C5 FOREST MANAGEMENT PLAN 2006–2026

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Table of Contents

List of Appendices

EXECUTIVE SUMMARY

The new C5 Forest Management Plan (FMP) identifies how Alberta Sustainable Resource Development (ASRD) will manage the C5 Forest Management Unit (FMU) for the next 20-year planning cycle (May 1, 2006 – April 30, 2026). The FMP describes the "desired future forest" that will be achieved in the C5 FMU.

Section 14(1) and (2) of the Alberta *Forests Act* allows the province to divide public forest land into forest management units and calculate annual allowable cuts for forest management units. The calculation of an annual allowable cut is a key component of a forest management plan. Such plans are prepared by forestry companies for areas under Forest Management Agreements. ASRD prepares the forest management plans for those areas of the province where Forest Management Agreements do not exist—as with the C5 FMU.

This FMP is supported by ASRD's 2006-2009 Business Plan, as shown in Goal 3: "*Alberta's forests and forest landscapes support healthy ecosystems and vibrant communities.*"[1]. This means to ensure the numerous benefits from Alberta's forests and forested landscapes are protected, sustainable forest management methods and practices will be followed that include adaptive forest management planning and practices by government and industry. Education and awareness programs will be used to promote responsible use and effective management of the resource and landbase. A framework of legislation, leading-edge policy, regulatory systems and science will be used to support and guide all forest management in Alberta.

The C5 FMU is increasingly in demand by many different users because of its location, its many desirable forest attributes, and the wide-ranging benefits it provides. Use levels continue to increase, which has necessitated a multiple-use approach in managing this highly sought after forest. In keeping with the principles of sustainable forest management, the C5 forest will continue to be managed to provide social, economic and environmental benefits for Albertans.

The intended focus of the C5 FMP is on managing timber resources, timber harvesting and silvicultural activities (i.e., optimizing timber production to provide a sustainable supply of coniferous timber), while minimizing the impacts of forestry operations on non-timber resource values, land uses and human activities. The forest management strategies outlined in this plan promote the maintenance of forest health and ecosystem integrity through sound forest management approaches, and support continued multiple use of the C5 forest.

The C5 Forest Management Plan conforms with Alberta's Forest Management Planning Standard (2005 draft), and is based on the *Sustainable Forest Management: Requirements and Guidance* (Canadian Standards Association [CSA Z809] 2002). This, in turn, is based on the Canadian Council of Forest Ministers (CCFM) criteria and indicators framework. The six broad sustainable forest management criteria that have been adopted by CCFM provide a framework for this forest management plan. Note that certification of the C5 forest management unit will not be pursued at this time.

Direction contained in this plan is centered on 53 resource management objectives. These objectives and their associated targets provide the basis for numerous action recommendations. If

[1] *ASRD Business Plan 2006-2009 (http://www.finance.gov.ab.ca/publications/budget/budget2006/sustain.html).*

successfully implemented, these recommendations will help resource managers and timber operators achieve the plan's desired outcomes. The FMP will be updated and revised at regular intervals to ensure progress continues in attaining the desired future forest described in the plan.

Staff from ASRD and other government agencies developed the direction detailed in this integrated plan. A public involvement process was adopted to identify community values and to gather feedback on planning proposals. The public consultation process included a public advisory committee (i.e., CrowPAC), quota holder involvement, stakeholder participation, general public open houses, and a web page that facilitated the exchange of information.

Achieving the desired future forest will require meeting numerous targets pertaining to biodiversity, forest management, forestry operations, environmental protection and public involvement. Modeling work completed as part of the timber supply analysis has resulted in an annual allowable cut (AAC) calculation of 209,414 m^3 per year. This amounts to an increase increase from the last AAC calculation which was established following the Lost Creek Fire in August 2003. A series of timber supply analyses (TSA) were also undertaken to consider the effects of different scenarios, objectives and constraints, and to prepare a spatial harvest sequence consistent with the preferred forest management strategy.

Embracing the principle of adaptive management will ensure this plan remains responsive to monitoring results, new information and improved resource management approaches. Amendments to this plan will be considered at five-year intervals based on recommendations contained in the five-year stewardship reports that will be prepared by ASRD throughout the life of this plan.

This forest management plan is not a statutory document. The direction contained in the plan will be followed by ASRD and guide the activities of timber disposition holders and other users of the C5 forest. Once approved by the Executive Director of Forest Management Branch (Public Lands and Forests Division, ASRD), the plan will also become a consultation document for future decision making.

1.0 INTRODUCTION

To assist the reader, a Glossary and List of Acronyms has been provided in Appendix 1.

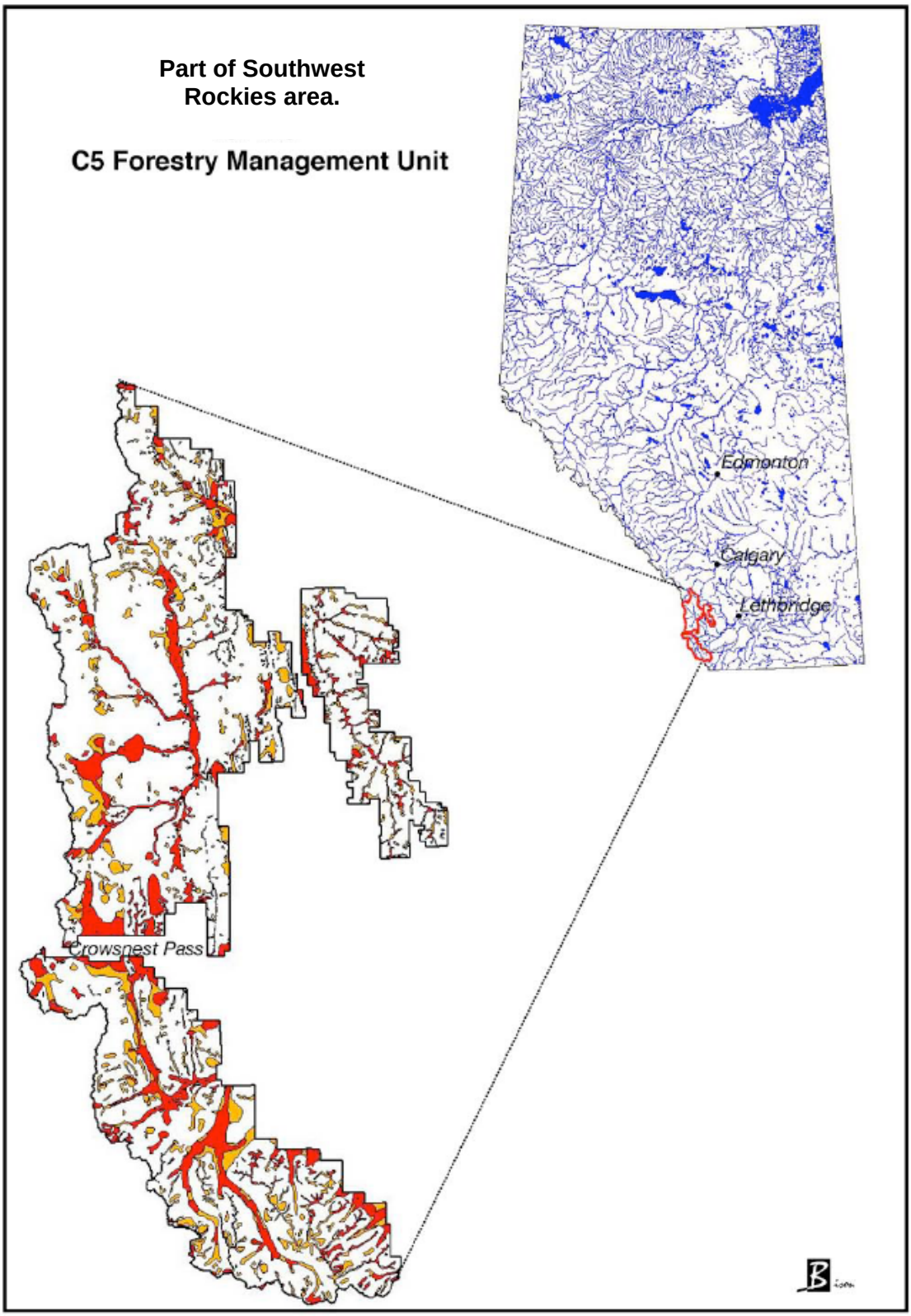
1.1 FOREST MANAGEMENT PLANNING

Public land (provincial Crown land) in Alberta's Green Area has been partitioned into a number of forest management units (FMU) and forest management agreement (FMA) areas. Establishing these management units ensures efficient administration and management of Alberta's forested landbase.

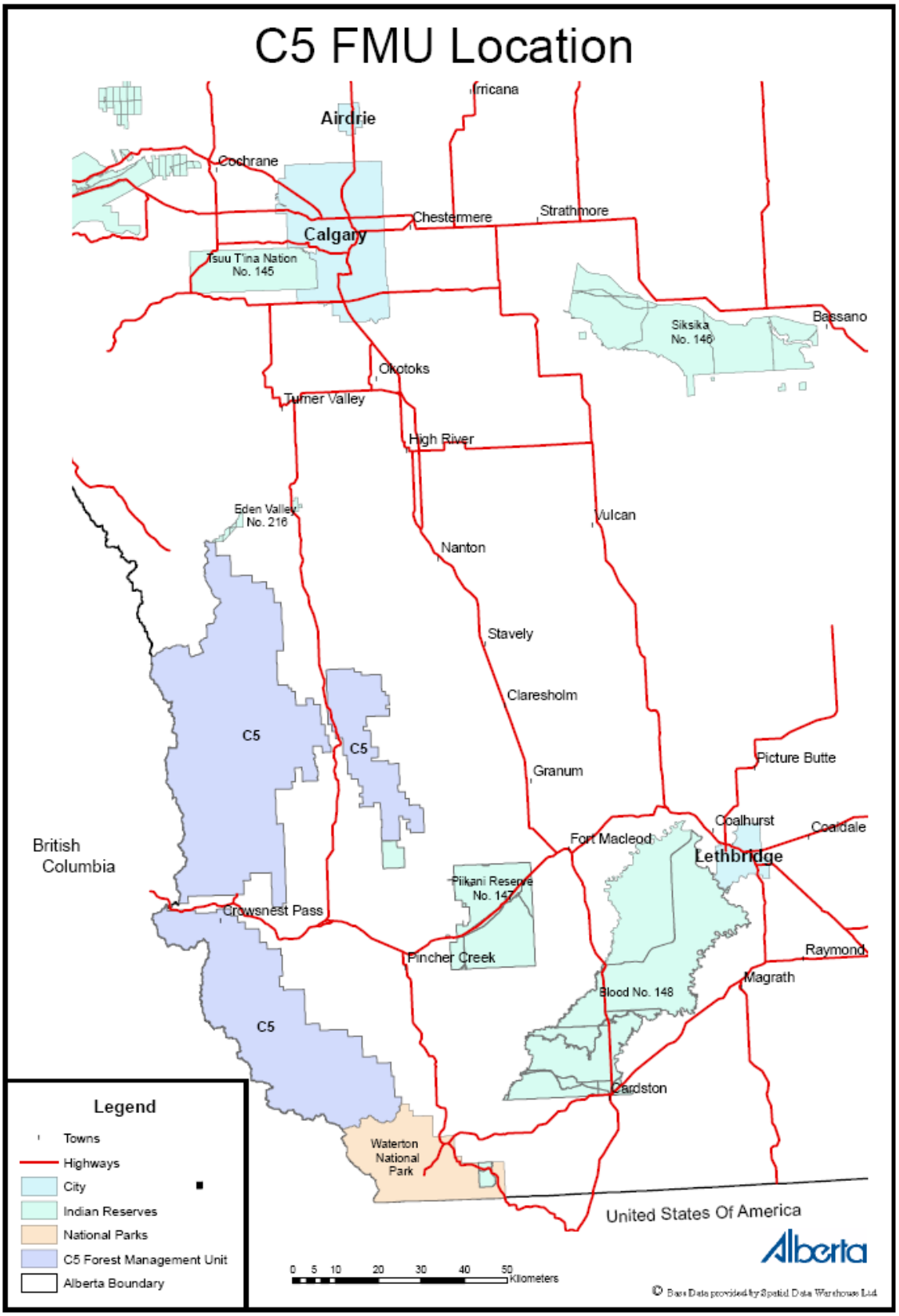
The C5 Forest Management Unit is located in southwestern Alberta, lying to the north of Waterton Lakes National Park and to the south of Kananaskis Country (Map 1). It encompasses approximately 3,522 km^2 of public land (Map 2). This management unit consists largely of foothills and mountainous terrain within Alberta's Eastern Slopes. Numerous meadow complexes are also found throughout the C5 FMU.

The C5 FMU is managed by the Alberta Sustainable Resource Development (ASRD), the department responsible for the administration of provincial forests. Section 14(1) and (2) of the Alberta *Forests Act* allows the province to divide public forest land into forest management units and calculate annual allowable cuts for forest management units. The calculation of an annual allowable cut is a key component of a forest management plan. Such plans are prepared by companies where FMAs exist, and by the Public Lands and Forests Division of ASRD where provincial forested lands do not fall within an FMA.

In May 1986, the Government of Alberta adopted a management plan for the C5 FMU. This plan will reach the end of its 20-year lifespan on April 30, 2006. Upon expiry of the current plan, a new 20-year forest management plan (May 2006 to April 2026) will be put in place. Development of this new plan was initiated in the fall of 2001. Referred to as the C5 Forest Management Plan (FMP), this new plan was developed in accordance with sustainable forest management principles and approaches adopted by the Government of Alberta and other jurisdictions. The C5 FMP will be implemented by ASRD staff in the Southern Rockies Management Area (SW1), which is in the Department's southwest corporate region. Terms of Reference for the C5 FMP are located in Appendix 2.



Map 1. C5 Forest Management Unit, geographical location.



Map 2. C5 Forest Management Unit — planning area.

The C5 FMP conforms with direction contained in the *Alberta Forest Legacy*. It also complies with policies, standards, guidelines and requirements adopted by ASRD which pertain to forest management planning, including Alberta's new Forest Management Planning Standard. Wherever possible, an effort was made to follow the *Z809-02 Sustainable Forest Management: Requirements and Guidance* (Canadian Standards Association [CSA] 2002). Key elements of the CSA document include:

- meaningful public participation; the adoption of recognized forest values and criteria,
- implementation of sustainable forest management practices,
- consideration of environmental, social and economic factors,
- effective management and management review systems, and
- continual improvement.

Although ASRD has conceptually embraced the requirements of the CSA 2002 standard, the Government of Alberta will not pursue certification of the C5 forest at this time.

This C5 FMP will be reviewed and updated at its midpoint, 2016, to ensure it is current and remains responsive to changing needs, societal preferences and conditions, and to any new information and technologies that emerge. The C5 FMP will be consulted when regional timber harvesting operating ground rules are developed for southwestern Alberta.

Timber (logging) allocations for the C5 forest management unit are determined by ASRD. Currently, the annual allowable cut (AAC) for the FMU is fully allocated in the form of coniferous timber quotas and authorizations under the Department's Community Timber Program.

Historical Background

Logging operations began in the Porcupine Hills and Castle River areas during the late 1800s to provide logs and dimension lumber for railroad construction and human settlement. A growing coal mining industry in the Crowsnest Pass during the early 1900s placed additional demands on local forest stands for posts and beams to be used in local mining operations. Extensive salvage logging was undertaken in the region following a period of forest fire activity during the mid-1930s. Salvage logging was also initiated following insect outbreaks in the 1970s (spruce stands) and the 1980s (pine stands).

Commercial timber harvesting began within three newly established provincial forest management units (C1, C2 and C3) in southwestern Alberta in the mid-1960s. In response to recommendations in the 1986 C5 forest management plan, the provincial government consolidated the three existing management units to form a single new forest management entity—the C5 FMU. A timber supply analysis (TSA) was then completed by the provincial government to establish the AAC for C5.

The 1986 coniferous AAC for the C5 FMU was 165,753 m^3 on a productive coniferous landbase of 115,511 ha. In 1999, an increase in the AAC occurred and the coniferous AAC was re-established at 181,400 m^3. Following the Lost Creek Fire in 2003 (21,163 ha burned), the AAC was re-calculated and set at 174,920 m^3.

1.2 PURPOSE AND SCOPE OF THE PLAN

The purpose of the C5 FMP is to set forth and describe the desired future forest within the C5 FMU. This occurs within the context of existing government legislation and policies that promote sustainable forest management. The desired future forest state will be achieved through the attainment of the plan's 6 broad goals (the Canadian Council of Forest Minister's 6 national criteria) and 53 objectives. Environmental, economic and social benefits will be realized when the management strategies in this plan are implemented, and associated outcomes are tested against pre-determined indicators and targets. Adaptive management will be used, and action recommendations and strategies within the FMP may need to be adjusted as new information or scientific studies become available.

The C5 FMP planning area is also referred to as the C5 FMU gross landbase. This identifies the areal extent of the forest management unit; i.e., represents the area covered by land and water within the boundaries of the C5 FMU. Within the gross landbase, a distinction is made between the timber harvesting landbase (also called the net or active landbase) and the passive landbase. The net landbase refers specifically to those areas within the gross landbase where timber harvesting will occur, and where silvicultural and forest management activities will take place to establish and maintain commercial timber stands.

After the net landbase was established and calculated, the remaining portion of the gross landbase was categorized as being passive. The passive landbase consists of those areas that have not been designated for logging or active silvicultural work. The following table identifies the area covered by each category.

Table 1. Categories and area percentages within the gross landbase.

C5 Forest Management Unit	Area (ha)	Percentage
Active (net) landbase*	120,589	34
Passive landbase	231,233	66
Gross landbase (totals)	351,823	100

** The active land base within the C5 FMU refers to those areas in which timber harvesting will occur. The active land base, also known as the net land base or net forested land base, contains forested areas that are actively managed for timber harvesting. It includes all forested stand types with the exception of larch. Also referred to as the net landbase or timber harvest landbase.*

The focus of this FMP is on the timber harvesting forest landbase within the C5 FMU. The C5 FMP is not considered a landscape-level plan, because it deals primarily with the net landbase. A noted weakness of this plan is that the net coniferous landbase amounts to only 34% of the C5 FMU gross area. Activity on the remaining 66% of the landbase is managed by both ASRD and Alberta Community Development (ACD). The need for these two government agencies to work together has been identified, in order to ensure that landscape-level issues (e.g., management for mountain pine beetle infestations, FireSmart landscape requirements) are viewed in a more holistic manner than is allowed through the mandate of the C5 FMP.

The FMP will focus on managing the C5 forest landbase to supply a continuous flow of timber (i.e., wood fiber), while ensuring the following occurs: Forest ecosystem processes will either be allowed to operate unimpaired or will be emulated where these processes are controlled or eliminated; i.e., the health and well-being (integrity) of forest ecosystems will be sustained.

- A wide range of cultural, educational, recreational, economic, and social benefits are achieved in conjunction with timber harvesting and forest management activities.
- The natural environment is protected and environmental quality is maintained.
- Timber harvesting and forest management practices do not result in unacceptable impacts to resource values that are present and to other land uses and human activities.
- Natural disturbance effects will be emulated (where possible) through management actions if natural disturbance events are controlled or eliminated, such as wildfire.

The C5 FMP will identify a sustainable AAC for the timber harvesting forest landbase of the C5 FMU, and provide guidance on how logging and alternative silvicultural treatments are to be carried out. All forest management and timber harvesting operations must consider the multiple use benefits associated with the net forest landbase, as well as the non-timber resources values present in the FMU. Emphasis will be placed on sustainable forest management that considers all known non-timber resource values, ecological processes, land uses and human activities that are present on the landscape. Land and resource management actions within the C5 FMU will not be designed to maximize single use at the expense of other resource values, land uses and activities.

