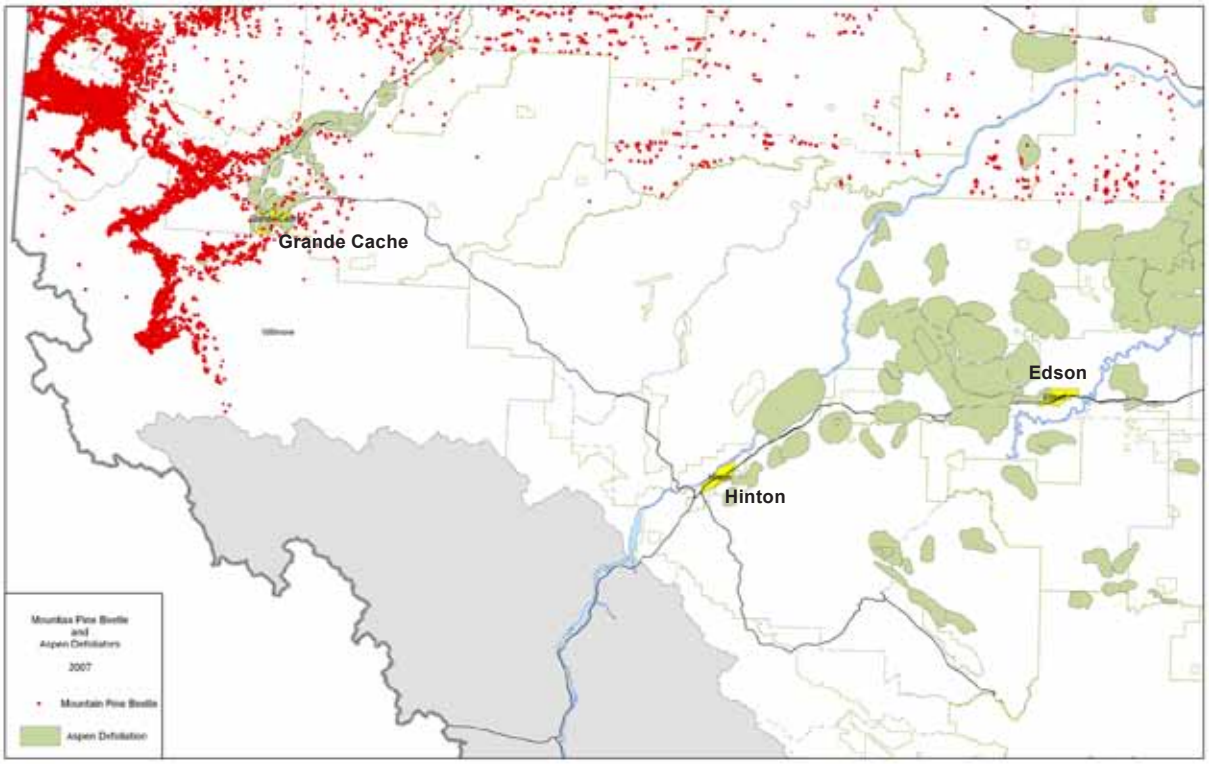


Figure 7: Mountain pine beetle and aspen defoliation in the Foothills Model Forest area in 2007

Please note that Figure 7 does not include Jasper National Park mountain pine beetle locations.

[7] Interpretation

Currently, forest ecosystem conditions and productivity are being conserved and ecosystem resiliency is not being compromised. The indicator (presence of mountain pine beetle and aspen defoliators) shows the forest over the reporting period to be healthy overall. Aspen defoliator populations have increased and decreased over time, which is common for the Foothills Model Forest landbase. The threat of mountain pine beetle to the healthy forest, however, is very real at present and in the near future. The beetle population on the British Columbia side of the mountains adjacent to the FtMF landbase is at a peak level, and the numbers on the Alberta side have increased dramatically due to a large dispersal flight in the summer of 2006. While the population in the Foothills Model Forest landbase is largely limited to Willmore Wilderness Park and to a lesser extent Jasper National Park, the E10 and E8 Forest Management Units are now beginning to be affected.

[8] Rationale for allowable variance (threshold)

For the mountain pine beetle, Alberta Sustainable Resource Development has a goal that all detected beetles on provincial Crown lands within science-based priority areas for control of spread must be controlled.

All areas of aspen defoliation that can be observed from a fixed wing aircraft are mapped and assigned an attack severity. In contrast, at this time defoliators are only monitored and not actively managed.

[9] Analytical considerations

a. Calculation of indicator

The indicator was calculated from numbers derived from historical mountain pine beetle data from Alberta Sustainable Resource Development and Jasper National Park. For pine beetle calculations, the number of infested trees surveyed and the number of infested trees controlled were totalled by year. Aspen defoliation was determined by calculating the area of aspen defoliation

severity by year for provincial lands within the FtMF landbase. Aspen defoliation severity was calculated by mapping the areas of attack according to severity and using a geographic information system (GIS) to calculate.

b. Special considerations
Starting in 2007, the number of trees infested by the mountain pine beetle that are controlled will no longer be a reliable indicator on provincial lands. The population has increased to the point these trees will not be controlled. However, the number of trees surveyed will still be obtainable through estimation of non-priority areas, and through actual ground survey information in priority areas.

From 2000 to 2003, mountain pine beetle activity was reported on a calendar year basis. This reporting led to confusion because events of the mountain pine beetle program overlap two calendar years. In 2004 the Forest Health Section of Alberta Sustainable Resource Development decided to base its reporting on a "beetle year" basis, starting on August 15 of one year and ending August 14 of the following year (for example, Aug. 15, 2005 – Aug. 14, 2006 is known as the 2005 beetle year).

For Jasper National Park, however, beetle activity will continue to be reported using the fiscal calendar. (April 1 to March 31).

[10] Responsibility
Alberta Sustainable Resource Development and Jasper National Park were responsible for providing the data for the calculation of this indicator.