This plan focuses on timber harvesting, silvicultural activities and timber resource management within the net forest landbase in the C5 FMU. The C5 FMP is not intended to provide detailed direction for managing all non-timber values and resources found in the forest management unit, nor does it address specific landscape issues that affect the passive[2] landbase. Comprehensive or detailed planning for non-timber land uses (i.e., oil/gas exploration and development, mining, coalbed methane, livestock grazing, tourism opportunities, recreational motorized access) and non-timber values (i.e., fish and wildlife, threatened species, historical resources) has either already occurred to some degree, or will be addressed in other strategic plans, operational plans and related policy initiatives. The C5 FMP may acknowledge the existence of—or identify the need for—such plans, policy initiatives and other management activities where they inter-relate with the C5 FMP or where their completion is required for ASRD to discharge its broader departmental mandate in the C5 forest management unit.

Consistent with its scope, this plan will ***not*** provide direction for:

- designated protected areas within the C5 FMU (protected areas are managed under separate management plans);
- adjacent (White Area) public lands;
- allocation of public land and resources for non-timber uses;
- strategic land use zoning (as contained in the Eastern Slopes Policy and existing approved Integrated Resource Plans);
- recreational motorized access trails within the C5 FMU.

[2] *The passive landbase contains those lands deleted from the active landbase for timber production, such as stream reserves, excessive slopes, non-merchantable areas, elevation restricted areas, natural areas and others that are identified in the land determination net down process.*

1.3 SUSTAINABLE FOREST MANAGEMENT

1.3.1 Sustainable Forest Management (SFM) Defined

During the 1990s, foresters in Canada and around the world re-examined the basic principles of forest management for the purpose of bringing these principles in line with the concept of "sustainable development", which is generally defined according to the Bruntland Commission report: "*...to make development sustainable—to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs*." This has resulted in a new approach to forest management called sustainable forest management.

Sustainable forest management includes the traditional goals and values of forest planning and operations, which are essentially to maintain the health and productivity of the forest resource over the long term. However, it also embraces a wide range of other environmental, social, cultural, economic and scientific considerations. Sustainable forest management requires a much greater depth and breadth of knowledge about the forest itself and the uses and activities that occur in it. It also requires that new approaches be adopted for assessing and re-assessing management activities, incorporating new information, knowledge and best management practices, and continuously adapting to changes occurring in the physical, biological, social and economic environments.

Different definitions of sustainable forest management have emerged, including the following three:

- "To maintain and enhance the long-term health of forest ecosystems, while providing ecological, economic, social, and cultural opportunities for the benefit of present and future generations" (Canadian Standards Association 2002).
- "Forest management regimes that maintain the productive and renewal capacities, as well as the genetic, species and ecological diversity of forest ecosystems" (Dunster 1996).
- "Management that maintains and enhances the long-term health of forest ecosystems for the benefit of all living things while providing environmental, economic, social and cultural opportunities for present and future generations" (Natural Resources Canada 2001).

The Canadian Council of Forest Ministers (CCFM) has developed a comprehensive and cohesive framework for achieving and evaluating sustainable forest management in Canada. Their report, *Defining Sustainable Forest Management in Canada: Criteria and Indicators 2003*, identifies six broad criteria and a series of supporting elements and indicators to achieve sustainable forest management in Canada. These same criteria and elements were largely adopted in preparing this plan.

The *Z809-02 Sustainable Forest Management: Requirements and Guidance* (Canadian Standards Association 2002), which is based on CCFM's criteria and indicators framework, was also consulted during development of this plan. At the time of plan approval and implementation, ASRD was not prepared to proceed with formal certification of the C5 Forest Management Unit in accordance with the CSA SFM Z809 or other sustainable forest management certification standard.

1.3.2 Provincial Context for Sustainable Forest Management

A significant provincial government initiative was launched in 1993 to address provincial forest issues, examine forestry legislation and decision-making, and consider new forest management approaches and paradigms to ensure the sustainable use of Alberta's forests. This initiative was a follow-up to commitments made by the Government of Alberta in response to:

- the report of the Expert Panel on Forest Management in Alberta;
- Alberta's participation in the National Forest Strategy;
- the Canada-Alberta Partnership Agreement in Forestry.

The objectives of the *Alberta Forest Conservation Strategy* (Alberta Environmental Protection [AEP] 1997) were to set goals and establish principles for the future use, protection and enhancement of Alberta's forests. Following extensive stakeholder and public consultation, the outcome of the initiative was a strategy that included a long-term vision for Alberta's forests. It also set policy direction (goal statement, set of guiding principles, strategic directions) for the protection and use of Alberta's forests. In short, the Strategy provided a broad strategic framework for the sustainable use of Alberta forests, and provided the foundation for subsequent development of new provincial forest policy.

In February 1998, the Government of Alberta introduced a new provincial policy on sustainable forest management—the *Alberta Forest Legacy*. This document was developed based on recommendations contained in the *Alberta Forest Conservation Strategy*, as well as two other reports:

- *Alberta: Working for a Sustainable Future* (Alberta Round Table on Environment and Economy 1991);
- *Forest Management in Alberta: Report of the Expert Review Panel* (Forestry, Lands and Wildlife [FLW] 1990).

The *Alberta Forest Legacy* outlines the government's philosophy for land and forest management in Alberta. In particular, it recognizes:

- there is a need for an expanded focus in decision making (i.e., all forest values, resources and land uses must be considered in decision making);
- greater attention must be given to forest ecosystems/landscapes and to the processes that sustain them (i.e., there is a need to adopt landscape-level ecological approaches);
- a balance of uses and activities must be accommodated to ensure the benefits, goods and services derived from provincial forests benefit society as a whole.

The Legacy document includes key principles to safeguard the ecological integrity of the forest, and describes the role of stakeholders and the general public in forest management.

To assist with implementing and "operationalizing" the Legacy document and sustainable forest management approaches, the Land and Forest Service developed the *Interim Forest Management Planning Manual: Guidelines to Plan Development* (AEP 1998). This manual provided guidelines for developing detailed forest management plans, which are required for every forest management unit within Alberta. The draft Alberta Forest Management Planning Standard provided the basis for developing the C5 FMP.

1.3.3 National Context for Sustainable Forest Management

The history of forest management in Canada comprises numerous significant events and developments. Of these, only select recent developments are noted here.

On May 1, 1998 the second *Canada Forest Accord* (1998) was signed at the Eighth National Forest Congress. Recognizing that Canada's forests are a national symbol and a prominent landscape feature (covering nearly half of the county), the Accord built on existing national support for the wise use and management of provincial, territorial and national forests across Canada. The Accord contained a vision, goal, statement of beliefs, and a series of commitments for action to achieve sound forest management across Canada, and was signed by numerous governments, agencies, organizations and industries. The third *Canada Forest Accord* has now been developed to cover the period 2003-2008.

The fifth *National Forest Strategy (2003-2008), A Sustainable Forest: The Canadian Commitment* was introduced at the Ninth National Forest Congress. The *National Forest Strategy* is the reference document for work undertaken under the *Canada Forest Accord*. The Forest Strategy provides a strategic and comprehensive statement for achieving sustainable forest management across Canada. It was prepared by the National Forest Strategy Coalition, which is composed of signatories to the Accord. The Strategy contains a vision statement and action recommendations organized around eight strategic themes. National forest strategies were developed beginning in the 1980s. They have evolved over time, accompanied by new challenges and attitudes and increased knowledge, understanding and participation. Each forest strategy has led to a more concise definition of a sustainable forest.

Setting and achieving higher standards in forest management is of importance to the forest products industry. The Alberta Forest Products Association has established a *Code of Practice* that is followed by member companies. The Forest Products Association of Canada is developing common guidelines for the improvement and responsible use of forest management practices by the forest industry. Early in 2002, the Forest Products Association of Canada announced that all member companies would be required to submit their forest management practices to the scrutiny of third party certification audits. As well, a new condition of membership in the Association is third-party certification of the company's forestry practices to one of three internationally recognized sustainable forest management standards:

- Canada's National Sustainable Forest Management Standard (CAN/CSA Z809);
- Forest Stewardship Council Principles and Criteria (FSC);
- Sustainable Forestry Initiative Standard (SFI)[3].

1.3.4 Forest Management in Alberta

Alberta uses timber permits and quotas, and forest management agreements (FMA) to manage the province's timber resources. All three are tenure systems that are used to ensure sustainability of the forest resources through effective forest management.

[3] *The Sustainable Forestry Initiative®, SFI®, and the SFI® Implementation Committee Logo are registered service marks of the American Forest & Paper Association.*

- A timber permit is generally a short-term agreement that can be in effect anywhere from 30 days to 5 years. It is generally used to make a specific amount of timber available to meet local demand for smaller timber operators.
- A timber quota is a 20-year agreement that can be renewed based on the environmental performance and practices of the rights holder. Companies are given a specific percentage of an allowable cut (volume-based) in the case of a coniferous quota, or a specified volume for a deciduous quota. These volumes can be harvested within a specific area (timber licence within a forest management unit).
- A forest management agreement is generally a 20-year, area-based agreement that can be renewed. The FMA provides the holder with the right to harvest, remove and grow timber in a specific area. An FMA requires the company to take responsibility and accountability for forest management planning and a commitment to manage timber on a long-term sustained-yield basis within a sustainable forest management framework. This includes protection of watersheds, environment and wildlife.

Forest management plans contain the details of where, when and how trees on public land in Alberta are harvested and managed for sustainability. These plans, also called detailed forest management plans, are a requirement of forest management agreements. The forest management planning time frame considered is 200 years, which generally represents two full life cycles, or rotations, for trees in the FMA. Forest management plans are prepared and implemented in collaboration with forest industry, government agencies, other resource users and the public.

1.4 Resource Management Issues

Human interest in, and use of the C5 forest, particularly following European settlement in the late 1800s, has resulted in significant land use change within the forest management unit over time. Resource development, land conversion, intensified land use and activities and other factors have led to land and resource management issues. Some issues have been resolved successfully, others are being "managed", and still others are neither resolved nor managed. This plan focuses on issues that fall within the purpose and scope of its terms of reference. Issues that may be addressed more appropriately through other processes will be identified for the government agencies or local authorities with the a mandate for their resolution.

Twenty substantive issues considered applicable in some way to the C5 FMU were identified during the public involvement process. These are shown in Appendix 5b.

1.5 Plan Development Process

The C5 forest management planning project was initiated by the Land and Forest Service of Alberta Sustainable Resource Development in the fall of 2001. At that time, the Terms of Reference were prepared and made available for internal government review, the project manager and project coordinator were assigned, and a planning team was assembled. The main structural elements of the planning project and their linkages are shown in Figure 1.

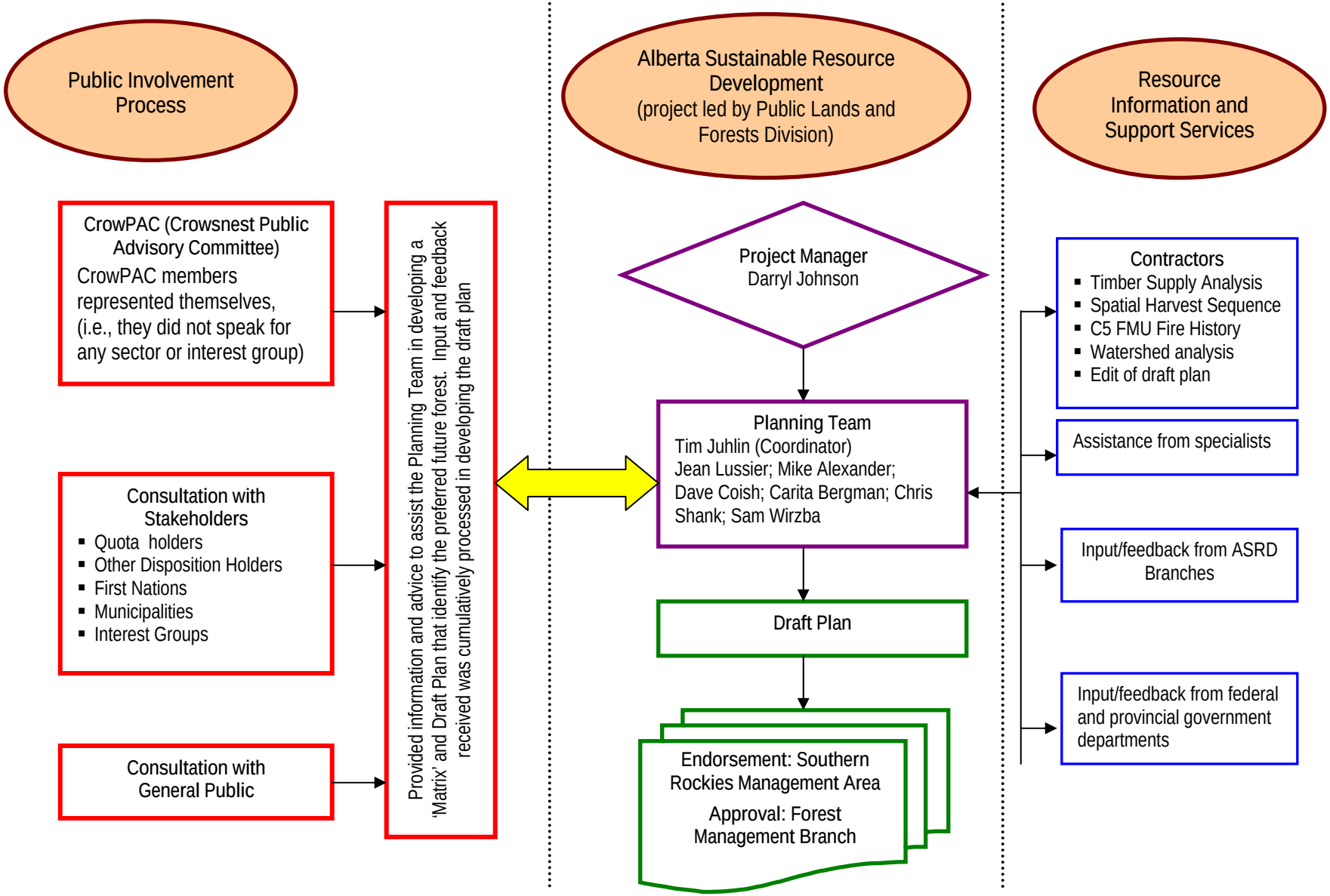
An internal, inter-disciplinary government Planning Team was established to assist the project manager, project coordinator and CrowPAC. The primary responsibilities of planning team members were:

- attend CrowPAC meetings to learn member concerns and viewpoints;
- share needed information on various topics and answer any questions;
- help prepare the C5 FMP Matrix and other project materials/documents;
- review TSA/spatial harvest sequence outputs and planning proposals;
- assist in the development and review of the draft management plan.

Government specialists and experts were enlisted throughout the planning exercise to assist the planning team in developing and reviewing proposals, completing analyses, and reviewing feedback obtained through the public involvement process.

Following stakeholder and public review of the draft plan, appropriate revisions will be made. The plan will then be sent for final approval to the PLFD Area Manager – Southern Rockies Area (SW1) and the Executive Director of the Forest Management Branch, ASRD.

Figure 1. Organizational structure adopted in developing the C5 Forest Management Plan.



1.5.1 Significant Planning Steps, Activities and Milestones

- Project Terms of Reference developed and adopted in 2001 (Appendix 2).
- Inter-disciplinary planning team consisting of provincial government staff established.
- Public consultation Terms of Reference developed and approved (Appendix 3A).
- Crowsnest Public Advisory Committee (CrowPAC) established.
- List of stakeholder contacts prepared and updated.
- Public notification of the project through a news release, media coverage, newspaper advertisements, presentations to municipalities and interest groups, etc.
- Project website established and maintained throughout planning process (http://www.srd.gov.ab.ca/regions/southwest/c5/index.html).
- Contact made with First Nations; clarity obtained on their preferred manner of consultation.
- Landscape assessment prepared for C5 FMU (Appendix 4A).
- CrowPAC members identified key values and issues pertaining to C5 FMU.
- Stakeholder and public input obtained on the draft values and issues identified by CrowPAC.
- Presentations on relevant topics provided to CrowPAC by industry representatives, researchers and government specialists.
- CrowPAC members completed two tours: one of the C5 forest and one of the Lost Creek Fire area.
- CrowPAC authorized the planning team to develop a draft matrix consisting of objectives, indicators, targets, management strategies and monitoring requirements following a template contained in the CSA SFM Z809-02 standard.
- CrowPAC systematically reviewed the C5 matrix (Appendix 5). Input received from CrowPAC, quota holders, other stakeholders and members of the public was compiled and reviewed by the planning team, resulting in numerous changes to the matrix.
- C5 matrix was re-designed by planning team to provide more detailed direction for achieving the C5 FMP's 53 objectives.
- Timber Supply Analysis (TSA) model runs and sensitivity analyses completed by a consultant; preferred future forest strategy identified; annual allowable cut determined for the preferred forest strategy; spatially explicit harvest schedule developed (Appendix 6B).
- Several quota holder meetings held throughout the planning process to review the C5 matrix, and obtain feedback on various planning proposals and input on Timber Supply Analysis runs and early iterations of the spatial harvest sequence.
- Stakeholder information packages (draft matrix and minutes from CrowPAC meetings) were prepared and distributed.
- Meetings held with three bordering rural municipalities. In attendance at one meeting were members of the Crowsnest Pass Environmental Action Society, the Castle Crown Wilderness Association, and the Canadian Parks and Wilderness Society.
- A public consultation strategy prepared to facilitate public review of draft plan.
- CrowPAC and quota holders invited to review the draft plan before its public release.

- Draft plan made available for public review. Public feedback was sought from October 26, 2005 to January 26, 2006, on the proposed direction contained in draft.
- Significant effort was made with the Cross Country Ski Association and Tecumseh landowners to re-assess the proposed spatial harvest sequence in the Allison-Chinook Forest Land Use Zone, an area north of the forest land use zone (FLUZ).

The public involvement process was designed to ensure that a cross-spectrum of public views and opinions was obtained during the plan development process. The public consultation components described below are noteworthy.

Creation of a Public Advisory Group

The Crowsnest Public Advisory Committee (CrowPAC) was established to work closely with the project Planning Team in developing a draft plan. To facilitate cooperation and reduce the incidence of arguments, a citizen jury approach was adopted. No interest group or constituency positions were directly represented at meetings with CrowPAC.

The CrowPAC members were asked to provide only their personal views, rather than serving as an advocate or representing views held by organizations with which they were personally affiliated. The belief was that most of society's values could be broadly represented through a diverse CrowPAC membership. However, it was recognized that some social values and concerns would not be adequately reflected within CrowPAC; therefore, additional consultation mechanisms (e.g., meetings with municipalities, other stakeholders and quota holders) were adopted to obtain such input. CrowPAC met 21 times over a 4-year period. Facilitation services were provided by contractors and internal professional staff.

First Nations Involvement

Through meetings and correspondence, contact was made with Aboriginal communities to ensure Aboriginal views and concerns were considered during the planning project. First Nations participation also occurred at various points throughout the project.

Consultation with Quota Holders

Meetings were held with existing timber disposition holders to carry out the following:

- establish the C5 net landbase,
- review and propose changes to the C5 matrix,
- review initial TSA outputs,
- establish quota spheres,
- react to preliminary spatial harvest sequence outputs, and
- review the final text of the draft plan.

Outreach to Other Stakeholders

Through meetings and correspondence, contact was made with various stakeholders, individuals and organizations that use the C5 forest or have a strong interest in the outcome of this planning project. Stakeholders were notified of the project, provided with updates, and given opportunities to provide advice and respond to planning proposals.

Public Open Houses

Two open houses were held to provide opportunities for interested public, Aboriginal peoples and organizations to learn about the draft plan, meet with members of CrowPAC and the Planning Team, offer opinions and suggestions, and provide feedback on specific proposals contained in the draft plan. A summary of the public consultation process is found in Appendix 3B, as well as the public open house C5 summary document.

Website Access

A project website was established to disseminate information and provide project updates throughout the C5 plan development process (http://www.srd.gov.ab.ca/regions/southwest/c5/index.html).

2.0 C5 FOREST MANAGEMENT UNIT

2.1 BIOPHYSICAL DESCRIPTION

A comprehensive biophysical description and other pertinent information on the C5 FMU is contained in the C5 Landscape Assessment (Appendix 4). The Landscape Assessment provides a snapshot in time of the baseline description for the FMU in the form of maps, figures, charts, tables and verbal descriptions.