[11] Monitoring
On provincial lands, the mountain pine beetle year begins with the results of the pheromone bait monitoring program in the summer and aerial overview surveys in the fall of one year, and ends with the resulting management program in the following year.

The pheromone baits contain three chemicals: one which replicates lodgepole pine aroma, another which replicates the male attractant (pheromone) released by the female, and one which replicates the attractant (pheromone) released by the first beetles into a new tree to summon other beetles to a mass attack to overpower the tree's defences.

These baits are used to gather beetles to known locations. Over the course of the beetle year, dispersal (beetles from elsewhere) and containment baits (to keep beetles in known locations) are monitored and taken down, aerial surveys are conducted, ground surveys are completed by concentric and transect methods, and detection walkthrough surveys are done in select areas.

Control measures are taken by two methods: fall and burn (destroys all live beetles) and fall and peel

Mountain pine beetle burrowing through the inner bark of a lodgepole pine tree

(exposure of beetle larvae causing death). As well, rotary-wing-assisted control methods are used in areas where attacked trees are in high density. Dispersal and containment pheromone baits are deployed in the summer before the next flight.

Aspen defoliators are monitored by aerial surveys, flown in late spring to early summer. Aspen defoliation is sketch-mapped and then ground surveys are done to determine which defoliator pest is causing the damage. In Jasper National Park, two aerial surveys in April along with a ground survey will continue to be undertaken. Control measures are taken in situ on attacked trees using the fall and burn method.

In Jasper National Park, aerial surveys using rotary-wing aircraft, are conducted in the late spring and late summer each year. These surveys, done in conjunction with forest insect and disease specialists from the Canadian Forest Service, have been carried out since 1996.

During aerial surveys, low-level flights are flown over areas recognized as potentially susceptible to mountain pine beetle infestation. These areas are earmarked based on the mountain pine beetle risk and susceptibility model, known infestation locations, and proximity to known infestation locations.

During the survey, surveyors look for any evidence of mountain pine beetle activity. This could include both red attacked pine and "faders" (beetle-attacked trees, often in the process of dying, which appear light green and/or yellow, in contrast to the darker green of healthy pine trees).

For treatment of colonized trees in Jasper National Park, a trained ground crew is provided with a map of the management unit in question that details the previous summer's air survey locations of suspect beetle-attacked trees. As well, a list of maps of beetle attack trees locations, in Universal Transverse Mercator (UTM) format, is provided to the ground crew. Procedures for performing cut and burn operations are as follows:

- Locate suspected red attack trees using global positioning system (GPS) and map references
- Determine if identified trees were killed by mountain pine beetles
- Perform 100m concentric circle survey around red attack tree to identify green attack trees in area
- Identify green attack trees and perform circle surveys from any green trees found
- Fall red and green attack trees and burn all trees containing mountain pine beetle
- Document attacked trees and record UTM locations

[12] General discussion

Since the previous report inclusive of data from 2000, aspen defoliation levels have not changed to any degree. Mountain pine beetle populations, however, have increased significantly. There has been a steady increase in trees surveyed and controlled from 2001 to 2005, and a spike occurred in 2006.

While the pine forests in the FtMF landbase are generally healthy, they have reached a stage of maturity that has left them in a state that is susceptible to mountain pine beetle attack. Due to this state, significant change in the state of the forest is very possible. A widespread mountain pine beetle outbreak would have a devastating impact on the sustainability of the Foothills Model Forest landbase, given the prominence of mature lodgepole pine in the forest.

As such, the threat of mountain pine beetle is taken very seriously by Jasper National Park and Alberta Sustainable Resource Development. Every effort is being made to control any detected outbreaks found in areas at risk of spread, through harvesting in the working forest to single tree control or prescribed burning within protected areas.

In July/August, mountain pine beetles typically fly from their "birth" tree to a new host tree. The female lays eggs in a vertical gallery and then dies. The eggs hatch into larvae, which then burrow out horizontally, eating inner bark. The larvae overwinter while dormant under the bark, continue their development the following spring and early summer, and emerge as new adults and fly to a new host tree in July/August. Trees typically turn red within a year of being infested. The trees are killed by girdling caused by the larval feeding, as well as by the blue stain fungus which is brought to the host tree by the invading beetle.

Aspen defoliators also have one generation per year. The defoliation (leaf eating) is done by larvae (caterpillars) and is partial or complete depending on

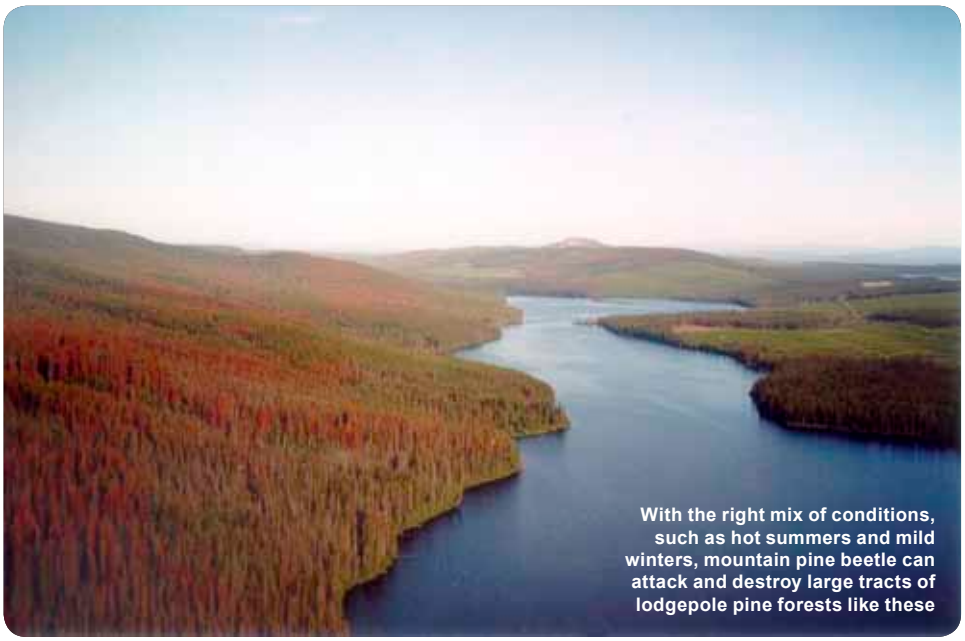
the species. Defoliation generally occurs in June and the trees will typically reflush with leaves in mid to late July, though not fully. Because leaves are absent during the growing season, the growth of the tree is reduced. Defoliation may occur for many consecutive years, which cause the trees to be stressed. The trees are then susceptible to other diseases which may cause mortality. The defoliation itself is very rarely the cause of mortality, even with consecutive years of leaf removal. The more severe the defoliation, however, the greater the growth loss, stress and susceptibility to other diseases.

Along with mountain pine beetle and aspen defoliators, Alberta Sustainable Resource Development actively monitors spruce budworm and gypsy moth through trapping and aerial detection. Pheromone traps are used to monitor population and dispersal trends of adult spruce budworm moths. Each year, 13 spruce budworm traps are placed throughout the FtMF area. These are collected each fall and the adult moths are counted. The results are used to predict the likelihood of new budworm outbreaks occurring in the following year.

Although spruce budworm is always present within the FtMF, there have been no large infestations over the last five years. Yearly forest insect and disease surveys are completed in Jasper National Park. These surveys are conducted by both the Canadian Forest Service and Parks Canada personnel.

Gypsy moth is one of the most serious introduced pests of trees in eastern Canada. It has not become established in Alberta. It prefers to feed on the foliage of oak trees; however, it can attack and kill other deciduous tree species in Alberta. Alberta Sustainable Resource Development dispatches pheromone traps annually, in four established sites within this working area. There have been no gypsy moths found in this area from 2001-2006.

Many other forest pests affect the local forests, such as terminal weevils, other bark beetles, and root collar weevils. As well, there are major diseases, such as lodgepole pine dwarf mistletoe, various pine and spruce rusts, and cankers, stem rots, and root rots such as Armillaria root disease. Levels of these insects and diseases are generally low, and there have been no outbreaks detected or brought to our attention that have the potential to compromise ecosystem stability or resiliency.



With the right mix of conditions, such as hot summers and mild winters, mountain pine beetle can attack and destroy large tracts of lodgepole pine forests like these

Indicator 6.1.1

Activities that Allow Interested Parties to Participate in the Decision-Making Process

[1] Foothills Model Forest value
Meaningful public involvement.

[2] Objective
Ensure broad participation of interested parties in the decision-making processes.

[3] Statement of indicator
Activities that allow interested parties to participate in the decision-making process.

[4] Indicator measure
This indicator provides a summary of the public participation opportunities and activities undertaken by a number of the companies that work within the Foothills Model Forest (FtMF) landbase. However, not all companies that conduct public participation activities on the FtMF landbase contributed to the data, so public participation opportunities may be underrepresented in this indicator.

[5] Rationale for Indicator

a. Significance of indicator to landscape-level management
A strong public participation process is a vital component of sustainable forest management in Canada. Involvement of interested parties is the best way to ensure that the broad views of society and local communities are recognized and addressed across the landscape. The vast majority of the land within the FtMF landbase is public – it is the responsibility of those companies and organizations that work on this publicly owned landbase to develop, maintain, and continually improve a public participation process that meets the public's demanding requirements.

b. Meaning of indicator
This indicator provides an indication of the type and range of public consultation and participation activities that occur across the FtMF landscape. Both government and industry conduct public consultation and provide opportunities for participation and/or input into decision-making; however, not all activities that allow interested parties to participate in the decision-making process are the same, and not all groups (i.e., government and industry) keep the same types of records. For example, some companies keep track of the number of people who attend open houses, while others do not. These discrepancies make it difficult to report on these activities using a common format.

c. Relation of Indicator to Foothills Model Forest and to sustainability
Public participation activities are relatively common throughout the FtMF landbase and are generally hosted either by the provincial government, by Parks Canada, or by a company working on the FtMF landbase. Because most of the land in Canada is public land, any measure of sustainability needs to take into account public input. Part or most of the definitions of sustainable forest management (SFM) include the provision that the same values present on the landscape today should be there for future generations to utilize and enjoy. To determine whether that definition of SFM is being met (i.e., are we losing or maintaining values?), the public needs to be given the opportunity to provide input into how those values are being managed.

[6] Current status of indicator
Each of the FtMF partners has developed their own public consultation and participation process that provides interested parties with the opportunity to provide input into and participate in decision-making processes. These methods range from municipal, county, and provincial elections, to public advisory groups, to a commitment to respond with information when a question or concern is raised.

The following information, provided from a sampling of FtMF partners, gives a summary of the activities that allow interested parties to participate in decision-making processes within the FtMF landbase.

This well-attended meeting is an example of public participation in the decision-making process

Alberta Sustainable Resource Development (ASRD)

Alberta Sustainable Resource Development (ASRD) is the major approving agency for all forestry-related activities that take place on the non-protected portion of the Foothills Model Forest landbase. This includes approving long-term plans such as the detailed forest management plan, as well as shorter term plans such as the annual operating plan, which provides a forest company with approval for harvesting cutblocks, building roads, and conducting reforestation activities. ASRD is also responsible for coordinating all forest-fire-related activities (in both protected and non-protected provincial land), such as approving fire control plans, carrying out fuel reduction strategies (such as those associated with the FireSmart program) and fighting forest fires. Table 1 outlines a sampling of public participation opportunities from 2002 to 2006.