2.2 LAND USES AND ACTIVITIES

The C5 forest is of high importance owing to the diverse values found within its boundaries, as well as the many opportunities and benefits it provides to local residents, visitors, communities and industry.

Aboriginal people used the C5 forest area for centuries before the Europeans arrived. As western Canada was settled, and immigrant communities developed throughout southern Alberta, the demand for local natural resources increased dramatically. The C5 forest was of great importance to both Aboriginal people and to European immigrants, as it furnished an abundance of resources including: clean water, timber, coal, oil, natural gas, fish, wildlife, edible plants, and forage for domestic livestock. Human demand for these resources has only intensified over time. More recently, the C5 forest has increasingly been sought out and valued for other benefits, including: recreational activities (sport fishing, hunting, motorized recreation, hiking, camping, etc.), spiritual rejuvenation, wilderness experiences, nature appreciation, scientific research, solitude, and other aspects.

A rapidly growing human population, mounting economic development pressures, intensive land use, the availability of more leisure time, a growing outdoor recreation sector, increased consumer spending, the proximity to large urban centers, and other factors have all contributed to the convergence of significant human activity within the C5 forest. Traditional land uses (e.g., logging, grazing, oil and gas development, and trapping) have been joined by a host of other land uses and activities of a more recent origin. To accommodate the wide range of activities, the Government of Alberta has adopted a multiple use approach in managing the C5 forest.

2.2.1 Brief History of Timber Harvesting in the C5 FMU

For more than a century, timber harvesting has been a significant activity in the C5 forest. Logging operations started in the Livingstone/Porcupine Hills area in the late 1800s, before the railway line was built through the Crowsnest Pass. The first local timber dispositions were issued by the Federal Department of the Interior to enable construction of buildings as part the transcontinental railway project. Oxen were used to haul loads of timber from Highway 3 north to Calgary.

"License Timber Berth No. 80" was issued to the Canadian Pacific Railway under the federal government's 25-mile railway timber belt policy. This timber berth had no standards for tree utilization and no term was specified in the disposition. Douglas fir from the Porcupine Hills was in high demand during this period, and spruce and pine were also harvested. Burmis Lumber Co. Ltd. was established and operated under a timber berth until 1966 when the berth was replaced by timber licenses issued as part of a new provincial quota system.

The primary demand for logs in the early 1900s came from railroad companies in need of railway ties, and from underground mining operations that needed supporting beams and props. Through successful site regeneration and subsequent forest succession in the harvest areas, most signs of activity from this logging are no longer visible. Remnant stumps can still be found, however, particularly in areas that were accessed before 1960 (Porcupine Hills, the West Castle and Crowsnest valleys, Lille and Grassy mountain, the Livingstone range), can still be found.

Timber harvesting in the Crowsnest Pass area was relatively extensive during the first half of the 20th century. However, logging activities were confined to the Crowsnest corridor owing to the lack of roads. When the new provincial quota system was established in 1966, quota operators began developing road networks into areas north and south of the Crowsnest Pass in what is now called the "headwater basins" of the C5. At that time, extensive tracks of mature virgin timber still carpeted valley floors. Loggers were active in harvesting timber in these headwater basins—from the South Castle up to the upper Oldman River drainage, as well as the Porcupine Hills—throughout the second half of the 20th century. Subsequently, logging was extended into what is known as the "middle ridges" south of Highway 3 in the early 1980s to salvage lodgepole pine stands devastated by Mountain Pine beetle.

As the 20th century drew to a close, harvesting activity continued to move from the headwater basins into the middle ridges where expansive stands of predominantly lodgepole pine existed (reaching maturity following fires that moved through the area between 1913 to 1936). More recently, two fires—the Cherry Hill Fire (2000) and the Lost Creek Fire (2003)—have resulted in timber salvage operations. An extensive open competitive timber permit bidding process was used to allocate burned wood as part of the Lost Creek Fire salvage operation.

Despite rough mountainous terrain, ground-based logging—dependant on equipment having wheels and tracks—has been the main approach to logging forest stands throughout the C5 forest. Over the course of a full century, logging practices in the C5 forest went through a significant evolution: from bucksaw to chainsaw; from tree shear to feller-bunchers; from horse and mule logging to tractors, skid trucks, line skidders and more recently, grapple skidding technology. Perhaps the most significant piece of equipment used in the C5 forest has been the bulldozer. Timber harvesting during the 1960s and 70s involved significant trail development on steep slopes, which was made relatively simple with bulldozers. The bulldozer has also been widely used for cutblock scarification work on moderately steep slopes to encourage reforestation.

Early logging requirements demanded the complete removal of all merchantable stems from a cutblock. Although this strict requirement was relaxed in the late 1980s, it was often the case that any remaining standing stems left within a clearcut were destroyed during scarification treatments. More recent timber harvesting activity, under quota allocations, has been carried out using the clearcut method.

Scarification, which has often been perceived as a harsh activity on the landscape, became more acceptable owing to significant challenges faced by loggers in the headwater basins. There, timber stands often contained large volumes of dead standing trees (snags) and downed stems. These decadent stands yielded extremely high wood volumes, containing significant quantities of un-merchantable stems that were of no value at the sawmill. The challenge was how to effectively reforest sites containing unusually high volumes of logging debris, and often large, dead, spiral-checked trees.

The approach most often followed was to use windrow scarification or pile scarification to expose mineral soil throughout the cutblock. Although the area covered by slash and debris piles was unavailable for regeneration, the remaining area could be seeded (from the air or the ground) or planted with seedlings. During the late 1990s and beginning of the 21st century, there has been a move toward leaving standing live stems and other residual material scattered throughout harvested areas to provide wildlife habitat, and microsites for reforestation and snow retention.

Throughout the 20th century until about the mid-1970s, portable sawmills were located throughout much of the C5 forest. Sawdust piles are still evident at numerous locations in the FMU. The access roads created to haul logs out of the forest, and to deliver rough milled timber and lumber to surrounding communities, opened the forest to the public. Some of these roads continue to be used for recreational purposes. Forestry road standards have undergone considerable changes over the years to allow modern equipment to operate at higher speeds when delivering large loads to centrally located sawmills.

Timber harvested from the C5 FMU today is delivered primarily to one mill—the Spray Lake Sawmills (SLS) mill in Cochrane. Two of the four current quotas within the C5 FMU are not tied to any mill, and the annual harvest from these two quotas is sold to the highest bidder.

Spray Lake Sawmills has recently diversified its product line, and is aggressively marketing a variety of other wood products including mulch, wood shavings, sawdust and post peelings for use in landscaping and erosion control.

2.3 FOREST TENURE

Tenure refers to the legal rights and entitlements that have been conferred by the Government of Alberta to individuals and companies to access, use, manage, extract or control the use of provincial assets (i.e., public land and natural resources). Tenure may also apply to resources such as timber, forage, water, minerals and hydro-carbons, surface materials, and wildlife (fur trapping, guiding/outfitting), and the use of public land. Forest tenure is assigned through a disposition or authorization to the rights holder; currently there are several types of forest tenure within the C5 forest.

As stated previously, the C5 FMU is not contained within a provincial FMA area. As a result, ASRD has the mandate for managing timber resources in this forest management unit. Most of the AAC is allocated through timber quotas, with quota holders allocated a specified volume of wood as a percentage of the available annual allowable cut. The remaining portion is allocated through the competitive timber permit program through a bid process, and the Community Timber Program to local community manufacturers and loggers.

Volume distributions for the C5 FMU as of August 2004 (after adjustment for the Lost Creek Fire) were as follows:

Table 2. Quota Distribution, 2004.

Disposition	Company	Percentage of AAC	Cubic Meters
Quota Certificate CTQC050009	Crowsnest Forest Products Ltd.	58.69	102,661
Quota Certificate CTQC050008	Spray Lake Sawmills (1980) Ltd.	29.07	50,849
Quota Certificate CTQC050005	770538 Alberta Ltd.	4.38	7,661
Quota Certificate CTQC050002	793128 Alberta Ltd.	1.65	2,886
Community Timber Permit Program (CTPP)	CTP-C5	6.21	10,863
TOTAL		100	174,920

Quotas are assigned through quota certificates, which identify the responsibilities of quota holders. The quota certificates are issued for a period of 20 years; however, during that time the AAC volumes are balanced over four 5-year periods (each 5-year period is a quadrant). The next quota renewal period is scheduled to occur at the end of the current fourth quadrant, April 30, 2006.

The Community Timber Program consists of commercial timber permits, coniferous community timber permits, local timber permits and TM66 (poles, rails, Christmas trees, firewood) permits. This program operates through a competitive bid process, and permits are generally awarded to local operators.

Active harvest block in C5 FMU.

2.4 FOREST ADMINISTRATION

Alberta Sustainable Resource Development is responsible for the primary management of land and resources within the C5 forest. Relevant line agencies within the Department are as follows:

- Public Lands and Forestry (manages public land; i.e., rangelands and provincial forests);
- Forest Protection (protects forests and communities from wildfires);
- Fish and Wildlife (manages fish and wildlife species).

Further information on the mandate, responsibilities and activities of ASRD can be found in the department's latest business plan and annual report.

Regional delivery of ASRD's line agency mandates, programs and work plans occurs within four corporate administrative regions throughout the provice; each region is subdivided into corporate management areas. The C5 FMU is located within the Southern Rockies Management Area in ASRD's Southwest Region. Currently, the C5 forest is administered from Calgary and through a satellite office in the Municipality of Crowsnest Pass. A team of government foresters, resource specialists and technical support staff undertake day-to-day management responsibilities for the C5 forest. Government staff work closely with quota holders, other disposition holders and forest users to, among other things, ensure compliance with policies and statutory requirements, raise awareness of issues, and address known resource management issues.

3.0 RESOURCE MANAGEMENT FRAMEWORK

3.1 MANAGEMENT DIRECTION

3.1.1 Provincial Direction

The C5 FMU is located entirely on public land. In Alberta, public land and natural resources are under the jurisdiction of the Government of Alberta. Provincial government departments and agencies responsible for managing these provincial assets derive their authority (mandate) from provincial statutes. Key instruments and mechanisms that affect decision making for the C5 forest include:

- provincial legislation, regulations, Orders in Council, Ministerial Orders;
- codes of practice, departmental directives, ground rules, standards, information letters;
- provincial policy (written and unwritten);
- plans, strategies, guidelines;
- land and resource dispositions and authorizations;
- public land reservations and notations;
- government programs;
- government administrative processes (e.g., referrals, preliminary disclosures, Environmental Impact Assessment reviews, development applications);
- decisions of quasi-judicial tribunals (Alberta Energy and Utilities Board, Alberta Natural Resources Conservation Board).

Existing provincial government direction and authority, which is expressed through the above mechanisms, provided the basis and context for developing the C5 FMP. In particular, this plan was developed with reference to the following:

- provincial sectoral policy statements (e.g., Alberta Forest Legacy, Fish and Wildlife Policy, Fish Conservation Strategy, Coal Development Policy for Alberta, Water for Life Strategy);
- integrated resource management policy/plans (e.g., Eastern Slopes Policy, Livingstone-Porcupine Hills Sub-Regional IRP; Castle River Sub-Regional IRP, Crowsnest Corridor Local IRP).

This plan (and other strategic policy plans that apply to all or portions of the C5 FMU) will provide a basis and context for the development of lower order plans within the C5 forest. Examples of lower order plans include:

- general development plans to be prepared by quota certificate holders (s.18(2) of the *Forests Act*);
- operating plans to be prepared by timber license/permit holders (s.21(3) and 22(3) of the *Forests Act*);
- fire/fuel management and/or fire suppression plans;

- access development plans and access management plans;
- reforestation plans;
- reclamation plans.

The C5 FMP is one of several plans that guide resource management in the C5 forest. Figure 2 identifies the provincial and regional context for developing the C5 FMP and operational planning activities that are based on the approved C5 plan.

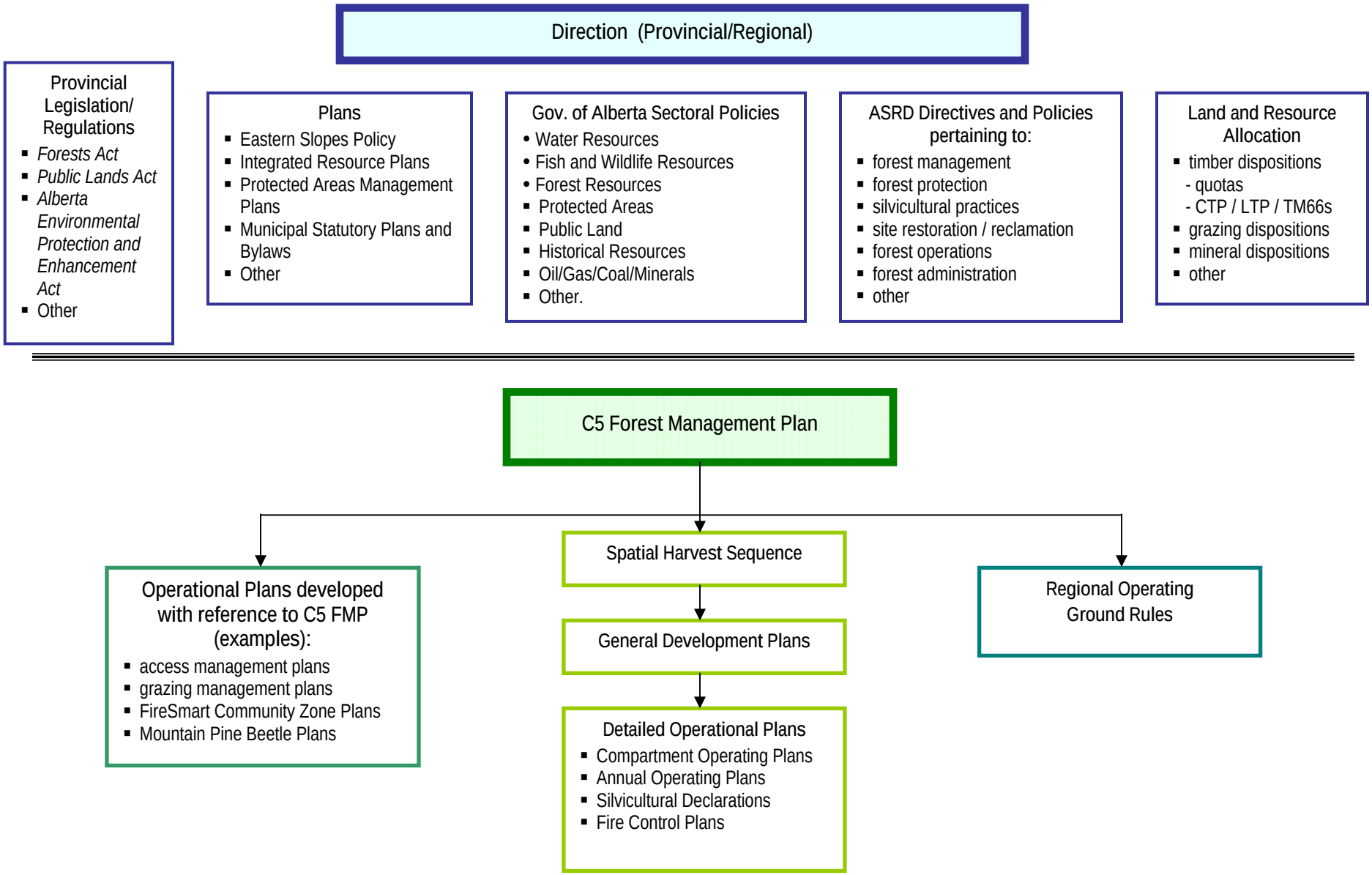
3.1.2 Federal and Municipal Direction

The Government of Canada and surrounding municipalities (local authorities) also possess some legal authority within the C5 forest. This authority is limited to those specific areas in which federal government agencies and municipalities exercise jurisdiction when fulfilling their respective legislated mandates.

Provisions within municipal (statutory) general development plans, land use bylaws, and area structure plans guide private development within the Forest Reserve. Furthermore, policies within municipal statutory plans and bylaws apply to any private land that occurs within the Forest Reserve.

Federal departments and agencies also exercise a certain amount of jurisdiction within the C5 FMU. The responsibilities of the Government of Canada include navigable waters, fisheries habitat, migratory birds, endangered species, inter-provincial and international oil/gas pipelines, inter-provincial and international trade of forest products. Various federal programs and policy initiatives may also have some influence within the C5 forest. As well, international treaties and agreements signed by Canada, such as the Kyoto Accord, and NAFTA's North American Agreement on Environmental Cooperation, can influence decision making regarding the C5 forest.

Figure 2. Linkages between the C5 FMP and provincial/regional plans, policies and operational activities.



3.2 DESIGNATED AREAS AND RESOURCE MANAGEMENT UNITS

A number of distinct geographical management units currently exist within, or contain all or portions of the C5 forest management unit.

3.2.1 Rocky Mountains Forest Reserve

The Rocky Mountains Forest Reserve (RMFR) was established by legislation in 1910. The Forest Reserve was created for the purpose of conserving the critical headwaters of the North and South Saskatchewan River basins, thereby ensuring that an optimum flow of water existed in both river systems to meet the needs of Alberta, Saskatchewan and Manitoba. The RMFR was formally re-established under Alberta's *Forest Reserves Act* in 1964. In describing the purpose of forest reserves, the current Act states the following: "All forest reserves within Alberta are set apart and established for the conservation of the forests and other vegetation in the forests and for the maintenance of conditions favourable to an optimum water supply."

Dutch Creek–Middle Ridge in the Forest Reserve (photo courtesy of Crowsnest Forest Products Ltd.).

The RMFR coincides with Alberta's Green Area—that portion of the province dominated by forest cover and in which human settlement is restricted. The Green Area is generally managed under a multiple-use philosophy for fish, wildlife and watershed protection, timber and minerals production, recreation, domestic livestock grazing and resource conservation.

3.2.2 Protected Areas

Seven protected areas currently exist within the C5 forest management unit. They are as follows:

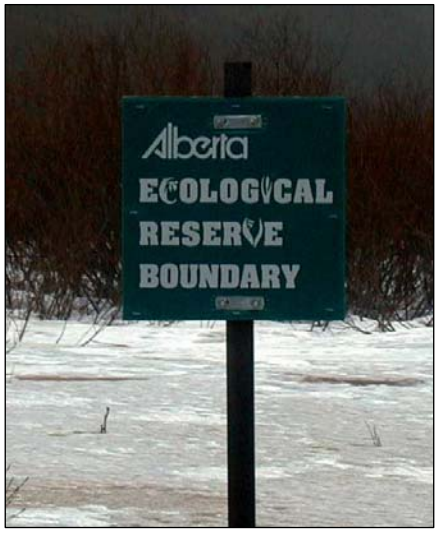
Table 3. Parks and Protected Areas within the C5 FMU.

Name	Established	Size in ha (ac)	Management Plan
West Castle Wetlands Ecological Reserve	1998	94.16 (232.67)	to be developed
Bob Creek Wildland	1999	21,290.72 (52,608.65)	under development
Upper Bob Creek Ecological Reserve*	1989	2600.95 (6426.86)	in place
Mt. Livingstone Natural Area	1987	535 (1321.97)	to be developed
Beehive Natural Area	1992	5662 (13,990.61)	in place
Plateau Mountain Ecological Reserve**	1991	2322.98 (5740)	draft plan prepared
Don Getty Wildland Provincial Park***	2001	62,775 (155,114.89)	to be developed

** Upper Bob Creek Ecological Reserve will be dissolved when Bob Creek Wildland is re-designated and the management plan for the Wildland has been approved.*

*** Only a portion (i.e., 1546 ha/3820 ac.) of Plateau Mountain Ecological Reserve falls within the C5 FMU.*

**** Don Getty Wildland Provincial Park consists of a number of non-contiguous parcels of provincial Crown land east and south of Elbow-Sheep Wildland Provincial Park. Only a small portion (i.e., 3590 ha/8871 ac.) of Don Getty Provincial Park falls within the C5 FMU.*



Ecological Reserve boundary sign.

Protected areas within the C5 FMU are managed in accordance with direction contained in protected area management plans that are in place.

3.2.3 Provincial Recreation Areas

Twelve provincial recreation areas currently exist within the C5 FMU.

Table 4. Provincial Recreation Areas within the C5 FMU.

Name	Established	Size in ha (ac)
Beaver Mines Lake Recreation Area*	1998	118.39 (292.54)
Castle River Bridge Recreation Area*	1998	15.4 (38.05)
Castle Falls Recreation Area*	1998	37.39 (92.40)
Lynx Creek Recreation Area*	1998	23.76 (58.72)
Syncline Recreation Area*	1998	20.64 (50.99)
Chinook Lake*	1998	48.02 (118.65)
Racehorse Recreation Area*	1998	18.78 (46.40)
Dutch Creek Recreation Area*	1998	17.28 (42.70)
Oldman River North Recreation Area*	1998	37.38 (92.37)
Livingstone Falls Recreation Area*	1998	14.78 (36.52)
Honeymoon Creek Recreation Area*	1998	4.05 (10.00)
Indian Graves Recreation Area	1997	14.62 (36.13)

** Formerly referred to as Forest Recreation Areas.*

3.2.4 Forest Land Use Zones

Three forest land use zones (FLUZ) exist currently within the C5 forest management unit.

Table 5. Forest Land Use Zones within the C5 FMU.

Name	Established	Size (km^2)
Castle Special Management Area	1998	1003
Allison/Chinook	1986	5
Cataract Creek Snow Vehicle*	1979	503

** Only a portion of the Cataract Creek Snow Vehicle FLUZ falls within the C5 FMU.*

It is anticipated that new FLUZ will be established within the C5 forest in the future to manage motorized recreational activities more effectively in the FMU. Two FLUZ exist in the C5 at this time that are fully within the FMU area.

Forest Land Use Zones within C5 FMU.

3.2.5 Other Resource Management Units

Different mechanisms have been adopted by government departments to ensure public land and Crown assets that are on or beneath the surface of public land in the C5 FMU are managed to achieve provincial objectives. Examples of these mechanisms include the following:

- IRPs: these provide direction for defined Resource Management Areas (RMA) within the C5 FMU; land use zones identify permitted and non-permitted land uses throughout the C5 FMU.
- Wildlife management units (WMU): 5 WMUs provide direction for the management of wildlife and harvesting game species in the C5 FMU.
- Fisheries management area: the C5 FMU falls within the "ES1" Fisheries Management Area, for which fisheries regulations are developed.
- Coal categories: land within the C5 FMU has been classified into four different categories for coal exploration and development.
- Grazing allotments (49 forest reserve grazing allotments exist): allotment management plans provide direction for managing domestic livestock grazing in the C5 FMP.
- Watershed (basin and sub-basin) management units.
- A Policy for Resource Management of the Eastern Slopes.

It is anticipated these and other resource management units will continue to provide a basis for achieving various resource management goals in the C5 FMU.

3.2.6 Land and Resource Authorizations

Access to and use of public land and its resources are granted through a variety of authorities, such as lease, license, permit, agreement, or other mechanisms. This occurs under acts such as the *Forests Act, Forest Reserves Act, Public Lands Act, Wildlife Act, Mines and Minerals Act* and the accompanying regulations. Within the C5 FMU, authority may be granted for the following activities:

- timber harvesting;
- livestock grazing;

- trapping;
- commercial ventures;
- surface access (roadways);
- exploration and recovery of oil, gas, coal, coal-bed methane and minerals;
- extraction of surface materials (e.g., sand and gravel);
- extraction of historical resources;
- recreational-based activities (e.g., guiding and outfitting).

These authorities require the holder to assume accountability for meeting the prescribed terms.

Four volume-based quota allocations have been assigned to companies to harvest logs in the C5 FMU. Under the Community Timber Program, coniferous community timber permits, commercial timber permits, local timber permits and forest tags (the TM66 program) are issued to allow for the harvesting of logs, Christmas trees, poles, rails and firewood.

3.3 FOREST MANAGEMENT APPROACH

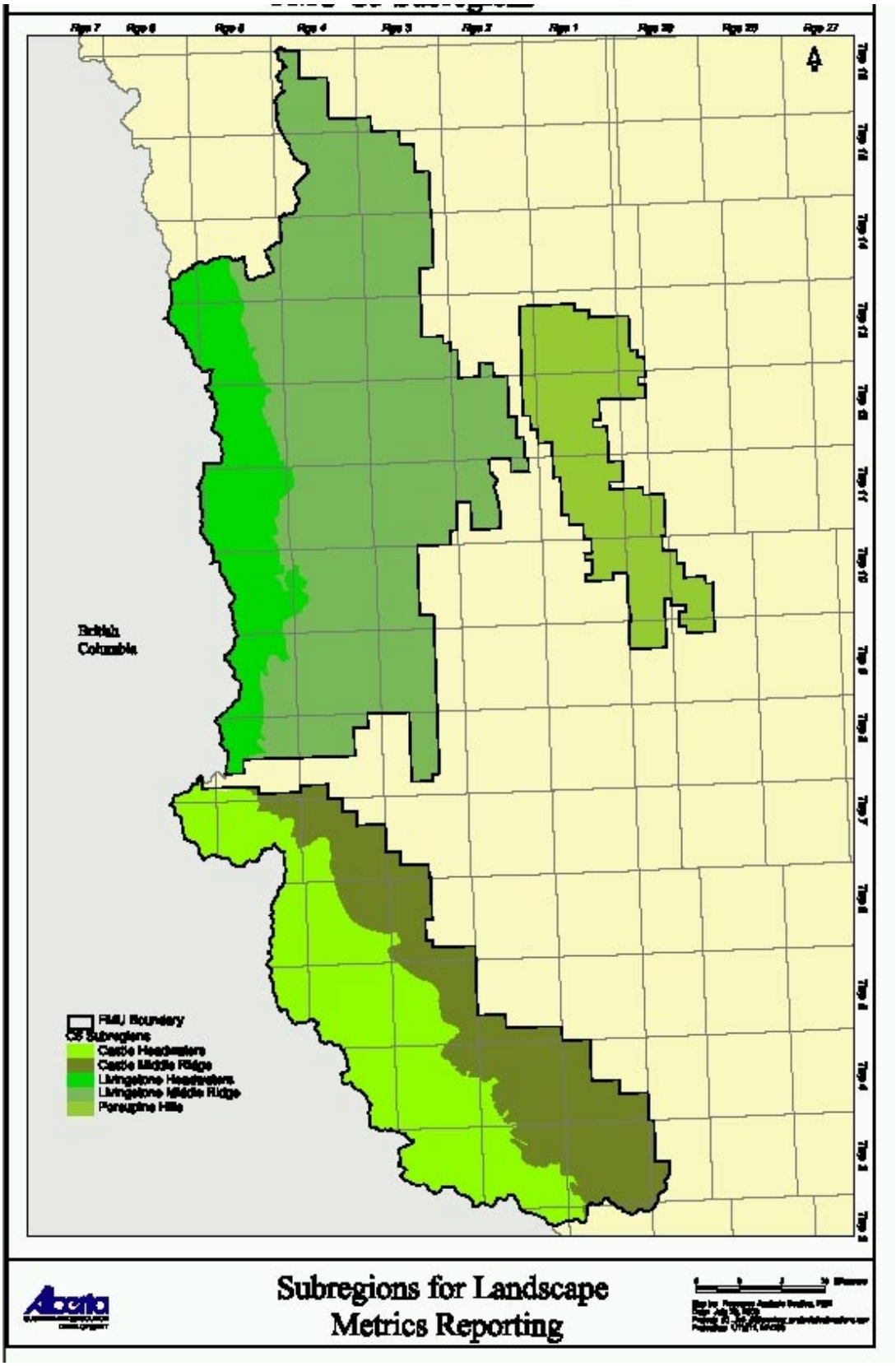
As stated at the outset, sustainable forest management has become the accepted philosophy for managing forests on public land in Alberta and throughout much of Canada. In conjunction with sustainable forest management, other approaches and principles that have been adopted by provincial agencies to promote the sound management of public land and resources will be applied in the C5 forest. The key principles listed below will guide plan implementation and future decision making.

- Ecosystem sustainability.
- Ecosystem based management.
- Precautionary principle.
- Adaptive management.
- Integrated land management (ILM).
- Multiple use.
- Emulation of disturbance regimes.
- Coarse and fine filter management.

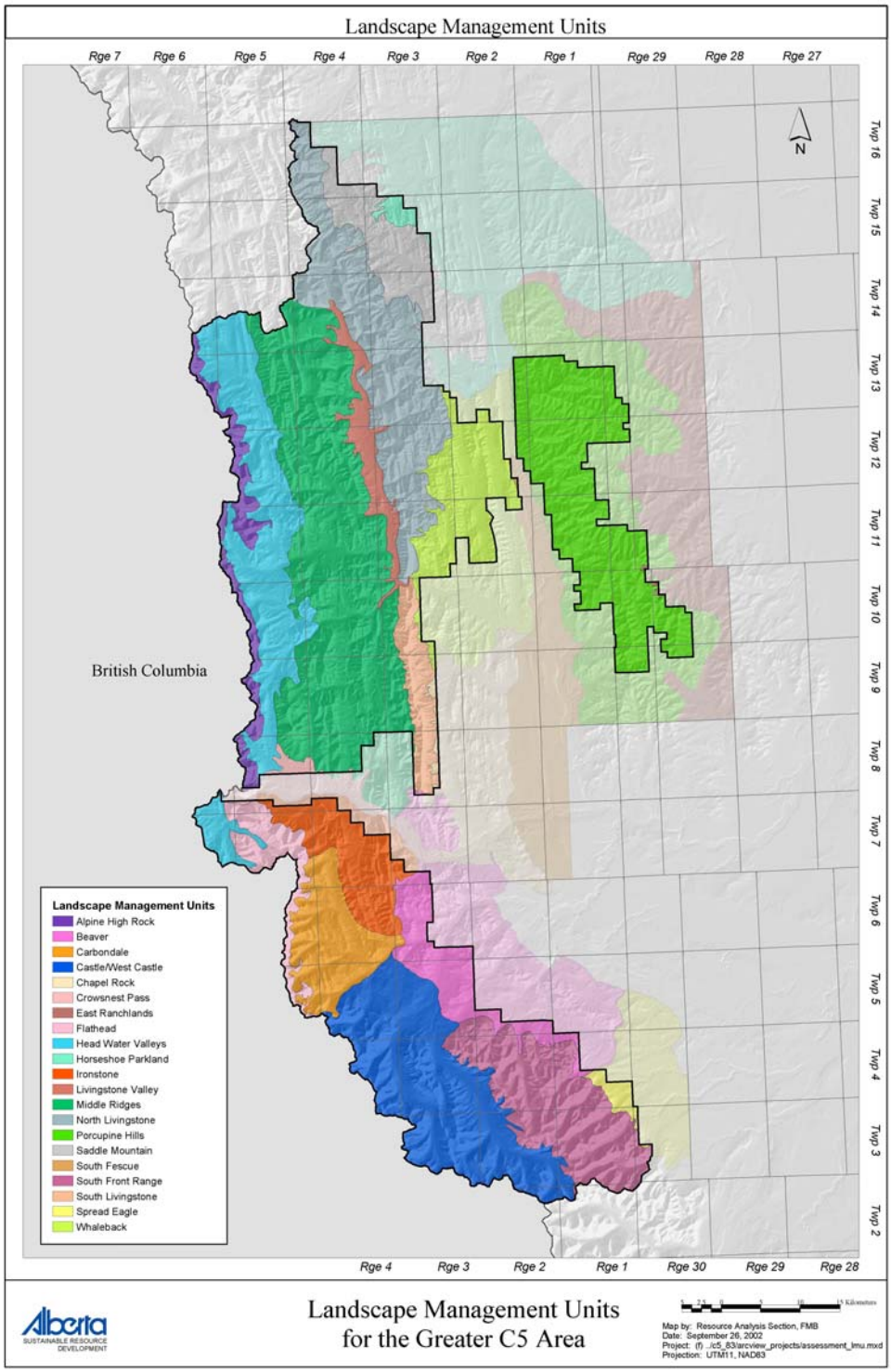
These principles and approaches are defined in the Glossary (Appendix 1).

The C5 forest management unit contains significant bio-physical diversity, both along its north-south and east-west axes. This has necessitated that management units be established at two different scales to allow forest managers to tailor management prescriptions to areas having some degree of similarity and uniformity. Five subregions (Map 3) and 21 landscape management units (Map 4) have been established to facilitate modeling, analysis, stewardship reporting, and application of forest management prescriptions.

Foreground shows log decks along access road and background shows harvest block with standing structure (trees).



Map 3. C5 FMU subregions.



Map 4. C5 forest management unit – landscape management units.

3.4 ACHIEVING A DESIRED FUTURE FOREST

A "desired future forest" refers to a description of the preferred future state/condition of a defined forest area. According to the Alberta Forest Management Science Council (1999), the

> "*Desired Future Forest (DFF) is a spatially explicit projected range of conditions of the forest landscape 100+ years into the future. The range of forest conditions defines the goal towards which forest management will be directed. It is our best guess today on the arrangement of forest age classes, roads and habitats that will provide for a set of objectives and desired outcomes that have been identified for the area*."

A desired future forest has been described in this plan through a series of inter-related statements that include criteria, values, goals, objectives, targets and recommended management actions. Since the C5 forest is a public forest, a public consultation process was used to identify issues, values, objectives and targets.

As stated earlier, the desired future forest for the C5 FMU will be expressed using the Canadian Council of Forest Ministers criteria and indicators framework, will be patterned on the Z809-02 CSA SFM standard to varying degrees, and will follow ASRD's Alberta Forest Management Planning Standard. The CCFM's six major criteria provide the framework for the C5 matrix (Appendix 5) and detailed forest management direction contained in Section 4 of this plan. Definitions are provided in the glossary (Appendix 1).

4.0 DESIRED FUTURE FOREST

The objective for developing sustainable forest management plans in Alberta is to ensure the values Albertans receive from forests and forested landscapes are sustained and enhanced for future generations. Forest management plans are based on the principles of integration and broad public support.

Given the complexity of numerous competing interests in the land and forest resources, the challenge is to reach a balance or compromise between environmental or biological, social, cultural and economic values and establish, where possible, a mutually agreeable solution that will meet long term forest resource management objectives. These objectives try to balance as much as is possible, the maintenance of biodiversity, a healthy forest, fair economic return for use and the maintenance of sustainable communities and employment. To ensure the effectiveness of a forest management plan, an adaptive management approach is to be used to make changes to management objectives and strategies using sound scientific knowledge and best management practices.

The C5 FMU Forest Management Plan was developed in recognition of conflicting values, priorities and uncertainties. The direction contained in the C5 FMP is anchored in the broad environmental, social and economic values outlined in Canada's six national CCFM criteria. The decision-making process used in arriving at the preferred forest management scenario (PFMS) of the timber supply analysis for the C5 FMP involved the prioritization and weighting of the various forest values (i.e., maintenance of forest health, amount and distribution of seral stages [old-growth], timber harvest age and production, FireSmart landscapes, etc.) to reflect sustainable forest management principles and public interests.

Owing to the imminent and potentially high threat of mountain pine beetle epidemic that is devastating pine forests in the neighboring British Columbia Elk Valley, and the evidence of MPB in some areas of the C5 FMU, the planning team decided a proactive/defensive approach was needed over the short term to reduce the potential for MPB infestation.

The planning team determined that maintenance of a viable and healthy C5 forest was a high priority and in the interests of the broader public. This management decision involved an increase in the current AAC for 20 years up to 2026, and the focusing of harvesting primarily on pine stands that are rated high and extreme for MPB to minimize losses from infestation that will likely result. Should epidemic proportions occur, the commercial removal of infected stands will be adjusted to meet the challenge. Harvest level rates will increase and the spatial harvest sequence identified in this plan will be dropped for more aggressive action to control MPB spread and recovery of affected timber.

Since the insurgent populations are increasing but still relatively low at this time, the decision was made to continue with a sustainable forest management plan and a spatial harvest sequence that targets and accelerates the removal of lodgepole pine stands while still meeting other objectives to varying degrees. Over the next 10 years, however, and before the next FMP is due (2016), Alberta will monitor the MPB infestation and implement operational plans accordingly.

In applying an integrated approach, management objectives and assumptions have been incorporated into the timber supply analysis that will provide for the maintenance of ecological diversity and old-growth forests across the C5 FMU. Seral stage targets for the managed landbase will fall within the range of natural variability (based on existing information/data and the informed judgments of specialists). Biodiversity targets will be achieved through the gross landbase at levels acceptable to Alberta in the short term.

Alberta will also support research initiatives that will study fire regimes and biological diversity and old-growth to verify old-growth targets. If the MPB is no longer a threat after 10 years, Alberta will re-assess the C5 Plan. At that time, a new TSA will be conducted where all values, including old-growth seral targets, will be re-assessed.

The following text and data provides some of the details associated with development of the C5 timber supply modeling, the choice of preferred forest management strategy, and the resulting forest harvest sequence.

4.1 C5 FMP VALUES

Personal and community values are a powerful force in shaping human life and conduct. The values that follow provide a basis for developing resource management direction contained within the C5 forest management plan, and will influence future decision-making and plan implementation. A "value" is defined by the Canadian Standards Association as "a defined forest area specific characteristic or quality considered by an interested party to be important" (Canadian Standards Association 2002).

The following values were identified at an early stage of plan development through the C5 public involvement process. Value statements that follow are not listed in order of importance. These "local/regional" values complement national values (widely held societal values) that are expressed in the form of Criteria and Elements in the CCFM's Criteria and Indicators Framework.

4.1.1 Environmental/Ecological Values

- Maintain and, where necessary, restore the integrity and quality of the environment.
- Conserve biological (i.e., ecosystem, species, genetic) diversity.
- Maintain and enhance ecosystem condition, productivity and processes.
- Conserve soil, water, forest and rangeland resources and the wildlife habitat they provide.
- Understand the contributions of local forest ecosystems to global ecological cycles (carbon budget, carbon dioxide conservation, hydrological cycles).
- Protect unique, sensitive, rare and irreplaceable natural features.
- Collect scientific information (through inventories, studies, data, monitoring) about the forest ecosystem and the resource values found in the C5 forest management unit.
- Management actions and operational practices will emulate natural disturbance regimes.

- Emphasis will be placed on managing the C5 forest management unit at a landscape/ecosystem level.

4.1.2 Societal Values

- Social benefits derived from forest ecosystems include:
  - recreational opportunities;
  - wilderness experiences;
  - natural environments for spiritual contemplation and rejuvenation;
  - a destination for leisure time activities;
  - a place to escape and find solitude;
  - nature enjoyment and education.
- Forests are an integral part of our "home place". Healthy forests contribute to our quality of life and well being. Well-managed forests also provide the following:
  - "option" value (the option to visit a forest in the future);
  - "existence" value (satisfaction of knowing forests are being protected);
  - "bequest" value (assurance that future generations will have forested landscapes).
- People whose subsistence and livelihood are dependent on the forest should have an ongoing opportunity to maintain essential interactions with the forest.
- Forest landscapes possess aesthetic qualities; the scenery associated with forested landscapes differs from other natural landscapes (e.g., prairies) and urban, built-up, developed or modified landscapes.
- Well-managed forests are needed to allow researchers/scientists to study the many different facets of naturally functioning ecosystems. Forest ecosystems may hold the secrets, and offer solutions, for tomorrows' society.
- A well-managed forest and a strong, forest-based economy contributes to the future sustainability of communities and the well being of area residents and businesses.
- Decisions affecting public land and resources should be made through public consultation processes.
- Planning and monitoring are important activities in managing the C5 forest management unit.
- Societal benefits derived from the C5 forest management unit are invariably obtained at a cost. Those who derive benefits from the C5 forest management unit must accept the costs associated with managing the forest such that a continuous stream of benefits can be supplied in the future. Users must also assume responsibility for restoring/reclaiming any disturbed areas.
- The resources of the C5 forest management unit should be managed, and its renewable resources conserved, for the benefit of future generations.