Table 1 – Opportunities for public participation provided by ASRD, 2002 -- 2006

Mechanism for public participation	Summary of opportunities for public participation
FireSmart public events	ASRD, in conjunction with its FireSmart partners, held public awareness events in Hinton and Edson. From 2002 to 2006 there were six FireSmart events (five in Hinton, one in Edson), with approximately 1300 people attending. The intent of these events was to raise the awareness of the FireSmart Program, which involves taking measures to protect community infrastructure and development from the dangers of wildfire.
FireSmart community protection plans: open houses/public meetings	Between 2001 and 2005, ASRD hosted ten meetings to present and seek feedback on FireSmart plans that had been developed to protect specific communities. There were two meetings in 2001, two in 2002, and six in 2005. A total of 133 people attended.
Willmore Wilderness Park: Fire Management Plan consultation	In 2006, various stakeholders were sent a copy of the draft fire management plan for Willmore Wilderness Park, and invited to attend presentations to provide their feedback; 20 people attended the presentations.

The Minister of Alberta Sustainable Resource Development is also responsible for the Natural Resources Conservation Board (NRCB). The NRCB reviews applications for approval of major natural resource developments projects in Alberta. Projects reviewed under the NRCB Act include those from the forest, recreation, tourism, mining industries, as well as water management projects and projects referred to the NRCB by the Alberta Cabinet. The NRCB must decide if these projects are in the public interest, and in making this determination, must consider social, economic and environmental effects. NRCB approvals must be authorized by the Alberta Cabinet, and are in addition to any licenses, permits or approvals stipulated by other acts, regulations or bylaws. Where unresolved concerns remain, the Board responsible determines whether the concerned parties are directly affected (the Alberta Environmental Appeals Board (AEAB) must also determine whether the issue is environmental in nature), and may initiate a public hearing process. Following the hearing, the Board responsible may issue the approval, direct changes to the plan, or refuse the proposal.

Alberta Energy and Utilities Board

With the boom in the oil and gas industry over the last five years, development associated with energy exploration has dramatically increased within the Foothills Model Forest landbase. Energy developments are regulated primarily by the Alberta Energy and Utilities Board (AEUB), whose mission is to ensure that the discovery, development, and delivery of Alberta's energy resources occurs in a manner that is fair, responsible, and in the public interest. Before any permits or licenses are issued, the AEUB requires development proponents to inform potentially affected parties, including other industrial users and the public, of the nature of the proposal and invite their comments or concerns. The extent of public consultation expected is related to both the size and type of proposed projects. Consultation and discussion may include public meetings and open houses. Project proponents deal directly with the concerns identified by providing more information, detailing justifications, or by altering their project plans.

Alberta Environment

Some larger projects may also require approvals from Alberta Environment. This process may involve specific environmental planning or impact assessment protocols and may require public notification. This provides another opportunity to deal with the public's unresolved environmental concerns before projects proceed. The

public can contest approved projects by appealing to the Alberta Environmental Appeal Board (AEAB). The AEAB will determine if parties are directly affected, and may conduct a public hearing.

Alberta Tourism, Parks, and Recreation

The Ministry of Tourism, Parks, and Recreation, is responsible for the management of the provincial protected areas within the Foothills Model Forest landbase, such as Switzer Park, Willmore Wilderness Area, and Sundance Provincial Park. Its responsibilities include enforcing provincial legislation regarding the use of parks, as well as the development of park management plans, which give longer-term direction about how a particular protected area will be managed. Table 2, below, describes recent opportunities for public participation in the management of these areas.

Table 2 –Opportunities for public participation provided by Alberta Tourism, Parks, and Recreation, 2002 – 2006

Mechanism for public participation	Summary of opportunities for public participation
Public discussion forum followed by individual meetings	A park management plan was developed for Sundance Provincial Park. An initial public meeting was held in 2000 at the Marlboro Community Hall to help identify a list of interested stakeholders; 26 people attended. In 2001 and 2002, individual meetings were held with identified stakeholders. Meeting notes were recorded by the planning team and sent to the participants to validate.
Open houses	The draft of the Sundance Provincial Park Management Plan was reviewed by the stakeholder group and members of the public. Two open houses, attended by 120 people in total, were held in Edson during 2002 to facilitate feedback.

Jasper National Park – Parks Canada

In Jasper National Park, the public is consulted on a range of issues from the development of the Park Management Plan to proposed changes in fishing regulations. A routine opportunity for public participation occurs as the park executes its duties for projects, which are subject to the Canadian Environmental Assessment Act. Under such projects, a range of public participation occurs from informal/passive offers of involvement to structured formal consultative processes. Likewise, the building permit/development review process also provides opportunities for public participation in decisions.

Other opportunities are created as needs arise, such as the creation of a Trail Stewardship Program, where a diverse group of stakeholders and park staff work to address trail issues and concerns. Table 3 outlines a sampling of public participation opportunities within Jasper National Park.

Table 3 – Opportunities for public participation provided by Jasper National Park, 2001 – 2006

Mechanism for public participation	Summary of opportunities for public participation
Regular meetings	Jasper Trail stewardship program – regular meetings since 2001 with stakeholders to address trail issues
Public meetings	Jasper Planning Forum public meetings – a total of four meetings were held between 2003 and 2006; approximately 50 persons attended.
Public meetings	Eagle Ridge Comprehensive Study – four public meetings were held in Calgary, Edmonton, and Jasper
Regular meetings	Jasper Trail project – during 2006 and early 2007, 25 meetings were held, with attendance varying between 12 and 60 people.
Meetings, newspaper notice, planning forum	Jasper River Use Guidelines Review – in 2003 public participation in the development of river use guidelines was sought by Jasper National Park. Two meetings were held, and 14 people attended.

Hinton Wood Products – a division of West Fraser Mills Ltd.
Hinton Wood Products (HWP) is the major forest tenure holder within the FtMF landbase. The HWP Forest Management Area (FMA) is approximately one million hectares in size. Table 4, below, outlines some of the public participation opportunities provided by HWP from 2001 to 2006.