4.1.3 Economic Values

- A prosperous and sustainable local/regional economy is dependent on the forest for:
  - timber and wood fiber for forest products and consumer goods;

- forage and rangeland resources for livestock grazing and consumer goods;
- fish/game species and fur-bearers that have economic importance;
- clean water and air;
- natural, aesthetic environments that attract visitors.

- Renewable and non-renewable resource-based industries (e.g., logging, oil/gas, agriculture), and the jobs they provide, contribute to the maintenance of a strong and stable local/regional economy, which in turn contributes to a high standard of living.
- The tourism and recreation industry (e.g., skiing, snowmobiling, off-highway vehicle use, camping, fishing, hunting, hiking, equestrian use, guiding and outfitting, etc.) make a significant contribution to the local and regional economy.
- Well-managed forests provide opportunities for future economic diversification and value-added industries.
- Well-managed aesthetic forests attract visitors whose expenditures on goods and services support the local/regional economy.

Harvest block showing standing live structure (some regeneration) and downed woody debris necessary for survival of many species of insects, wildlife and others.

4.1.4 General Values

A society is dependent on the land and its resources; therefore, its members must be respectful of these valuable public assets. Ensuring the sustainability of the forest ecosystem is everyone's responsibility.

- Users and visitors should act responsibly, assume a sense of ownership, and take pride in the C5 forest management unit (demonstrate appropriate attitudes and behaviors, be informed of potential impacts to the natural environment, and be guided by a stewardship ethic). Education is crucial to inform both visitors and users.
- Compliance checks and enforcement activities should be undertaken to ensure human activities and land uses comply with any approved standards, guidelines or resource management policies that are in place.
- The consequences of land use decisions and management actions should constantly be assessed to determine their effect on the C5 forest management unit (i.e., adaptive management).
- The C5 forest management unit has value to people living outside the region (provincially, nationally and internationally).
- If known, land use thresholds and ecosystem limits will be observed to reduce human impacts.
- All members of society have the right to access and benefit from the C5 forest management unit. This right is contingent on human performance, however—it is a privilege that can be modified or taken away.
- If the C5 landbase and its resources are degraded beyond an acceptable, allowable limit, appropriate actions and remedies will be undertaken to repair, reclaim or re-establish what was damaged or destroyed.

4.2 C5 Matrix

To facilitate development of this forest management plan, the planning team prepared a matrix at the request of CrowPAC, with the assistance of specialists (Appendix 5A). Development of the matrix, which was an intermediate step in the planning process, proved to be a substantial undertaking. The matrix was patterned on CCFM's "criteria" and "indicators" framework, and the Z809-02 CSA SFM standard. It helped to ensure that a structured process was used in proposing objectives, targets, indicators, strategies and monitoring requirements that were in alignment with CCFM criteria and elements, and the "values" identified through the C5 FMP public consultation process. (*Note*: The contents of this document, the *C5 Forest Management Plan 2006–2026* take priority over wording in the matrix.)

After its development, the draft matrix was reviewed by government managers, CrowPAC, quota holders and several public interest groups. Feedback received from these sources resulted in numerous changes to the matrix. The revised matrix provided the basis for developing the Detailed Forest Management Direction section, which is below.

4.3 Detailed Forest Management Direction

This section provides detailed direction for achieving the desired future forest within the C5 FMU. Key terms used in this section of the plan are defined below.

Term	Definition
Acceptable variance	The acceptable variance around a stated target identifies the range of performance results that are deemed to be acceptable outcomes for a given target. (Note: It is recognized that events and activities outside of the mandate and scope of this Forest Management Plan may affect the attainment of listed plan targets; such interactions will be noted as they become evident.)
Current status	Contextual information that provides a summary of challenges, successes, current direction, practices and recent historical events that pertain to the objective.
Element	A concept used to define the scope of each CCFM criterion . . . elements serve to elaborate and specify the scope of their associated criterion. (Canadian Standards Association 2002)
Forecasting assumptions and analytical methods	A summary of how the objective was incorporated into the timber supply analysis used to forecast the desired future forest.
Forest management activity (i.e., strategy)	A coordinated set of actions designed to meet established targets and achieve stated objectives.
Implementation schedule	Outlines the timelines for implementing listed forest management activities.
Indicator	A variable that measures or describes the state or condition of an element or value. (Canadian Standards Association 2002)
Linkages between strategic and operational plans	Describes any linkages between this FMP and existing regional/local strategic or operational plans.
Monitoring procedures	From a forest management perspective, monitoring is the systematic measurement or analysis of change . . . [which] attempts to determine the effects (outcomes) of planned actions to see how well they comply with anticipated outcomes; or the legal requirements, regulations and policies in effect. (Dunster 1996)
Objective	A broad statement describing a desired future state or condition of an element or value. (Canadian Standards Association 2002)
Target	A specific statement describing a desired future state, condition (or level) of an indicator. (Canadian Standards Association 2002)
Value	A defined forest area characteristic, component, or quality considered by an interested party to be important (desirable/worthwhile) in relation to a CSA-SFM element or other locally identified element. (Canadian Standards Association 2002)

The detailed direction that follows is centered on 53 resource management objectives.

Table 6. Forest management objectives for the C5 forest.

FMP Unique Number	Matrix Number*	Objective
1	1.1.1	To maintain the full range of cover groups and seral stages.
2	1.1.2	To minimize landscape fragmentation.
3	1.1.3	To minimize the impacts of motorized access.

FMP Unique Number	Matrix Number*	Objective
4	1.1.4	To retain stand level structural attributes.
5	1.1.5	To retain forest structure associated with wildfire and blowdown events.
6	1.2.1	To maintain habitat quality for species which are dependent on larger landscapes.
7	1.2.2	To retain, create and enhance habitats capable of supporting selected species.
8	1.3.1	To retain a wild forest genetic resources for each species through *in situ* conservation.
9	1.3.2	To retain wild forest genetic resources through *ex situ* conservation.
10	1.3.3	To maintain adequate genetic diversity in seedlots used for reforestation plantings.
11	1.4.1	To adopt forest management practices that maintain the ecological integrity of established protected areas.
12	1.4.2	To retain specific wildlife features.
13	1.4.3	To maintain rare plant communities.
14	2.1.1	To sustain the capacity of the ecosystem to recover from both natural and human-caused disturbances.
15	2.1.2	To minimize losses to human life, communities, soil, watersheds, natural resources and infrastructure from wildfire.
16	2.1.3	To minimize the impacts of pests (i.e., insects and disease) which have the ability to kill healthy trees.
17	2.1.4	To maintain the long-term sustainability of the landbase by managing those forest health agents that can reduce growth, alter form, or kill trees after several years of infection/attack.
18	2.1.5	To prevent the establishment of and control the spread of noxious and restricted weed species.
19	2.1.6	To incorporate new research findings or recommendations, where applicable, into future forest management strategies and practices that are responsive to climatic and environmental factors and large disturbance events.
20	2.1.7	To use prescribed fire for achieving forest protection, forest productivity, forest health and biodiversity objectives.
21	3.1.1	To conserve soil and organic matter, and maintain soil productivity.
22	3.1.2	To minimize soil erosion and slope failure.
23	3.2.1	To ensure that all forest industry practices are conducted in a manner that places a priority on the protection of water quality.
24	3.2.2	To manage forest cover in a manner that places a priority on the conservation and protection of watersheds.
25	4.1.1	To adopt and implement provincial carbon protocols as they are developed.
26	5.1.1	To maintain sustainable timber harvest levels; i.e., timber harvesting shall not exceed the forest's productive (renewal) capacity.

FMP Unique Number	Matrix Number *	Objective
27	5.1.2	To maintain or increase the net forest (commercial timber harvesting) landbase in the C5 FMU.
28	5.1.3	To ensure all harvested areas are re-forested.
29	5.1.4	To achieve optimal utilization of wood fiber during logging operations.
30	5.1.5	To consider visual impacts during the development of harvest plans.
31	5.1.6	To allow the general public and various user groups to benefit from the C5 forest.
32	5.1.7	To provide reasonable access for recreational and industrial purposes while maintaining the ecological integrity of the forest.
33	5.1.8	To promote cooperation between forest harvesting operators and other forest users.
34	5.1.9	To ensure broad participation of disposition holders in forest management decision-making processes.
35	5.1.10	To integrate recreational activities with forest management practices.
36	5.1.11	To integrate rangeland management activities with forest management practices.
37	5.1.12	To integrate trapping with forest management practices.
38	5.1.13	To integrate energy/mineral (exploration and development) activities with forest management practices.
39	5.1.14	To integrate the commercial recreation and tourism sectors with forest management practices.
40	5.2.1	To ensure that local/regional businesses have an opportunity to share in the economic benefits that can be derived from the C5 forest.
41	5.2.2	To maintain the ongoing (long-term) viability of the forest sector by encouraging companies to consider value-added manufacturing and/or improved wood utilization and processing.
42	5.2.3	To provide economic opportunities for forest dependant businesses while maintaining the integrity of the C5 forest ecosystem.
43	6.1.1	"The Government of Alberta is committed to meeting all of its treaty, constitutional and legal obligations respecting the use of public lands." (p. 14) Aboriginal Policy Framework
44	6.2.1	To undertake effective and meaningful consultation with Aboriginal communities.
45	6.3.1	To proactively and meaningfully involve directly affected users and the interested public in forest planning and decision-making processes.
46	6.3.2	To raise public awareness of forest management issues and activities.
47	6.3.3	To be responsive to local and regional input concerning forestry planning and operations.
48	6.3.4	To be responsive to changing social values concerning sustainable forest management.
49	6.4.1	To pursue "active" adaptive management when managing forest resources in the C5 FMU.

FMP Unique Number	Matrix Number*	Objective
50	6.4.2	To remain informed of scientific advances, emerging technologies, and new knowledge in managing our forest ecosystems.
51	6.4.3	To protect historical resources where appropriate.
52	6.4.4	To obtain current information on forest resources.
53	6.4.5	To manage the C5 FMU as part of a larger regional landscape.

** Matrix numbers are based on the numbering scheme that has been applied to "Elements".*

The 53 objectives, when taken together, express the desired outcome of future management actions that will be undertaken during the life of this plan. To help ensure the intended outcomes are achieved, specific measurable targets have been established for each objective. Recommended forest management activities (referred to as strategies in the matrix) and guidelines have also been developed. Their implementation will help ensure progress is being made toward achieving the plan's objectives and targets. Indicators have been identified to allow ASRD and timber disposition holders to assess their performance and effectiveness in attaining intended plan outcomes.

This approach of expressing management direction through objectives, targets, forest management activities and indicators, conforms with conventions used in established sustainable forest management standards. To further increase the usefulness of this section, additional supporting information has been provided for each objective (i.e., monitoring procedures, implementation schedule, forecasting assumptions and analytical methods, linkages between strategic and operation plans).

This section of the plan is further subdivided into six subsections, based on the six broad criteria from the CCFM criteria and indicators framework. Each subsection begins with an overview of the elements, values and objectives that relate to the criterion in question. Detailed information and direction is then provided for each objective that is part of the criterion.

Criterion 1: Conservation of Biodiversity.

Conservation of biodiversity — Conserve biological diversity by maintaining the integrity, function and diversity of living organisms and the complexes of which they are part.

Elements:

1.1 Eco-system diversity — Conserve ecosystem diversity at the landscape level by maintaining the variety of communities and ecosystems that naturally occur in the defined forest area. *(CSA SFM Element 1.1)*

1.2 Species diversity — Conserve species diversity by ensuring that the habitats of native species found in the defined forest area are maintained through time. *(CSA SFM Element 1.2)*

1.3 Genetic diversity — Conserve genetic diversity by maintaining the variation of genes within species. *(CSA SFM Element 1.3)*

1.4 Protected Areas and Sites of Biological Significance — Respect protected areas identified through government processes. Identify sites of special biological significance within the defined forest area and implement management strategies appropriate to their long-term maintenance. *(CSA SFM Element 1.4)*

Values:

Element 1.1

Conserve ecosystem diversity at the landscape level by maintaining the variety of communities and ecosystems that naturally occur in the defined forest area. CSA SFM Element 1.1 represents a coarse filter approach. It will be applied at two spatial scales: at the landscape level (1.1.1 below) and stand level (1.1.2 below).

1.1.1 — Retain a wide spectrum of biodiversity at the landscape level.

1.1.2 — Retain a wide spectrum of biodiversity at the stand level.

Element 1.2

Retain species of special management concern. Species have been selected for biological reasons (i.e., because they have unique habitat requirements; because they are at risk) and for social reasons (i.e., they are socially desirable species). This represents a fine filter approach.

For Element 1.3

Genetic diversity for species will be maintained using a fine filter approach.

For Element 1.4

Trans-boundary effects on designated protected areas will be minimized.

Objectives that relate to Criterion 1 are listed below and are elaborated on in greater detail in the pages that follow.

Table 7. List of objectives for Criterion #1.

FMP Unique Number	Matrix Number*	Objective
1	1.1.1	To maintain the full range of cover groups and seral stages.
2	1.1.2	To minimize landscape fragmentation.
3	1.1.3	To minimize the impacts of motorized access.
4	1.1.4	To retain stand level structural attributes.
5	1.1.5	To retain forest structure associated with wildfire and blowdown events.
6	1.2.1	To maintain habitat quality for species which are dependent on larger landscapes.
7	1.2.2	To retain, create, and enhance habitats capable of supporting selected species.
8	1.3.1	To retain wild forest genetic resource for each species through *in situ* conservation.
9	1.3.2	To retain wild forest genetic resources through *ex situ* conservation.
10	1.3.3	To maintain adequate genetic diversity in seedlots used for reforestation plantings.
11	1.4.1	To adopt forest management practices that maintain the ecological integrity of established protected areas and passive landbase in C5.
12	1.4.2	To retain specific wildlife features.
13	1.4.3	To maintain rare plant communities.

***** *Matrix numbers are based on the numbering scheme that has been applied to "Elements".*

Objective 1	1.1.1 To maintain the full range of cover groups and seral stages.

Current Status	No formal recognition of seral stages was noted in the 1986 C5 Forest Management Plan. The current range of age classes for each seral stage is summarized in the Landscape Assessment (Appendix 4) and in the TSA summary (Appendix 6B).
Indicator	Percentage of regenerating, mature early and late (MEL) old growth and early and late (EL) old growth forest by C5 subregion.
Target and Acceptable Variance	Ecological benchmarks were applied as constraints in the Timber Supply Analysis (TSA) for the PFMS and the resulting seral stage targets have been identified, recognizing the balancing of social, economic and environmental values. Maximum or minimum and average percent occurrence of seral stages over the 200-year planning horizon are presented as targets in Tables 8 and 9 below, and in Appendix 7 supportive tables for the Objective. Acceptable variance is zero, although it is recognized that exceeding these targets for MEL and EL is acceptable.

Table 8. PFMS seral stage target summary and input benchmarks* — net landbase.

C5 Subregions		Seral Stage Percent Occurrence Over 200 Year Planning Horizon*								
		Regenerating Targets		*Ecological Benchmark[1] (Regeneration) TSA Constraint*	Mature, Early and Late Old Growth (MEL) Targets		*Ecological Benchmark[1] (MEL) TSA Constraint*	Early and Late Old Growth (EL) Targets		*Ecological Benchmark[1] (EL) TSA Constraint*
Name	Area (ha)	Maximum	Average		Minimum	Average		Minimum	Average	
Porcupine Hills	18,019	66%	37%	*40%*	13%	35%	*30%*	0%	3%	*9%*
Continental Divide North	16,231	38%	58%	*30%*	22%	39%	*35%*	7%	12%	*15%*
Continental Divide South	19,439	64%	40%	*30%*	17%	35%	*30%*	5%	9%	*13%*
Castle	14,039	57%	38%	*40%*	12%	34%	*35%*	2%	5%	*9%*
Livingstone	46,539	65%	40%	*40%*	15%	70%	*35%*	4%	7%	*9%*

[1]Ecological benchmarks were developed in an exercise that incorporated an analysis of natural disturbance on the C5 landscape, expert knowledge and appropriate literature review. These benchmarks represent one estimate of seral stage cover within the range of natural variation required for maintaining biodiversity values in the C5 Forest Management Unit.

** Ecological benchmarks were applied as TSA constraints and the actual seral stage targets recognized the integration of social, economic and environmental values. The young seral stage is excluded because it is dictated by the regenerating seral stage (see Appendix 6B).*

Table 9. PFMS seral stage target summary and input benchmarks* — gross landbase.

C5 Subregions		Seral Stage Percent Occurrence Over 200 Year Planning Horizon*								
		Regenerating Targets		*Ecological Benchmark[1] (Regeneration) TSA Constraint*	Mature, Early and Late Old Growth (MEL) Targets		*Ecological Benchmark[1] (MEL) TSA Constraint*	Early and Late Old Growth (EL) Targets		*Ecological Benchmark[1] (EL) TSA Constraint*
Name	Area (ha)	Maximum	Average		Minimum	Average		Minimum	Average	
Porcupine Hills	31,555	48%	29%	*N/A*	30%	51%	*30%*	0%	15%	*13%*
Continental Divide North	29,328	35%	25%	*N/A*	45%	59%	*35%*	22%	34%	*23%*
Continental Divide South	38,826	55%	26%	*N/A*	37%	58%	*35%*	14%	33%	*20%*
Castle	29,036	47%	47%	*N/A*	43%	59%	*35%*	6%	29%	*13%*
Livingstone	118,089	36%	22%	*N/A*	34%	62%	*35%*	7%	33%	*13%*

[1]Ecological benchmarks were developed in an exercise that incorporated an analysis of natural disturbance on the C5 landscape, expert knowledge and appropriate literature review. These benchmarks represent one estimate of seral stage cover within the range of natural variation required for maintaining biodiversity values in the C5 Forest Management Unit.

** Ecological benchmarks were applied as TSA constraints and the actual seral stage targets recognized the integration of social, economic and environmental values. The young seral stage is excluded because it is dictated by the regenerating seral stage (see Appendix 6B).*

Forest Management Activities

1. To maintain the species composition found in the forest, all harvested sites should be reforested to reflect the yield strata[1] proportions that existed before harvesting occurred. The original species mix and proportion can be achieved (balanced out) on a landscape management unit (LMU) basis at the end of each quadrant period. More detailed direction for implementing this strategy will be identified in the regional Operating Ground Rules (OGR).

   ([1] By definition, strata that have been adopted for the C5 FMP are as follows: Fa, Fd, Pl , Sx and CD. See "strata" in the Glossary of Terms for a detailed definition.)

2. Alternative harvest sequences will be modeled and analyzed by ASRD, and the preferred sequence (which best satisfies direction contained in this FMP) will be adopted to achieve the seral stage targets that correspond to Objective #1. (These target are subject to change over time.)

3. Timber disposition holders must adhere to the spatial harvest sequence outlined in this FMP, or with any future revisions to the approved spatial harvest sequence that may be adopted by ASRD.

In developing future spatial harvest sequences, the department will consider all relevant First Nations Traditional Use[4] information received (i.e., Traditional Uses as defined in the May 16, 2005 Consultation Policy or in subsequent revisions to the Policy). In the spirit of adaptive management ongoing consideration of existing and any new Traditional Use information received from First Nations will also be considered in General Development Plan (GDPs) reviews regarding proposed timber harvest areas tied to the Spatial Harvest Sequence of this Forest Management Plan.

Spatial Harvest Sequence

The spatial harvest sequence (SHS) is depicted on a map (Appendix 6B) which identifies timber stands that have been selected by Patchworks for harvest within a pre-established time period. Timber disposition holders must follow the SHS to achieve desired future forest conditions. The attainment of the desired future forest, while dependent on many factors, is strongly influenced by harvest patterns, logging intensity, logging schedules identified in this FMP, direction contained in operational plans, and the SHS itself. Adherence to the planned harvest sequence is imperative for achieving the desired future forest.

The following requirements apply:

Spatial Harvest Sequence

i. All operators must follow the 20-year spatial harvest sequence map, as presented in Appendix 6B.

ii. To address operational planning concerns, all timber disposition holders may modify the spatial harvest sequence (SHS) by deleting no more than 20% of the total sequenced area in each compartment, within each decade, while harvesting no more than 100% of the total area within the SHS by compartment, by decade. ASRD will need to approve any SHS deviations presented in Annual Operating Plans submitted to the Department.