Table 4 – Opportunities for public participation provided by Hinton Wood Products, 2001 – 2006

Mechanism for public participation	Summary of opportunities for public participation
Forest Resources Advisory Group	The Forest Resources Advisory Group (FRAG) is a multi-stakeholder group that was established in 1989 to provide organized and regular public input into planning and operations within Hinton Wood Products' Woodlands department. FRAG was also established to select or respond to issues, and consider and recommend actions and policies to Hinton Wood Products. From 2001 to 2006 FRAG held 63 meetings (including field trips) dealing with a wide range of topics.
Open houses	Open houses are held each year in the three largest communities within and/or adjacent to the Hinton Forest Management Area: Grande Cache, Edson, and Hinton. Occasionally, open houses are also held in the smaller hamlets within or adjacent to the FMA, such as Robb and Brule. From 2001 to 2006, HWP held 21 open houses, including one in Brule and one in Robb. On average, 135 people attend these open houses each year.
Public notification of the initiation of the compartment planning process	When HWP initiates planning in a new compartment, it places advertisements seeking public input in local newspapers. The public is encouraged to share its local knowledge of terrain and resources, resource use patterns and timing, any inter-resource conflicts of which they are aware, and other preferences and opinions. From 2001 to 2006, HWP placed 22 notices in local newspapers (each running twice); only 5 responses were received.
1-800 number	HWP provides a toll-free telephone number (1-800-293-6955) for public inquiries – all calls (which total 12 to 20 per year) are responded to and tracked. The large majority of these calls relate to road safety issues (e.g., reckless drivers, dust, poor road conditions, etc.).
Annual operating plan summary document	This document provides a simple overview of the general areas HWP plans on developing during each operating year (May to April), as well as showing areas where approval has already been gained. The document also contains information on how to provide input to HWP planners, and information on various HWP sustainable forest management practices. This document has been produced and sent out with HWP's company newsletter since 2005, resulting in a distribution to approximately 1700 households.
Ipsos Reid SFM survey	In 2006, HWP contracted Ipsos Reid to carry out a survey to determine how satisfied the public was with HWP's sustainable forest management (SFM) practices, as well as how effective the public believed HWP was in communicating with the public and allowing opportunities for public participation. Over 1000 residents were surveyed in Hinton, Edson, Jasper, and Grande Cache. The results are on HWP's website, www.westfraser.com/hintonforestry.

A group takes the Beaver Boardwalk tour at Maxwell Lake in Hinton, Alberta

The oil and gas industry

Numerous oil and gas companies operate on the industrial portion of the FtMF landbase, which is primarily made up of the Hinton Wood Products Forest Management Area. Many of these companies are partners in the FtMF and conduct varying levels of public participation activities, which are outlined in Table 5.

Table 5 – Opportunities for public participation provided by the oil and gas industry, 2001 – 2006

Company	Mechanism for public participation	Summary of opportunities for public participation
Petro-Canada	Open House	An open house was held in 2004 in Robb to discuss construction of the Robb Playground – 40 people attended.
Petro-Canada	Open House	Two open houses were held in Robb in 2005 to discuss the Robb Fire Protection plan – 25 people attended.
Devon	Open House	Open houses were held annually in Hinton from 2003 to 2006, giving the public an opportunity to provide feedback to Devon staff.
Canadian Natural Resources Ltd. (CNRL)	Open House	Open houses were held annually Marlboro in 2003, 2004 and 2006, giving the public an opportunity to provide feedback to CNRL staff. Approximately 70 people attended each open house.
CNRL and Talisman	Open House	Hinton area operators held a "discover energy" open house in Hinton in 2006 – approximately 100 people attended.
CNRL and Talisman	Yellowhead Synergy Group	This group, which is made up of members of the public with varying viewpoints and interests, meets about every six weeks and provides feedback and advice to CNRL. The group has been meeting regularly since 2001.
Talisman	Local trappers' association meetings	Talisman meets four times annually (since 2000) with the local trappers' association – approximately 15-20 people attend each meeting.

All oil and gas companies also place advertisements in local papers regarding gas plant expansions, renewals, and upgrades, asking interested parties to provide comments

The coal industry

A number of coal mines operate within the industrial portion of the FtMF landbase. Activities such as coal mine expansion can have a significant effect on landbase values that are important to the public. Table 6, below, highlights some of the efforts made by the coal industry to involve the public in decision-making processes and provide input into proposed plans.

Table 6 – Opportunities for public participation provided by the coal industry, 2001 – 2006

Company	Mechanism for public participation	Summary of opportunities for public participation
Tech Coal Limited	Public meetings	An open house was held annually from 2001 to 2005 in Hinton, and in 2006 in Cadomin, giving the public an opportunity to provide feedback to Elk Valley staff. On average, about 30 people have attended each year.
Tech Coal Limited	Focus group meetings	There have been four focus group meetings (one in 2004, two in 2005, and one in 2006) in Hinton, Edson, and Cadomin to discuss issues such as the Mountain Park staging area and fishery enhancement projects in the Cadomin area.
Tech Coal Limited	Cadomin Environment Protection Association	From 2001 to 2006 there were 17 meetings between the Cadomin Environment Protection Association and Tech Coal Limited, with an average of 12 people attending each meeting.

[7] Interpretation

Clearly, even though the data presented in the sections above doesn't reflect all of the public participation activities conducted, there are still significant opportunities for the public to be involved with the decision-making processes of various agencies and organizations operating within the FtMF landbase. Each agency or organization provides some level of opportunity for public participation; however, it must be noted that

the public's actual participation in the public participation activities varies considerably. Due to the amount of activity within the FtMF landbase and the busy lives people lead, people often simply don't have time to take advantage of the numerous opportunities provided for public input. In other words, the number of people who attend open houses or provide input through some other mechanism for public participation isn't always a reflection of how interested or important a particular issue is to the public. There is little that can be done to address this issue, except to continue to provide a wide variety of methods and opportunities for the public to become involved, and be able to adapt appropriately when the public need for more involvement arises.