[4] *The Government of Alberta's First Nations Consultation Policy on Land Management and Resource Development document , May 16, 2005, states Traditional Uses includes uses of public lands such as burial grounds, gathering sites, and historic or ceremonial locations, and existing constitutionally protected rights to hunt, trap and fish and does not refer to proprietary interests in the land.*

	iii. Preference should be given to selecting stands from the second 10 years of the SHS (years 11 to 20) when replacing deleted stands (from "ii" above). Where this is not feasible, replacements may be made from any other stands identified in the approved net landbase for the C5 FMU. iv. If timber operators exceed the variance described in "ii", the Southern Rockies Area Forest Manager may require the completion of a compartment assessment and the Senior Manager, Forest Planning Section, may recommend the adjustment of the approved AAC to reflect the impact of the variances. v. The Department requires that an analysis of any variance from the approved SHS be submitted annually by timber disposition holders. vi. Future modifications will be identified, either through legislation or policy that has been approved by the Minister of ASRD.
Monitoring Procedures	a) PLFD will document (through quadrant summaries) whether stand harvesting is in conformity with the spatial harvest sequence and TSA model outputs. This information will be presented at 5-year intervals in stewardship reports. Reports will also identify whether harvest sequences were able to maintain targets. b) After 10 years, TSA model outputs will be compared to actual harvested areas to determine whether harvest sequences have achieved the predicted targets. c) The Alberta Regeneration Inventory System (ARIS) tracking system will be used to determine if yield strata proportions are being achieved by timber disposition holders.
Implementation Schedule	a) The Spatial Harvest Sequence presented in this plan will come into effect on May 1, 2006. b) A TSA analysis of success achieved in reaching targets associated with Objective 1 will occur at the midpoint (i.e., year 10) in the life of this plan.
Forecasting Assumptions and Analytical Methods	Ecological benchmarks (as identified in Appendix 6B seral stage) were incorporated into the TSA as a constraint, and weighted according to a balance with other values including economic, social and environmental. Cover groups are addressed in Objective 28, Forest Management Activity #6.
Linkages between Strategic and Operational Plans	Compartment Plans, General Development Plans and Annual Operating Plans shall follow the Spatial Harvest Sequence. Any deviations will be documented in the Annual Operating Plan and summarized in 5-year stewardship reports produced by ASRD.

Objective 2

1.1.2 To minimize landscape fragmentation.

Current Status

Land fragmentation that results from human activity can have adverse effects on wildlife species. Consequently, forest harvest systems need to be adopted that ensure a desirable level of habitat connectivity. Land fragmentation also has an effect on the ecological characteristics of remaining tree stands.

Two-pass harvest systems have been used extensively in several drainages, primarily in the headwater basins (e.g., Dutch Creek, Racehorse Creek and Oldman River watersheds). Although aesthetics may be an immediate concern when using two-pass systems, the net result of patch removals at 20-year harvest intervals can include the re-creation of potentially larger interior spaces that are useful to wildlife if access trails are limited.

Patch size and interior forest areas are identified in the TSA summary (Appendix 6B).

Indicator

a) Area of late post-rotation age class "interior forest" in each cover group.

b) Distribution of patch sizes by seral stage in each C5 subregion.

Target and Acceptable Variance

a) 6.2% of old forest will meet interior forest conditions. For the purposes of this plan, a patch of old forest is assumed to have interior forest conditions if a patch reaches 100 ha in size.

b) Table 10 provides patch size target ranges for the PFMS. Ecologically it is beneficial to have a wide range of harvest patch sizes on the landscape, with some being very large. However, due to social constraints, a maximum harvest patch size of 500 ha for the Middle Ridges Landscape Management Units (LMUs), and 250 ha for all other LMUs in C5, have been identified.

Table 10. PFMS patch size target summary.

Patch Ranges[1]	Middle Ridge LMUs		All Other LMUs	
	Minimum[2]	Maximum[2]	Minimum[2]	Maximum[2]
0–0.5	0	0	0	0
0.5–2	0	2	0	1
2–4	0	3	0	2
4–100	28	70	40	54
100–250	17	32	17	30
250–500	0	38	0	26*
500+	0	32*	0	23*

[1]Patches that contain cumulative cutblock area harvested within a time frame of 0-30 years of each other.

[2]Minimum and maximum percent ranges of harvest area in the last 100 years of the planning horizon.

** Not applicable because of social constraints on the maximum block size of 500 ha (Middle Ridges LMUs) and 250 ha for all other LMUs. This will be administered through the Operating Ground Rules and approval of submitted Annual Operating Plans.*

Forest Management Activities	1. Timber disposition holders must adhere to the spatial harvest sequence outlined in this FMP, or with any future revisions to the approved spatial harvest sequence. They must also ensure maximum harvest patch sizes do not exceed the social benchmarks without acceptable justification. (The Regional Operating Ground Rules will address the maximum block size targets.) 2. The department and/or timber companies will take reasonable steps to ensure that when known First Nation hunting grounds overlap with timber harvesting areas, access trails identified by First Nations (e.g.., with GPS coordinates) will remain clear of logging debris.
Monitoring Procedures	a) The success achieved in meeting the range of harvest block sizes dictated by the spatial harvest sequence (to emulate patch sizes in the TSA model) will be addressed in 5-year stewardship reports. b) Comparison of the actual area of interior forest in relation to interior forest targets identified at year 5 and 10 (Appendix 6B). c) Comparison of the actual harvest sequence in relation to the predicted harvest sequence at year 5. At year 10, assess whether actual patch size targets have been achieved (Appendix 6B).
Implementation Schedule	The Spatial Harvest Sequence will become effective May 1, 2006.
Forecasting Assumptions and Analytical Methods	Age class distributions, over time, by leading species group, by C5 subregion is an output of “Patchworks”. For a detailed review of the Timber Supply for the C5 FMU, see Appendix 6B.
Linkages between Strategic and Operational Plans	Compartment Plans and Annual Operating Plans must conform to the spatial harvest sequence. Comparisons between operational (actual harvested) results and direction provided in the spatial harvest sequence will be summarized in stewardship reports.

Objective 3	1.1.3 To minimize the impacts of motorized access.

Current Status	Scientific research has clearly demonstrated that increased road densities can impact wildlife in a number of ways. In particular, roads will impact wildlife security (animal disturbance and displacement), habitat effectiveness (habitat loss and fragmentation), and wildlife mortality (hunter/poacher access; wildlife-human conflicts). These problems are exacerbated when roads are open to motorized access. Options for reducing the impacts of roads include minimizing the construction of new roads, gating roads, seasonal road closures, road decommissioning, and road reclamation.
Indicator	"Open road" density values.
Target and Acceptable Variance	"Open road" density values for chosen management units (i.e., watersheds, C5 subregions, LMUs, or priority areas) within the C5 FMU.
Forest Management Activities	1. Using a GIS, map the location of all existing roads and trails within the C5 FMU. 2. For each chosen management unit, calculate current (existing) road densities for each of the following: • industrial roads – open • industrial roads – closed • industrial roads – temporary • recreational motorized access trails – highway vehicles • recreational motorized access trails – OHVs • other linear disturbances (seismic lines, reclaimed roads, etc.). 3. Identify the need for and location of proposed new forestry roads within chosen management units (i.e., watersheds, C5 subregions, LMUs, or priority areas) as part of ASRD's access development plan initiative. 4. Encourage the involvement of other industries and user groups in the development of the access development plan (which will be used in land management referral processes), resulting in the preparation of a comprehensive and coordinated access strategy for each landscape management unit. 5. Establish road density targets for individual landscape management units based on industry needs (existing and future), motorized recreational objectives, and wildlife management needs/objectives (e.g., Grizzly Bear recovery plan). 6. Access management strategies (recreational and/or industrial) are to be consistent with road density targets and direction provided in the access development plan. 7. The department and/or timber companies will take into account available First Nation Traditional Use information, particularly that which relates to hunting, fishing, and trapping for food when the Ministry initiates access development

	and access controls and if there are identified potentially adverse impacts, SRD will consult or direct timber companies to consult with relevant First Nations. Consultation will be done at the General Development Plan (GDP) level. 8. Consider the use of legislative/regulative instructions to restrict public use of industry roads in the FMU.
Monitoring Procedures	See Objective 32: Criterion 5.
Implementation Schedule	See Objective 32: Criterion 5.
Forecasting Assumptions and Analytical Methods	See Objective 32: Criterion 5.
Linkages between Strategic and Operational Plans	See Objective 32: Criterion 5.

Objective 4	1.1.4 To retain stand level structural attributes.

Current Status

The 1986 FMP focused primarily on timber management, addressing forest biodiversity concerns only in an indirect manner. Throughout the 1980s and 90s, timber companies were harvesting very old timber age classes that often contained large amounts of dead and un-useable stems.

During this period, debris disposal became a major challenge. The idea of leaving standing stems throughout a clearcut was a foreign concept at the time, and was considered a hindrance to silviculture treatments that were intended to promote reforestation. The need to leave standing trees in cutblocks emerged as the knowledge of species habitat requirements improved.

Indicator

a) Volume of merchantable standing trees remaining on site, representative of the sizes and species present in a stand.

b) Amount of coarse, downed woody debris, standing topped trees, and snags.

Target and Acceptable Variance

a) 0% – 5% of the merchantable volume of standing trees shall be left standing within cutblocks (with an average of 3% or greater across assigned quota holder compartments).

b) Following timber harvesting, downed woody debris >7.5 cm in diameter, or standing topped trees >7.5 cm DBH, and existing snags shall be retained at levels similar to the assessed preharvest stand level.

Forest Management Activities

1. Regional OGRs shall contain the structure retention guidelines found in Appendix 7, and structure retention shall favour:
   - tree clump retention over single tree retention;
   - greater retention in larger blocks (20-500 ha in size);
   - lesser retention in small blocks (<20 ha in size).
2. In pine leading types throughout the C5 FMU, and particularly in the Crowsnest Pass corridor where excessive wind is a concern, forest companies are required to apply the following stand retention guidelines when harvesting:
   - retain all Douglas fir found as single trees or as clumps;
   - retain all spruce where sheltered or protected in clumps by other species. Remove those merchantable spruce stems standing >9 metres in height that are not found within protected clumps;
   - retain all deciduous stems for whitebark pine, limber pine, alpine fir, alpine larch or any other species found.

   It is recognized that some harvest of the above species may be required for access development and trails.
3. In large (i.e., 100-500 ha) scheduled harvest patches, the operational design of large merchantable retained patches, which will subsequently be removed after green-up in the initial harvest area, shall be encouraged.

4. Maintain existing snags at pre-harvest levels, or supplement them with topped trees >7.5 cm diameter base height.
5. During the preliminary harvest planning stage, the amount of structure that is to be retained shall be determined based on cutblock size, cutblock shape, and existing landscape character.
6. Timber disposition holders will educate equipment operators on the need for and benefits of structure retention, and ensure equipment operators are trained in harvesting practices that need to be used (e.g., selecting healthy trees for retention and harvesting unhealthy trees) for retaining structural attributes during and following timber harvesting.
7. For target "a", feasible assessment techniques will be developed in conjunction with timber disposition holders to determine the volume of standing trees. Stand retention measuring methods are identified in Appendix 7.
8. For target "b", timber disposition holders will complete assessments of coarse, downed woody debris remaining on site after timber harvesting to determine whether a correspondence has been achieved with debris levels found in adjacent stands. ASRD staff will complete periodic inspections (as part of the normal inspection process) to confirm levels of coarse woody debris retained on cutblocks following timber harvesting. CWD methodology is found in Appendix 7.
9. Timber operators must adhere to the Forest Prairie Protection Regulation Part II and the Forests Act. Additionally, operators are to ensure that downed woody debris is suitably scattered and distributed across any cutblock that falls within the 10 km zone of communities, and that debris and structure requirements to meet wildlife objectives are satisfied as identified in policy directive Debris Management Standards For Logging Operations Policy (effective Nov. 1, 2004) or its successor.
10. Retention targets for the CTP program will follow the regional OGRs. ASRD shall identify targets and educate CTP operators of the requirements for leaving standing live structure.

Monitoring Procedures

a) Timber disposition holders are to account for structure retention following harvesting. This will be conveyed in self-reporting forms.

b) Periodic inspections carried out by PLFD staff will include an assessment of structure retention/debris found on cutblocks.

c) Five-year stewardship reports will document success in attaining structure retention targets for standing trees and downed, coarse woody debris. (Note: ASRD shall lead development of an effective and acceptable means of measuring, tracking, and reporting on structure retention.)

Implementation Schedule

a) Harvest operations that commence on or after May 1, 2006, will be required to leave stand structure in variable amounts, as identified in this section.

b) ASRD, working with forest companies will test two survey methods to measure standing residual structure for single tree retention and a photo interpretation method for tree clumps by May 1, 2007.

Forecasting Assumptions and Analytical Methods	While completing the TSA, a reduction of 3% was imposed on the sustainable maximum AAC to account for merchantable standing live stems in harvest blocks.
Linkages between Strategic and Operational Plans	Forest companies will be required to assess standing and dead structure after site preparation is complete. This constitutes a new requirement. Results will be captured in Silvicultural Reports or annual operating plans. ASRD shall then summarize results in stewardship reports at the end of the first 5-year quadrant period. Discrepancies in the actual verses forecasted structure will be noted and corrected during the second quadrant period. At year 3 in the second 5-year quadrant period, an interim summary (i.e., representing 8 years of structural retention) will be completed. The resulting analysis will be factored into the 2016 TSA, wherein a structural retention volume will be established for the next 10-year period based on performance statistics obtained during the first 8-year period.

Stand structure in a harvest block.

Objective 5	1.1.5 To retain forest structure associated with wildfire and blowdown events.

Current Status	Historically, ASRD has followed the practice of salvaging (i.e., harvesting) all environmentally sound and merchantable tree stands following a wildfire or other natural disturbance event. ASRD developed a Fire Salvage Strategy framework in 2002 that provides guidelines for fire salvage allocation, planning, operations, annual allowable cuts, reforestation and production control. Policy directives such as *Directive 98-03 Quota Production Chargeability* address fire-killed and insect-damaged timber.
Indicator	a) Area of naturally disturbed forest left unsalvaged. b) Volume or area of blowdown left unsalvaged.
Target and Acceptable Variance	a) Fire salvage targets are identified in the current Fire Salvage Strategy: Forest Management Planning and Operations. b) Within each subregion, >20% of the merchantable blowdown volume or area, for blowdown events exceeding 10 ha in size, will be retained on site.
Forest Management Activities	1. Direction contained in the provincial *Fire Salvage Strategy: Forest Management Planning and Operations*, (or its successor) will be followed. 2. The timing of salvage operations to recover blowdown trees will be subject to forest health (insects/disease) considerations. 3. Stands that are "under-burnt" following a low-intensity fire will be assessed. If it is determined that stem mortality is greater than 30% in tree stands, those stands will be sequenced for salvage.
Monitoring Procedures	Post-harvest assessments to confirm structure retention will be completed by timber disposition holders for all areas salvaged.
Implementation Schedule	Direction outlined in this section is already being implemented; however, the method to confirm structural retention will be the same as that used for calculating standing live structure (this methodology is identified in Appendix 7 and will be confirmed through trials by May 2008).
Forecasting Assumptions and Analytical Methods	Not applicable.

Linkages between Strategic and Operational Plans	Fire events have the potential to change the harvest activities of forest companies on short notice, diverting them from following the approved spatial harvest sequence to pursuing salvage operations. Fires of sufficient size will affect the net landbase determination process for the next timber supply cycle, and can trigger a recalculation of the timber supply if the burned area is large (see Objective #26, FM Activity #4).

Objective 6

1.2.1 To maintain habitat quality for species that are dependent on larger landscapes.

Current Status

Fine filter species management, as it relates to timber management and supply, was not an explicit factor in the 1986 FMP.

Some linear human disturbances (e.g., roads) may reduce the free movement of wildlife. Recent studies of grizzly bear genetics suggests the isolation of bear populations due to human disturbances has reduced gene flow between adjacent populations, particularly in the Crowsnest Pass where Highway 3 acts as a barrier restricting the north–south movement of bears.

Landscape fragmentation can threaten the maintenance of large carnivore populations (e.g., grizzly bear, black bear, wolverine, wolf, mountain lion). Key habitat patches for large carnivores have been identified through a modeling process that focuses on grizzly bears. Wildlife corridors that connect these patches have also been identified.

Elk is another high profile species in the C5 forest. Elk are appreciated both for their intrinsic value and for consumptive purposes. Elk summer and winter ranges and migratory corridors are found throughout the C5 FMU. Elk populations within the FMU were considered to be stable in 2006. Recent forest fires within the C5 forest should increase the habitat quality for elk, as vegetation succession favors this species.

Grizzly bear on access road.

Indicator	a) Open motorized road density. b) High and medium-high quality habitat for large carnivores (as defined in SHARP grizzly bear HSI model, Blouin et al. 2004). c) Average mortality risk within each watershed (as data become available). d) Average RSF value for each watershed (as data become available). e) Number of elk calving/wintering in C5 area.
Target and Acceptable Variance	a) Road density thresholds may be determined following provincial direction from the Grizzly Bear Recovery Plan (when released by ASRD). b) Maintain or increase the current average HSI value of high and high-medium quality large carnivore habitat in each watershed. c) Maintain or decrease the mortality risk for grizzly bears as determined through modeling for each watershed (when data become available). d) Maintain or increase the average RSF value for each watershed (when data become available). e) Maintain or increase current number of elk calving/wintering in the C5 area.
Forest Management Activity	1. An updated HSI model depicting large carnivore habitat will be prepared at 10-year intervals, or when new information becomes available from Fish and Wildlife Division (in 2006 and prior to the next TSA and spatial harvest sequence revision slated for 2015-2016). 2. Winter elk surveys will be completed at bi-annual intervals to estimate the number of elk using the C5 landscape. 3. In areas identified as having high habitat and conservation values for grizzly bears, access restrictions and controls shall be considered to help meet conservation objectives. 4. The department acknowledges the importance, in general terms, of habitat quality for species that are dependant on larger landscapes and the relation between some of these species and known First Nations' Traditional Uses of the C5 forest. Therefore, the department and/or timber companies will consider all relevant information made available from Traditional Use Studies and First Nation Traditional Environmental Knowledge when the Ministry is planning and implementing the Forest Management Activities under this objective. 5. ASRD shall calculate an average HSI value for high and high-medium quality grizzly bear habitat, as identified in the model described in Blouin et al. 2004. 6. When adopted by ASRD, Alberta's grizzly bear recovery plan will guide future timber harvest planning and logging activities in the C5 FMU. • Several action plans will be developed as part of the grizzly bear recovery strategy, including an action plan for SW Alberta. • PLFD staff are expected to participate in the development of the action plan for SW Alberta. • Modeling tools made available through the Foothills Model Forest Grizzly Bear Research Program will be used to assess mortality risk and probability of grizzly bear occurrence by watershed.

7. An elk habitat map has been developed for the initial (2005) timber supply analysis (TSA) and spatial harvesting sequence. The elk model/map contained in the Southern Rockies Landscape Planning Pilot Study: Summary Report — which shows the location of elk nursery areas, winter habitat and migration areas used in the 2005-06 TSA calculation — will be updated (and expanded south of Hwy. 3) by FWD staff in consultation with PLFD staff, and incorporated in the next TSA and spatial harvest sequence iteration slated for 2015-2016.
8. Beneficial management practices for elk and grizzly bears will be identified in regional OGRs.
9. ASRD Final Harvest Plan (FHP) checklist shall indicate that elk and grizzly bear habitat maps must be consulted when changes to the spatial harvest pattern (derived through the TSA) are being considered.
10. Operational timing restrictions that pertain to ungulate winter range shall be identified in the regional OGRs and observed.
11. Timber harvesting shall be managed to provide hiding cover for wildlife and facilitate wildlife movement. Regional OGRs will specify silvicultural and access road requirements that need to be observed to maintain the effectiveness of wildlife movement corridors as identified below:
    - In a West Castle Wildlife corridor along a portion of the east side of the West Castle Road 774, as identified in Appendix 7.
    - Within a strip 1,600 m (1 legal mile) in width bordering the Rocky Mountain Forest Reserve boundary within the Crowsnest Corridor.
    - Along the Highway 22 corridor—where the highway bisects the Rocky Mountain Forest Reserve.
12. The West Castle Wildlife corridor will be recognized with a consultative notation in the land use management system used in disposition processing for the province.