Aboriginal consultation is treated separately from public consultation. Aboriginal communities are consulted in a separate process that varies by organization, but the commonality is that organizations consult with Aboriginal communities on a one-on-one basis, rather than treating them as part of their public consultation process.

[8] Rationale for allowable variance (threshold)
There is no allowable variance for this indicator.

[9] Analytical considerations

a. Calculation of indicator
There was no specific calculation of this indicator. A written notice was sent to all FtMF partners that conduct public participation activities asking that they provide data on public participation from 2001 to 2006, including (where possible) the number of meetings held and the number of people attending.

b. Special considerations
Not all partners provided the requested information. In addition, for those partners that did supply data, not all of it was provided in a consistent format; therefore, a simple overview outlining what sort of public participation activities were carried out by each agency or organization was all that could be documented above.

[10] Responsibility
Either data (actual statistics) or information (a written summary) regarding public participation activities was provided by the following agencies or organizations:

- Alberta Energy and Utilities Board
- Alberta Environment
- Alberta Sustainable Resource Development
- Alberta Tourism, Parks and Recreation
- Canadian Natural Resources Ltd.
- Devon
- Tech Coal Limited
- Hinton Wood Products
- Jasper National Park
- Petro-Canada
- Talisman

[11] Monitoring
Monitoring public participation activities and opportunities will continue to be the responsibility of the individual agencies and organizations conducting these types of activities on the FtMF landbase.

[12] General discussion
There has been no measurable difference in public participation activities since the Local Level Indicators of Sustainable Forest Management for the Foothills Model Forest - Initial Status Report published in 2003. This is due to the lack of consistency in data collection and reporting. Because of the wide variation between agencies and organizations in how public participation activities are conducted and documented, this indicator will continue to be a simple summary of what has occurred since the last report.

Town councillors from Hinton, Alberta take part in a tour of the Cardinal River coal operations which is located about 42 kilometres south of Hinton


Global positioning systems (GPS) can be used to document the locations of historical sites

Indicator 6.2.2
Number of Historical Resource Sites Identified Through the Referral and Inventory Processes

[1] Foothills Model Forest value
Historic resources.

[2] Objective
To conserve historical resources.

[3] Statement of indicator
To protect and maintain historic resource sites that have been identified through the referral and inventory processes in the region.

[4] Indicator measure
Measures for this indicator are (a) the number of historical resource sites that have been identified through the referral and inventory processes across the Foothills Model Forest landbase; and (b) the number of historical resource sites lost during the last reporting period within the Foothills Model Forest landbase.

[5] Rationale for indicator

a. Significance of indicator to landscape-level management

Human heritage is an important and significant characteristic on the landscape. Understanding connections and linkages to our past can help provide insight into the present. In order to learn about, celebrate, and conserve historical sites, we must be able to identify them. We can then use this information and knowledge when making decisions about land management and planning, resource management, and the environmental assessment process.

Aboriginal communities retain human, indigenous, aboriginal and provincial rights to their traditional territories. These rights manifest themselves in cultural uses, sites, and knowledge on the landscape, in both their historic and current forms. Current Supreme Court law has held that management regimes must respect, accommodate, and take into consideration these rights, especially where Aboriginal communities assert them, to ensure mitigation and minimal impact. Provincial policies, including Alberta's First Nations Consultation Policy, have been devised to address this added basis for including Aboriginal interests in landscape management. Thus, documenting Aboriginal historic sites on the Foothills Model Forest landbase is a precursor to successfully integrating Aboriginal interests, claims, and ambitions into the landscape-level management dialogue. Above all, the documentation of Aboriginal knowledge of the landbase provides data for these discussions.

b. Meaning of indicator

This indicator denotes the quantitative results

of efforts across the model forest landbase towards recording historic sites that have been identified through the referral and inventory processes.

The *referral process* is a process in which the main goal is to prevent disturbance to Aboriginal historical sites. Traditional cultural sites are entered into a geographic information system (GIS) database. Prior to a development, the location of the proposed development is entered into the same GIS database. A database query determines which Aboriginal communities need to be contacted for potential consultation and provides that information to industry. The referral process does not identify precise locations of culturally significant sites; that information is owned solely by the Aboriginal communities with ties to those sites. Aboriginal communities, industry, and government collaboratively identify Aboriginal landbase cultural values and agree to protect them whenever there are development plans for a mutual area of interest.

The *inventory process* documents information on historic sites and stores this information as a collection, either in a hard-copy format, such as paper, or in a digital format, such as a spreadsheet or database.

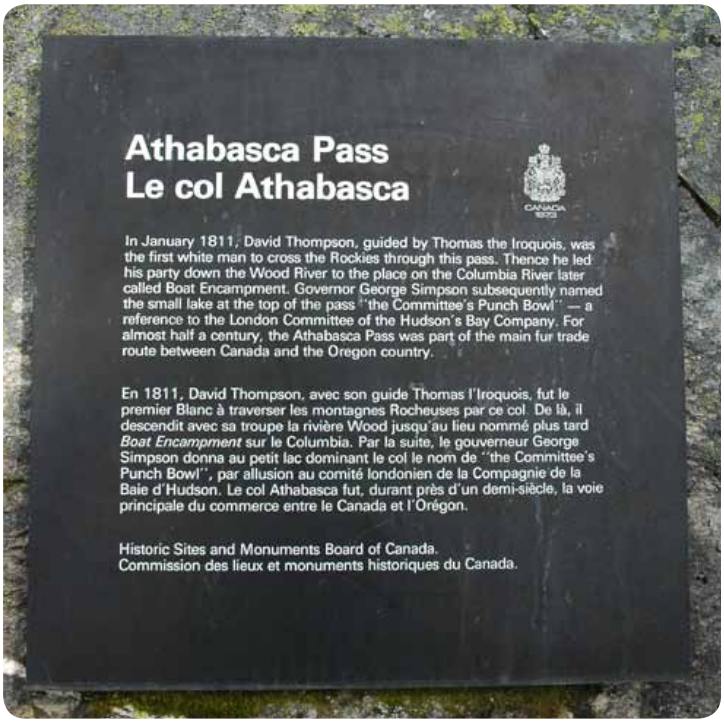
Historical sites include the following:

- Pre-contact archaeological sites, such as
  - Campsites
  - Caves
  - Pictographs
  - Kill sites
- Aboriginal resources, such as
  - Ceremonial sites
  - Gravesites
  - Berry-picking areas
  - Hunting, fishing, and trapping grounds
- Non-aboriginal sites, such as
  - Artifactual and structural remains
  - Structures that are still standing that are related to historical events and themes

c. Relation of indicator to Foothills Model Forest and to sustainability

The identification of historical resources across the Foothills Model Forest landbase creates links to many benefits: ecosystem, economic, and social. Knowledge derived from historical sites can yield valuable information about historic and present patterns of land use, wildlife, and other facets of local ecosystems and landscapes. These sites also provide a historical and social understanding of our surroundings.

Recording historic sites is important, because as more sites are documented, there is an increased chance of using this knowledge in sustainable landuse planning and decision-making. Monitoring the status of historical sites, specifically the number of sites lost, helps stakeholders across the landbase detect threats to historical sites and may provide insight into how these sites can be better protected. In order to promote the understanding, enjoyment, appropriate use, and conservation of sites, sound landscape management objectives should be interlinked with sustainable management of these sites. This will ensure their presence for future generations to enjoy.



National historic sites such as Athabasca Pass in Jasper National Park maintain vital links to our collective past

[6] Current status of indicator

a) The number of historical resource sites that have been identified through the referral and inventory processes across the Foothills Model Forest landbase:

Foothills Model Forest Referral Process through the Aboriginal Involvement Program (traditional cultural study and the associated referral and inventory processes):

- Approximately 2,000 sites are currently documented.
- Eleven pilots (test runs) of the referral process have been run, protecting 92 cultural sites.
- Six organizations have used the process: West Fraser Mills (Hinton), Coal Valley Mine, Luscar Limited, Shell Canada Limited, Jasper National Park, Alberta Sustainable Resource Development, and Devon Canada Corporation.

Jasper National Park:

- The park's Archaeological Resource Description and Analysis (ARDA) process tracks approximately 530 known and documented archaeological sites.
- Forty-two buildings have received a heritage designation rating from the Federal Heritage Buildings Review Office (FHBRO). Two buildings are designated Classified, and forty are designated Recognized (please refer to Section 7b, below, for definitions of these levels).
- Through Jasper's Built Heritage Resource Description and Analysis (BHRDA) a total of 106 buildings have been identified as having heritage significance. There are 24 Level A buildings, 37 Level B buildings, and 45 Level C buildings (please refer to Section 7b, below, for definitions of these levels).
- Four National Historic Sites are located in Jasper, including the Jasper Information Centre, Jasper House, the Athabasca Pass, and the Yellowhead Pass.
- One river (the Athabasca River) is designated as a Heritage River through the Canadian Heritage Rivers System (CHRS).
- One railway station (Jasper's Canadian National Railways Station) is designated as a heritage railway station by the Historic Sites and Monuments Board of Canada.

Historic Resources Management Branch (Alberta Culture and Community Spirit)
The following have been documented within the boundary of the Foothills Model Forest study area:

- Alberta Archaeological Site Inventory: Approximately 1,420 existing sites. .
- Alberta Heritage Survey Program Inventory: At least 62 existing sites/structures.
- Alberta Traditional Use Site Inventory: At least 92 existing traditional use sites. The Aboriginal Consultation Section of the Historic Resources Management Branch reviews development proposals against the Traditional Use Site Inventory, and may require consultation with Aboriginal communities if a site may be impacted. This consultation is required as a condition of the project's clearance under the Historical Resources Act.

b) The number of historical resource sites lost during last reporting period within the Foothills Model Forest Landbase: N/A

This is the first time this indicator has been reported on; therefore, this measure of the indicator's status is not applicable during this reporting period.

[7] Interpretation
In addition to the programs and inventories mentioned in Section 6, other organizations and individuals across the FtMF landbase document traditional, cultural, and historical resources. These organizations and individuals play an important role in documenting historically important features of the past. Most of this information exists independently and is not housed in a central database.

The following is an interpretive summary of the information in Section 6.

a) Foothills Model Forest

FtMF Aboriginal Involvement Program – Referral Process
As communities continue their research and increasing numbers of sites are visited, verified, and recorded, the number of sites identified under this program is growing. In addition, as companies and government regulators use the referral process, increasing numbers of cultural sites are protected from potential disturbances. The referral process is voluntary, and overall the number of sites, referral process pilots, and number of sites protected from potential disturbances continues to grow. As there were over 9000 new developments approved on the Eastern Slopes landbase(comprised of the four SRD management units that straddle the mountains from Nordegg to Grande Cache) in 2006, the low number of pilots (11) highlights the fact that the referral process remains a voluntary process and could be playing a much larger role in mitigating disturbances.

b) Jasper National Park

Archaeological Resource Description and Analysis (ARDA)
Through time, the number of sites documented through the ARDA continues to grow as archaeological and cultural sites of significance are located, documented and recorded. Parks Canada defines a cultural site as "a place that gives evidence of human activity or has spiritual or cultural meaning, and that has been determined to be of historic value" (Parks Canada. Cultural Resource Management Policy, in Guiding Principles and Operational Policies. Ottawa: Minister of Supply and Services Canada. 1994). The ARDA is the product of archaeological investigations intended and produced for parks planning reference and cultural resource management within JNP. The ARDA is also used in the Environmental Assessment process in JNP.