Monitoring Procedures	Monitoring activity is in progress, and may be directed at bear population changes, effect of highways as barriers to movement of bears, and the effects of modified timber management practices on the 1 mile buffer.
Implementation Schedule	ASRD has a process in place leading to the development of a provincial Grizzly Bear recovery plan and associated area-specific action plans.

Bull elk in the high country.

Forecasting Assumptions and Analytical Methods

An elk habitat map was incorporated in the TSA process (Appendix 6A).

The following process was used in arriving at the final spatial harvest sequence:

- The spatial harvest pattern, identified through the Patchworks program, was compared against a number of fine filter species habitat suitability (HSI) maps and several non-species theme maps, including the following:
  - Harlequin Duck habitat suitability
  - Pileated Woodpecker habitat suitability
  - Clark's Nutcracker habitat suitability
  - Whitebark pine/limber pine
  - Wolverine habitat suitability
  - Grizzly bear habitat suitability
  - Known elk theme from the Southern Rockies Landscape Planning Project
  - Elk theme — large opening timber complexes and habitat areas
  - Proposed inter-regional wildlife movement corridors of the greater C5 area
  - Mountain pine beetle hazard rating to 2020
  - C5 Visual Resource Inventory
  - FireSmart landscapes
  - Planning for the 10 km zone around Municipality of Crowsnest Pass.
- Changes to the proposed Patchworks harvest pattern were made to address identified concerns.

- The timber supply analysis model was then run and further comparisons were made.
- After a number of such iterations, the final AAC and spatial harvest pattern were established.

Linkages between Strategic and Operational Plans	Proposed deviations of greater than 5% of the area of a block, or additions of harvest types from the approved spatial harvest sequence that fall within highly suitable habitats, will be reviewed in light of the intent of the fine filter species maps and any new information that is acquired on species of management concern. Fish and Wildlife Division review of any proposed operating changes will be required. Monitoring of deviations will be recorded and reported in AOPs and stewardship reports.

Objective 7

1.2.2 To retain, create and enhance habitats capable of supporting selected species.

Current Status

The famous Burmis Tree was a limber pine.

The Southern Headwaters At Risk Project (SHARP) project of Alberta Fish and Wildlife identified several species of management concern for southwestern Alberta. A number of the chosen SHARP species occupy habitats outside the C5 FMU. Several species are located within or are on the periphery of the FMU, and thus are singled out for special attention in this plan. Appendix 7 identifies the federal (national) and provincial status of various wildlife species found within and adjacent to the C5 FMU.

Two tree species in the FMU are being threatened. In recent years, white pine blister rust has been adversely affecting (even killing) whitebark and limber pine in the C5 FMU.

Douglas fir stands require exposure to fires as part of the tree species life cycle and to remain healthy. Large, older-aged Douglas fir trees that exist on the landscape, particularly in the Porcupine Hills, are valued because of their size, stature and character.

Limber Pine shown in left photo. Whitebark Pine cones shown in right photo. These cones mature in August of each year.

Indicator

Pileated Woodpecker

a) Location and extent of high-quality habitat for the following SHARP project species:
   - Wolverine
   - Harlequin Duck
   - Long-toed salamander
   - Western toad
   - Pileated Woodpecker
   - Clark's Nutcracker.

b) Exclusion from harvest of select tree species.

c) Number of low density Douglas fir ("A" and "B") stands that have been burned.

Harlequin Ducks (photo courtesy of Sam Wirzba).

Target and Acceptable Variance

a) Maintain or increase the current area of high and medium-high quality habitat for the following species:
   - Wolverine
   - Harlequin Duck
   - Long-toed salamander
   - Western toad
   - Pileated Woodpecker
   - Clark's Nutcracker.

b) No harvest of:
   - whitebark pine
   - limber pine
   - "A" (very open) and "B" density Douglas fir stands (in the Porcupine Hills) which lack a coniferous understory.

c) Two prescribed burns shall be completed in the Porcupine Hills.

d) 100% retention of known long-toed salamander and western toad production ponds and adjacent terrestrial habitat used by long-toed salamanders and western toads.

Forest Management Activities

1. Southern Headwaters At Risk Project species HSI maps will be consulted when reviewing spatial harvest sequence outputs. Where the proposed spatial harvest sequence may adversely affect any listed SHARP species, as indicated by an HSI map or other wildlife inventory information, the spatial harvest pattern will be adjusted to minimize impacts to SHARP species.

2. Updated maps depicting high and medium-high quality habitat for SHARP species will be prepared at 10-year intervals by FWD (i.e., prior to the next TSA and spatial harvest sequence iteration slated for 2015-2016).

3. The department and/or timber companies will consult on GDPs and proposed Prescribed Burn Plans with relevant First Nations (based on a pre-consultation Assessment) for the purpose of receiving Traditional Use and

Traditional Environmental Knowledge information for consideration in finalizing their plans or in its implementation (whichever is appropriate). ASRD and/or timber companies will give consideration to any subject species (plants and/or animals) and take steps to reasonably minimize impacts to rare plant communities that are also used by First Nations. It is acknowledged that some plant species availability and location may change with seasonal conditions, natural and human caused disturbances, or vegetation succession.

4. All whitebark and limber pine trees will be retained as live standing structures in harvest blocks where they form a minor component of a stand. The retention of these and other large diameter stems is a necessity for Clark's Nutcracker. Whitebark and limber pine leading stands have been deleted from the net landbase.

5. Beneficial management practices for SHARP species will be included in regional OGRs.

6. Subjective deletions from the net forest landbase will occur for stands in which the following species are primary and secondary:
   - whitebark pine
   - limber pine
   - western larch
   - "A" (very open) and "B" density Douglas fir stands (in the Porcupine Hills) which lack a coniferous understory.

7. To retain forest structure, whitebark pine and limber pine trees will not be cut where they are found to be a minor component of forest stands. Tree removals will be allowed where they coincide with an unavoidable road alignment. As well, whitebark and limber pine or other trees infested with mountain pine beetle will be cut.

8. All large, veteran "wolf" (turkey) Douglas fir trees that occur within scheduled stands will not be cut except when they occur on an unavoidable road alignment.

9. Prescribed fire shall be considered as a management tool to promote "A" and "B" density Douglas fir stands.

10. ASRD is developing, and will adopt, a strategy to ensure the recruitment of minor tree species (e.g., whitebark and limber pine)

11. Timber disposition holders will need to ensure that equipment operators are able to identify tree species that are to be retained.

12. Forest users will be encouraged to report to PLFD the locations of individual trees or tree stands containing:
   - ponderosa pine
   - western red cedar
   - scotch pine

   This information will be recorded in a spatial database.

13. ASRD (Forest Management Branch), Alberta Community Development, Canadian Forest Service, Parks Canada, United States Department of Agriculture, and academia are working together to develop a common strategy to manage dwindling numbers of whitebark and limber pine trees due to white pine blister rust and mountain pine beetle infestations. Any action recommendations arising from this multi-stakeholder initiative will be

	considered by ASRD and timber disposition holders. 14. Forest Protection Division, in conjunction with PLFD, will consider undertaking low-intensity burns in Douglas fir stands. 15. FWD will provide detailed information on the location of long-toed salamander and western toad production ponds. Location information will be updated by FWD at a minimum of 10-year intervals (i.e., prior to the next TSA and spatial harvest sequence iteration that is slated for 2015-2016). 16. Regional OGRs will provide detailed direction on the retention of known long-toed salamander and western toad production ponds and adjacent terrestrial habitat.
Monitoring Procedures	a) FWD will pursue validation of SHARP species habitat models (through species monitoring). Comparisons of current values of high and medium-high quality habitat will be done with future (10-year) values. b) ASRD shall confirm if timber disposition holders are adhering to beneficial management practices. c) Timber disposition holders will report whether selected tree species have been harvested. d) FWD will provide updates on the status of SHARP species that are found in the C5 FMU.
Implementation Schedule	a) Whitebark and limber pine strategies and protection processes are in place and evolving. b) Beneficial management practices for SHARP species will be identified in regional OGRs. c) Training for harvesting crews will be encouraged for early summer 2006. d) Low-intensity burn plans will be developed by May 2007. The timing for prescribed burns will be depend on burning, weather patterns, site conditions, fire hazard and other relevant factors.
Forecasting Assumptions and Analytical Methods	Subjective deletions were introduced to protect whitebark pine, limber pine and some Douglas fir stand types when establishing the net productive landbase for the C5 FMU (Appendix 6A).
Linkages between Strategic and Operational Plans	Timber operators will adhere to the spatial harvest sequence. Whitebark pine and limber pine will be excluded from all harvest plans where they are the leading species in tree stands. As well, where these species are encountered as a minor component of a scheduled stand, they will be left standing and intact to provide structure and to provide a seed source (resulting in the recruitment of young seedlings).

Objective 8

1.3.1 Retain wild forest genetic resources for each species through *in situ* conservation.

Current Status

The high biodiversity levels found in southwestern Alberta make the C5 FMU important for its unique ecosystems, plant communities and tree species.

In 1975, a forest genetics and tree improvement program was started in Alberta by the provincial government in cooperation with the forest industry.

A province-wide program exists for the conservation of representative wild forest gene resources of native tree species for each provincial Natural Subregion.

The Alberta Forest Genetic Resources Council was established in 2000 to provide needed direction in maintaining Alberta's forest genetic resources.

Indicator

Number and area of *in situ* gene conservation areas for selected tree species.

Target and Acceptable Variance

a) *In situ* gene conservation areas — consisting of >5000 trees (at rotation) surrounded by a ≥500 m protection buffer — will be established for each selected tree species in the following Natural Subregions:
   - Montane
   - Sub-alpine
   - Foothills–Parkland

b) Gene conservation areas will be developed for the following tree species:
   - lodgepole pine
   - white spruce
   - alpine fir
   - douglas fir
   - limber pine
   - whitebark pine
   - western larch
   - alpine larch

Forest Management Activities

1. Genetic resources must be managed in accordance with provincial policies (as recommended by the Alberta Forest Genetic Resources Council) and direction contained in *Standards for Tree Improvement in Alberta*.
2. Protective notations shall be applied to all *in situ* gene conservation areas.
3. Permanent genetic conservation areas shall be identified by the Forest Management Branch in accordance with the provincial gene conservation plan.
4. An *in situ* genetic conservation area management plan shall identify how genetic conservation areas will be maintained and monitored for forest ecosystem dynamics (i.e., insect and disease events, fire, stand decadence).
5. Seed zones should be finalized in 2005. It will take another 2-4 years to

	establish the locations for *in situ* conservation areas. 6. To the extent possible, *in situ* conservation areas will be established in designated protected areas, with the agreement of Alberta Community Development (ACD) and ASRD managers. 7. Selected tree species will have conservation areas only in ecologically appropriate seed zones. 8. Size requirements for conservation areas may need to be modified for limber pine, whitebark pine, Douglas fir, western larch and alpine fir.
Monitoring Procedures	ASRD shall report on the status of all gene conservation areas at 5-year intervals in stewardship reports.
Implementation Schedule	a) *In situ* conservation areas will be phased in over a 2-4 year period starting in 2007. b) *In situ* conservation efforts will be overseen by the Alberta Forest Genetic Resources Council with assistance from the Alberta Tree Improvement and Seed Centre and by Genetics and Forest Improvement Branch within ASRD.
Forecasting Assumptions and Analytical Methods	Whitebark and limber pine have been excluded from the net productive landbase. Wherever these species are found in stands that are scheduled for harvest in the spatial harvest sequence, they will be retained as living, standing trees (and thus can contribute to the 3% stand structure requirements that are outlined in this plan).
Linkages between Strategic and Operational Plans	The C5 FMP will comply with direction contained in *Standards for Tree Improvement in Alberta*. A newly established seed zone map has been developed for the C5 forest and will be used.

Objective 9	1.3.2 Retain wild forest genetic resources through *ex situ* conservation.

Current Status	*Ex situ* provenance and genetic lines are being maintained at arms length for some species within the C5 FMU. Seeds were harvested from representative limber pine and whitebark pine trees in 2003 and 2004. Seed collection for these species will continue in the future.
Indicator	Number of provenances and genetic lines in *ex situ* gene banks and trials for Douglas fir, western larch, limber pine and whitebark pine.
Target and Acceptable Variance	The number of provenances and/or genetic lines in *ex situ* gene banks must exceed: • 60 for Douglas fir • 30 for western larch • 50 for limber pine • 30 for whitebark pine.
Forest Management Activities	1. Seed and/or vegetative material collections shall be made from the target species and maintained in gene banks by ASRD. 2. Field trial(s) established with the collected materials shall be documented and maintained. 3. Provisionally, provenances shall be separated by 15 km with 100 m of elevation compensating for 3 km of horizontal distance, unless otherwise agreed by SRD.
Monitoring Procedures	ASRD shall report on the status of *ex situ* conservation at five-year intervals in stewardship reports.
Implementation Schedule	*Ex situ* conservation efforts will be overseen by the Alberta Forest Genetic Resources Council with assistance from the Alberta Tree Improvement and Seed Centre and by Genetics and Forest Improvement Branch within ASRD.
Forecasting Assumptions and Analytical Methods	Not applicable.
Linkages between Strategic and Operational Plans	The C5 FMP will comply with direction contained in *Standards for Tree Improvement in Alberta.*

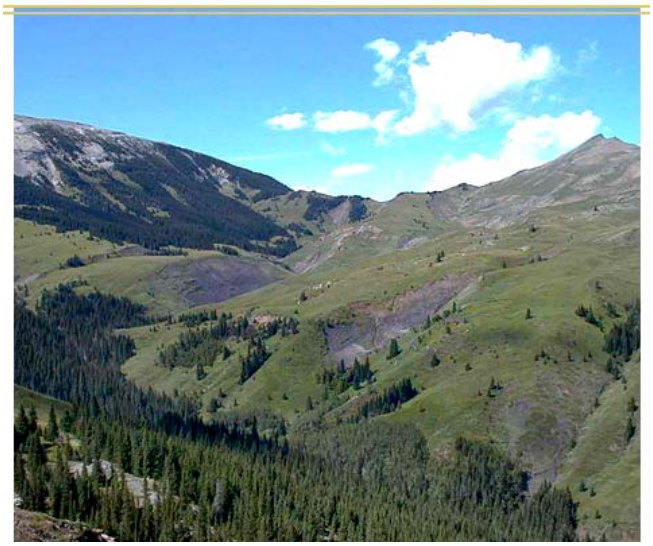
Objective 10	1.3.3 To maintain adequate genetic diversity in seedlots used for reforestation plantings.

Current Status	The genetic diversity of seedlots is determined by the number of parent trees that are represented in a seedlot collection (as identified in the seed registration maintained by ASRD) as of May 1, 2003.
Indicator	Number of unrelated parent trees represented in the seedlots used for reforestation.
Target and Acceptable Variance	Reforestation will be from seedlots collected from a minimum of 30 trees for wild stand collections, or seedlots maintaining an effective population size of greater than 18 unrelated parents in case of seed orchard seedlots, unless approved by ASRD for planting with "restricted registration stock".
Forest Management Activities	1. ASRD shall review registered reforestation seedlots and provide information on the genetic diversity level of these seedlots. 2. Genetic diversity information shall be included in documentation of reforestation seedlots. 3. Reforestation stock shall comply with genetic diversity guidelines established by ASRD.
Monitoring Procedures	a) ASRD shall report on the progress being made in retaining genetic diversity for native tree species at 5-year intervals in stewardship reports. b) Seed withdrawals for reforestation stock production will be monitored by ASRD for compliance with seedlot genetic diversity requirements.
Implementation Schedule	2005.
Forecasting Assumptions and Analytical Methods	Not applicable.
Linkages between Strategic and Operational Plans	The C5 FMP will comply with direction contained in *Standards for Tree Improvement in Alberta.*

Objective 11	1.4.1 To adopt forest management practices that maintain the ecological integrity of established protected areas and the passive landbase in C5.

Current Status	Seven protected areas, designated through provincial legislation, are found within the C5 FMU (see section 3.2.2 and Target "a" which follows). Waterton Lakes National Park borders the FMU on its southern boundary. The management of parks and protected areas within the FMU falls under the mandate of Alberta Community Development. Management plans have been developed for several of the protected areas listed in this section. Much of the vegetative cover and ecological processes within the greater C5 management unit was developed and maintained through natural and anthropogenic disturbances. These disturbances not only became the origin of the stand or forest cover (stand replacement fire), but also shaped the stand structure and its capabilities to withstand fire under more severe burning conditions (frequent, low-intensity fire that removed fuel build-up, as well as thinning, pruning, or other changes to the structure of the stand). Landscape coordination between PLFD and those agencies responsible for protected areas is necessary to ensure the management intents of one party are not adversely impacting the management goals of the other parties.
Indicator	Coordination agreements in place.
Target and Acceptable Variance	Agreements (for managing public land adjacent to protected areas) shall be developed for each designated protected area within or immediately adjacent to the C5 FMU: • Don Getty Wildland • Bob Creek Wildland • West Castle Wetlands Ecological Reserve • Plateau Mountain Ecological Reserve • Beehive Natural Area • Mount Livingstone Natural Area • Waterton Lakes National Park.
Forest Management Activities	1. Public Land and Forest Division (PLFD) and the Forest Protection Division (FPD) will work with the Fish and Wildlife Division (FWD) and Alberta Community Development (ACD) to investigate/discuss the implementation of agreements on forest or land management practices that will initiate the maintenance of ecosystem species and function over time within the parks and protected areas and passive landbase in the C5 FMU. These discussions/agreements should include consideration of seral stage targets in relation to grizzly bear habitat and travel corridors. 2. When the department enters into collaborative decision making processes with other Alberta ministries and agencies it will consult with relevant First Nations as part of those processes if any proposed measures or actions resulting from such processes have the potential to create adverse impacts to

	the First Nation's ability to exercise Treaty Rights and Traditional Uses. 3. Discussions shall be undertaken with Waterton Lakes National Park (WLNP) to minimize the impacts of the park on adjacent forests (e.g., fire, insects and disease impacts). 4. ASRD must ensure the appropriate forestry/silvicultural systems are adopted for lands adjacent to designated protected areas. Appropriate forestry/silvicultural systems must be outlined in agreements for individual protected areas. Direction contained in agreements will be developed by PLFD with input from affected stakeholders (e.g., ACD, WLNP, timber disposition holders). Agreements may address (but are not limited to): forest health issues, roads, invasive species, logging impacts. 5. Compartment development plans and AOPs must conform to any direction contained in agreements. 6. Agreements shall be reviewed on a periodic basis.
Monitoring Procedures	The activities of ASRD, ACD, WLNP, and timber disposition holders will be periodically reviewed to determine whether direction contained in agreements is being followed.
Implementation Schedule	ASRD and ACD representatives will, once this FMP is approved, meet to discuss various particulars about agreements and develop a schedule for completing agreements.
Forecasting Assumptions and Analytical Methods	All listed protected areas in the C5 FMU were excluded from the net productive landbase. Protected areas will contribute to seral stage targets. Lands adjacent to protected areas are available for scheduling in the timber supply. Where adjacent lands have been scheduled, they will be subject to operating and timing conditions outlined in agreements, as established through coordination with ACD or the federal government.
Linkages between Strategic and Operational Plans	Comparisons between protected areas management plans and this FMP will reveal whether plans are complementary to each other.



Mount Livingstone Natural Area.

Objective 12	1.4.2 To retain specific wildlife features.