Federal Heritage Buildings Review Office (FHBRO)
The Federal Heritage Buildings Review Office reviews federally-owned buildings in Canada that are 40 years of age or older in order to evaluate and determine heritage character designations. These buildings can be designated as *Classified* (the highest level) or *Recognized* (the lower level). There is also a third rating or level, *not heritage*. These buildings are recorded in the Register of the Government of Canada Heritage Buildings, which is maintained by FHBRO.

Built Heritage Resource Description and Analysis (BHRDA)
The Jasper Built Heritage Resource Description and Analysis (BHRDA) identifies, evaluates, and inventories buildings of heritage significance in the town of Jasper. This report is updated when a change occurs, such as the removal of buildings from the original BHRDA (for example, the building has been destroyed). Level A is the highest designation, given to buildings within the town that have the most heritage characteristics, while Level B buildings are "illustrative of building phases within the town," and Level C buildings are "of value to the townsite environment."

System of National Historic Sites of Canada
National historic sites are "places of profound importance to Canada" (Parks Canada, 2007-11-22, http://www.pc.gc.ca/progs/lhn-nhs/index_E.asp). One component of Parks Canada is responsible for Canada's program of historical commemoration, which recognizes nationally significant places, persons and events (Parks Canada, 2007-11-22, http://www.pc.gc.ca/progs/lhn-nhs/index_E.asp). All such designations are made by the Minister of the Environment on the advice of the Historic Sites and Monuments Board of Canada (Parks Canada, 2007-11-22, http://www.pc.gc.ca/progs/lhn-nhs/index_E.asp).

Canadian Heritage Rivers System (CHRS)
This program promotes, protects and enhances Canada's river heritage, and ensures that Canada's leading rivers are managed in a sustainable manner (http://www.chrs.ca/About_e.htm - Heritage Rivers Program, no year on site)

Heritage Railways Stations - Historic Sites and Monuments Board of Canada
This process evaluates railways stations older than forty years that are owned by companies operating under Part III of the Canada Transportation Act (formerly the Railway Act).

(See http://www.pc.gc.ca/clmhc-hsmbc/gfp-hrs/gfp-hrs1a_E.asp - Heritage Railways, 2004-01-14.)

c) Historic Resources Management Branch (Alberta Culture and Community Spirit):

Alberta Archaeological Site Inventory
The Alberta Archaeological Site Inventory was formed in 1973 when records from institutions including the Alberta Parks Service, the Glenbow Museum, the Provincial Museum of Alberta, the University of Alberta, and the University of Calgary were centralized in this provincial inventory. The earliest records within this inventory date back to the 1950s. The inventory currently contains over 30,000 site records, with over 500 records added each year. Today, most new site records result from archaeological investigations conducted for proposed developments, as required by the Historical Resources Impact Assessment process.

Alberta Heritage Survey Program Inventory
The Alberta Heritage Survey Program Inventory represents a database of over 80,000 records of non-archaeological heritage resources in Alberta. The Survey contains information gathered as early as 1971, and has been continuously added to since then. A wide variety of site types is represented, from geological and natural features, to houses, grain elevators, train stations and barns. The main focus of the survey is historic buildings and other structures, usually those more than 50 years of age. Information on file includes details of architectural characteristics, history, designation status, location, and photographs. The Survey provides a base of knowledge upon which informed decisions relating to Alberta's heritage resources can be made.

Alberta Traditional Use Site Inventory
The Alberta Traditional Use Site Inventory was formed in recent years as part of the Government of Alberta's First Nations Consultation Policy on Land Management and Resource Development.

An example of a historical resource site: The remains of the John Moberly Cabin on the Overlander Trail near Jasper, Alberta

[8] Rationale for allowable variance (threshold)
There is no allowable variance for this indicator.

[9] Analytical considerations

a. Calculation of indicator
There are no special calculations for this indicator in determining the total number of heritage sites.

b. Special considerations
It should be noted that the totals of each inventory in Section 7 may not include the most recent additions to each individual inventory. It should also be noted that in some cases, such as the Jasper National Park ARDA, conclusions that can be drawn for a site vary in relation to the quality of data and the extent of field investigation. Often, more intensive investigation in relation to developments in areas of cultural and traditional significance is required.

Although the agencies listed for this indicator are responsible for historic resources, it should be noted that other organizations and individuals across the FtMF landbase play a critical role in documenting and maintaining historical knowledge and site information.

[10] Responsibility
Data for this indicator was provided by the following agencies or organizations:

- Foothills Model Forest
- Jasper National Park
- Parks Canada Agency
- Alberta Culture and Community Spirit
- Aboriginal Community Nations
- Canadian Heritage Rivers System (CHRS) Program
- Historic Sites and Monuments Board of Canada
- Individuals and organizations across the FtMF

[11] Monitoring
Monitoring historical resources does not require statistical analysis – documentation and usage statistics are reported as is.

[12] General discussion
This is a new indicator and was not reported on in the last local level indicators report, which was published in 2003.

The documentation of sites identified through referral and inventory processes in the region should also respect sensitivities in historic knowledge. There should be a strong balance between using and sharing this information, as well as considering needs and sensitivities in regards to site information. Sensitivities around the ownership, source, and origin of the data must be considered as a strong aspect of the process, and stakeholder consultation is an important consideration.

Although there are many inventories throughout the landscape, many undocumented and undiscovered sites probably still remain. Therefore, maintaining and revising current inventories should also be an important and ongoing aspect of conserving historical resources. Cooperation among the various organizations, agencies, and individuals is critical for collaborative conservation, monitoring, and management of sites. By documenting historical resources across the FtMF landbase, we can begin to piece together evidence of our past which will help provide insight into today. There is still much to learn about our past, but there is immense value in knowing that historical sites are being documented to help ensure these critical pieces of the puzzle will not disappear.