Current Status	Given the impressive landscape and species diversity that exists in southwestern Alberta, numerous wildlife features and unique habitat sites will be present in the C5 forest. Section 4.3 of Alberta's *Provincial Timber Harvesting and Operation Ground Rules (1994)* provides objectives, standards and guidelines that apply to Wildlife Habitat Management Zones. Among other things, guidelines in the 1994 OGRs identify the kinds of buffers that need to be observed within wildlife habitat management zones to protect wildlife features during logging operations. These guidelines have been enforced through operational reviews and inspections wherever habitat features have been identified. Alberta FWD staff are knowledgeable about the location of many wildlife features and critical habitat areas in the C5 forest.
Indicator	a) Specific wildlife features: mineral licks, denning sites and nesting sites. b) Area of meadows. c) Wildlife habitat/cover adjacent to natural meadows. d) Buffers around identified long-toed salamander and western toad production ponds.

Target and Acceptable Variance	a) 100% of mineral licks, denning sites, and raptor and sensitive species nesting sites are protected. b) 100% of meadows are undisturbed. c) 50% retention of temporary buffers around meadows larger than 5 ha. d) 100% of buffers around identified long-toed salamander and western toad production ponds are protected.
Forest Management Activities	1. All known and identified mineral licks, denning sites, permanent nesting sites of raptors and other species identified as sensitive must be buffered according to direction provided in the Regional Operating Ground Rules. New wildlife features, as described above, will be added to the FWD database as they are discovered. Companies will report the discovery of any new features to FWD, and buffer these features according to regional OGRs. 2. The management of natural meadows (i.e., grass and shrub communities identified in the AVI as HF, HG, SC or SO) is a priority and the following will apply: • All reasonable efforts will be made by operators during planning and operation stages to avoid causing disturbances in meadows from harvesting and hauling activities such as roading, log decking, skidding, and parking equipment. Any required reclamation work will be completed following *Native Plant Revegetation Guidelines for Alberta* (February 2001) or its replacement. When seeding is required, seed mixes and certificates of analysis will be reviewed by appropriate ASRD staff before approval for seed application. • Generally, new forestry roads should avoid natural meadows. Disturbances to natural meadows may be approved upon reasonable justification acceptable to ASRD staff. • Natural meadow openings will be defined using AVI data used to complete the 2005-2006 TSA. The extent (ha) of natural meadows, as defined using current AVI data, will be maintained until the next plan revision. Meadows not identified by AVI, but discovered during operations, will be treated according to the same guidelines. • Natural meadows occurring within cutblocks must not be forested. (Tall stumps can be retained around the edge of meadows as visual cues to ensure that meadows are not forested.) • Controlled burns can be used to maintain natural meadows to achieve wildlife and rangeland management objectives. • To protect the integrity of natural meadows, FWD and Rangeland Management Branch (RMB) staff will provide guidance on their maintenance during the AOP review stage and the following must be achieved: – Harvesting can occur around all meadows; however, for those individual meadows greater than 5 ha in size, unharvested (“leave”) stands must together account for at least 50% of a meadow’s lineal edge. – For meadows smaller than 5 ha, structural retention may be considered within the block as a partial buffer bordering the meadow. – Unharvested "leave" stands can be harvested when the adjacent cutblock provides adequate wildlife hiding cover (i.e., when 3 m "green up" has been achieved).

- Unharvested "leave" stands must be at least 50 m wide/deep.
- The general development plan and final harvest plan review checklist will include a reference to 5 ha meadows and that adjacent meadow guidelines are addressed.

3. Final harvest plan review checklist will include a check box for maintenance of appropriate meadow edge buffers.
4. All known long-toed salamander and western toad production ponds and immediately adjacent upland areas will be buffered according to beneficial management practices and land use guidelines to be developed and incorporated into the regional OGRs.
5. When identified critical wildlife habitat areas or features overlap or correspond with known Traditional Use sites, particularly preferred First Nation hunting grounds, ASRD will consult with relevant First Nations if the proposed measures or actions have the potential to create adverse impacts to the First Nation's ability to exercise Treaty Rights and Traditional Uses.

   Consultation considering the Spatial Harvest Sequence map shall be the primary means of implementing this Forest Management Activity.

Monitoring Procedures	a) ASRD shall determine if timber disposition holders are adhering to beneficial management practices identified in regional OGRs. b) Compartment Plans and Annual Operating Plan reviews will identify actions to be undertaken to retain meadow complexes. c) The condition of known wildlife features will be ascertained as opportunities exist whenever ASRD staff are in the field.
Implementation Schedule	Operational forest management activities will be implemented May 1, 2006.
Forecasting Assumptions and Analytical Methods	Two fine filter theme maps that considered grassland/forest interface habitats associated with meadow complexes were incorporated into the process of reviewing timber supply scenarios to establish the AAC and chosen spatial harvest pattern: • Known Elk Theme from the Southern Rockies Landscape Planning Project. • Elk theme — Large opening timber complexes and habitat areas.
Linkages between Strategic and Operational Plans	Actions mentioned under "Forest Management Activities" must be added to the general development plan and final harvest plan reviews. Annual Operating Plans will be reviewed to determine whether Forest Management Activities are being satisfactorily addressed.

Objective 13	1.4.3 To maintain rare plant communities.

Current Status	The biodiversity of the C5 forest is unusually rich. In particular, the southern portion the C5 FMU, including the South and West Castle drainages, are known for an abundance of plant species that are unique in the province. Rare plants are being tracked in the province through the Alberta Natural Heritage Information Centre (ANHIC), which was established in 1996. ANHIC provides accurate and accessible biodiversity information necessary for making informed decisions concerning conservation, natural resource management and development planning. ANHIC collects, continually updates, analyzes and disseminates information about the location, condition, status and trends of selected elements, including species and plant communities.
Indicator	Rare plant communities identified in ANHIC are retained.
Target and Acceptable Variance	All known (documented) rare plant communities shall be protected.

Forest Management Activities	1. ASRD shall maintain a listing (i.e., GPS location and description) of all confirmed rare plant communities found in the FMU, and shall share this information with timber disposition holders. 2. Timber disposition holders shall be made aware of the probability of encountering rare plants (by species) and unique sites at the compartment assessment stage. Timber disposition holders are responsible for identifying rare plants and note their location in proposed cutblocks. Timber disposition holders must avoid these sites, or take precautionary actions to minimize impacts to sites containing rare plants and rare plant communities. 3. The department will compare all relevant Traditional Use and Traditional Environmental Knowledge plant related information made available by First Nations against ANHIC information about rare plant communities and take steps to reasonably minimize impacts to rare plant communities that are also used by First Nations. Further, the department will also consider all relevant First Nation Traditional Use and Traditional Environmental Knowledge plant information made available by First Nations when planning and implementing the other Forest Management Activities contemplated under Objective 13. Consultation considering the Spatial Harvest Sequence map shall be the primary means of implementing this Forest Management Activity. 4. Regional OGRs will provide direction for timber disposition holders on the identification and protection of rare plant communities and unique sites (e.g., mineral licks, denning sites). Timber disposition holders shall ensure that rare plant communities are not jeopardized by any silvicultural operations. This strategy shall be reviewed by ASRD during the general development plan or final harvest design stage and must be incorporated within AOPs or site plans. 5. Any new rare plant communities that are added to ANHIC databases following the adoption of this plan must eventually be added to Appendix 7. Updated information on rare plant communities must be provided to timber disposition holders. 6. The area occupied by rare ecosystem communities may be excluded from the net forest landbase and/or be excluded from future AAC calculations/revisions. 7. ASRD will investigate the feasibility of using "ecosite phase" data in the future to predict where rare ecosystems and plant communities might exist in the FMU.
Monitoring Procedures	Quota holders will confirm the status of known rare plant communities contained in cutblocks following logging operations. The identification and status of rare plant communities will be identified in stewardship reports.
Implementation Schedule	Quota holders will be notified of the location of known rare plant communities once this FMP has been approved.
Forecasting Assumptions and Analytical Methods	Not applicable.

Linkages between Strategic and Operational Plans	Areas that harbor rare, at risk or threatened plant communities could be removed from the net landbase during the next TSA iteration based on input provided by specialists.

Criterion 2: Maintenance and enhancement of forest ecosystem condition and productivity.

Maintenance and enhancement of forest ecosystem condition and productivity — Conserve forest ecosystem condition and productivity by maintaining the health, vitality and rates of biological production.

Element:

2.1 Forest Ecosystem Resilience — Conserve ecosystem resilience by maintaining both ecosystem processes and ecosystem conditions. *(CSA SFM Element 2.1)*

Values:

Values identified through the public involvement process are as follows:

- Management actions and operational practices will emulate natural disturbance regimes.
- Maintain and enhance ecosystem condition, productivity and processes.
- Maintain and, where necessary, restore the integrity and quality of the environment.

Objectives that relate to Criterion 2 are listed below and are discussed in greater detail in the pages that follow.

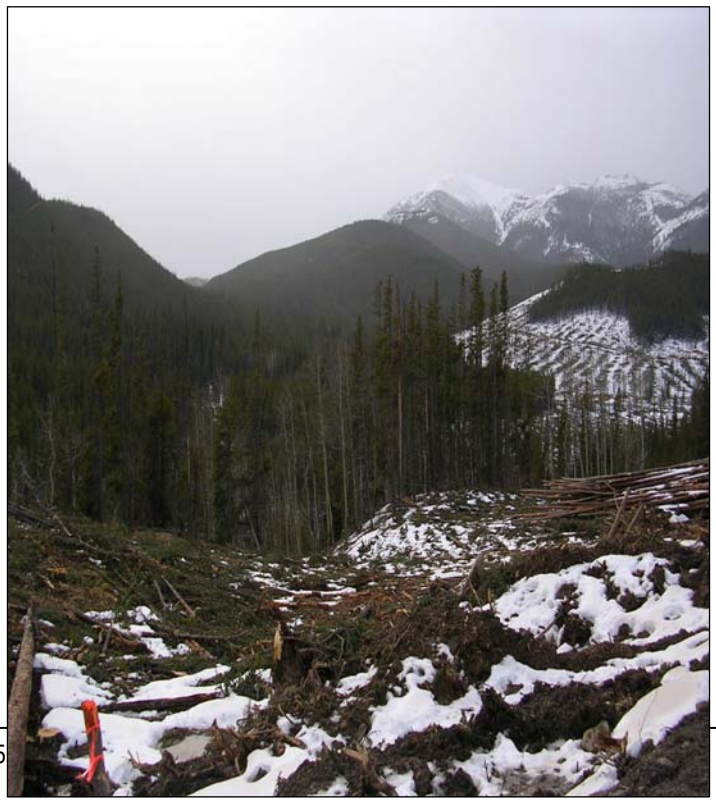
Table 11. List of objectives for Criterion #2.

FMP Unique Number	Matrix Number*	Objective
14	2.1.1	To sustain the capacity of the ecosystem to recover from both natural and human-caused disturbances.
15	2.1.2	To minimize losses to human life, communities, soil, watersheds, natural resources and infrastructure from wildfire.
16	2.1.3	To minimize the impacts of pests (i.e., insects and disease), which have the ability to kill healthy trees.
17	2.1.4	To maintain the long-term sustainability of the landbase by managing those forest health agents that can reduce growth, alter form or kill trees after several years of infection/attack.
18	2.1.5	To prevent the establishment of, and control the spread of, restricted and noxious weed species.
19	2.1.6	To incorporate new research findings or recommendations, where applicable, into future forest management strategies and practices that are responsive to climatic and environmental factors and large disturbance events.
20	2.1.7	To use prescribed fire for achieving forest protection, forest productivity, forest health and biodiversity objectives.

**Matrix numbers are based on the numbering scheme that has been applied to "Elements".*

Objective 14	2.1.1 Sustain the capacity of the ecosystem to recover from both natural and human-caused disturbances.

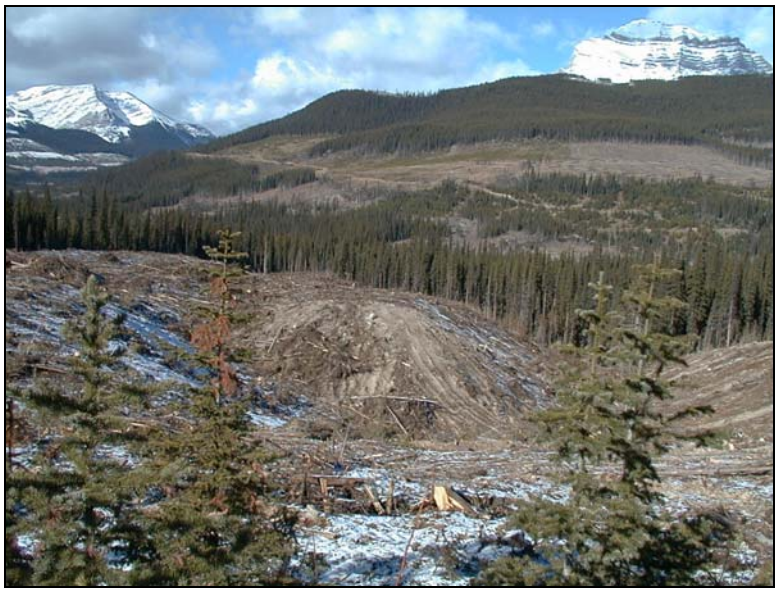
Current Status	Legislation (e.g., Regeneration Regulations), policies (e.g., Reforestation Directives), monitoring and inspection processes, and provincial Timber Harvest Planning and Operating Ground Rules have been developed over the years to minimize the effects of human disturbance on the environment. The "First Nations Consultation Policy on Land Management and Resource Development" was approved by the Government of Alberta on May 16, 2005 and is a relevant policy with respect to this Objective.
Indicator	a) Approved reclamation plans in place. b) Area of each cover group by seral stage. (Note: identical indicator and target are being used in Objective 1, Value 1.1.1) c) Species composition (i.e., retain diversity at stand and landscape levels).
Target and Acceptable Variance	a) 100% compliance with approved legislation, policies and operational plans. b) Reduce "not satisfactorily restocked" (NSR) lands to zero percent. c) Upper and lower bounds of the area for 8 cover groups in 5 subregions for both the gross and net landbase over a 200 year time period, as identified in Appendix 7.



Winter harvest blocks on steeper terrain in the C5 FMU.

Forest Management Activities

1. Replace coniferous cover classes according to leading species (types/strata) in the same relative proportions as existed prior to harvesting (and having regard for Reforestation Directive 2004-01 and the provincial Regeneration Manual).
2. ASRD has developed, and will work with, forest companies to refine the Silvicultural Prescription Matrix found in Appendix 9A. In addition, a suggested methodology for Pre-harvest and Post-harvest Silvicultural Assessments is also provided in that appendix. Though pre- and post-harvest assessments are optional for forest companies, this write-up can be helpful especially since all harvested sites are to be reforested to reflect the yield strata proportions that existed before harvesting occurred (see Objective 28 for yield strata definitions for the C5).
3. Forest practices must be encouraged that minimize ecosystem degradation and site disturbance (including but not limited to):
    - Comply with seasonal operating conditions: (i.e., where possible, operate on frozen or dry ground).
    - Use harvest systems that reduce/lessen the industrial footprint (e.g., eliminate or reduce the number of landings).
    - Rutting resulting from harvesting or silvicultural activities.
    - Excessive scarification.
    - Site reclamation must achieve equivalent capability.
    - Ground stabilization.
    - Re-vegetation.
    - Re-contouring.
    - Retain on-site organic matter.
4. Timber disposition holders will undertake prompt and progressive reclamation and reforestation to comply with regulated reforestation treatment timelines while carrying out prescribed silvicultural activities. The prescribed silviculture activities are expected to be based on pre-harvest/post-harvest assessments utilizing site, tree species and climate information. ASRD will work with quota holders and FRIAA representatives to achieve a mutually agreed upon silviculture assessment and prescription process. (See Appendix 9A for details on expectations surrounding Pre-harvest/Post-harvest Silvicultural Assessments
5. Develop agreements with timber disposition holders that require self-inspections and self-reporting.
6. ASRD or timber disposition holders to complete inspection forms (i.e., land use, skid clearance, final block clearance inspections). ASRD must follow up on any outstanding issues related to inspections.
7. ASRD staff must complete visual appraisals of disturbed areas when engaged in field work, and document any sites that appear to be degraded.
8. ASRD new growth-and-yield monitoring program for the C5 FMU is identified in Appendix 8B.



Excessive scarification in Dutch Creek area.

Monitoring Procedures	a) ASRD/forest industry audits/checks shall be completed on a periodic basis to assess compliance with plans. b) ASRD shall use the Alberta Reforestation Information System (ARIS) to track silviculture treatments and performance.
Implementation Schedule	a) Negotiations on self-inspection procedures and the development of reporting will be concluded by December 2006, recognizing the provincial directive on Forest Operations Monitoring Protocol and implementation of the FOMP and Reforestation Monitoring Protocol (RMP). b) A growth-and-yield monitoring program that is part of this plan identifies the establishment of additional permanent and temporary sample plots within the FMU. These plots will be established in 2006-2010.
Forecasting Assumptions and Analytical Methods	Yield assumptions that have been changed from the 1986 FMP for the new planning cycle include the following: • An establishment period of 5 years was incorporated for regeneration of coniferous species except Douglas-fir. The Douglas-fir establishment period was increased to 10 years. • A green-up constraint of 30 years was implemented to ensure adequate reforestation. These changes were made based on existing growth-and-yield information specific to the area, and the need to recognize other values (e.g., aesthetics).
Linkages between Strategic and Operational Plans	ARIS tracking will confirm that harvest areas are transitioning to the listed AVI species and the tree density that existed at the time of harvest.

Road reclamation in the Vicary Creek area.

Forest road reclamation in the Tent Mountain area.

Objective 15

2.1.2 To minimize losses to human life, communities, soil, watersheds, natural resources, and infrastructure from wildfire.

Current Status

FireSmart community planning and FireSmart landscape planning are underway in the Crowsnest Pass and the C5 Forest Management Unit. These initiatives were accelerated since the Lost Creek Fire in 2003 and the devastating losses that resulted from the Okanogan valley fire of 2003.

ASRD's FireSmart philosophy focuses on mitigating the impact of large, high-intensity, high-severity fires and the risk associated with the use of prescribed fire. FiresSmart community planning seeks to minimize fire threats within the wildlife/urban interface. FireSmart landscapes are designed to recognize the interaction between the ecological, economic and social impacts of fire, and identify opportunities for the use of prescribed burning as a natural disturbance management strategy to meet ecological objectives across the landscape. ASRD has adopted a policy on the use of prescribed fire within the province.

Industrial Vegetation Management Treatment Directive No. 98-06 allows disposition holders to manage vegetation for safety reasons and to reduce the fire hazard.

A contractor has been retained by ASRD to complete a fire regime review and develop a fire regime model for the C5 FMU (see Appendix 10A).

Indicator

a) Percentage reduction in Fire Behaviour Potential area (ha) within the FireSmart Community Zone

b) Percentage reduction in Fire Behaviour Potential area (ha) across the defined forest area (DFA) now and over the planning horizon

Target and Acceptable Variance

a) Reporting on reductions in area (ha) of extreme and high Fire Behavior Potential rating categories by X% within the FireSmart Community Zone.

b) Reporting on reductions in area (ha) of extreme and high Fire Behavior Potential rating categories by X% across the DFA.

Forest Management Activities

1. Comply with provincial forest protection policies, including pre-suppression and suppression requirements and guidelines.
2. Apply FireSmart landscape goals and objectives to the C5 forest:
   - Reduced the likelihood of large, high-intensity, high-severity fires (i.e., reduce the likelihood of negative, catastrophic fire events).

     Protect human life, communities, watersheds and soils, natural resources, and infrastructure.
   - Reduce extreme fire behavior potential, fire occurrence risk, and exposure to values-at-risk.
   - Identify and enhance barriers to fire spread.
   - Enhance suppression capabilities.

- Incorporate wildland/urban interface initiatives.

3. Forest Protection Division (FPD) – assuming a lead role – shall work with PLFD and F&WD to complete a wildfire threat assessment to:
   - Identify "hot stands" (i.e., stands that: have a high potential for ignition; which present a high threat to desired values; and are not easily accessible to carry out suppression activities).
   - Identify values at risk (Human life, Communities, Watershed and Sensitive Soils, Natural Resources, Infrastructure and, "protected" First Nation Traditional Use sites (i.e., those that are protected under the Historical Resource Act or have a Protective Notation (PNT).
   - Determine fire behavior potential.
   - Assess suppression capability.
   - Identify the spatial distribution and location of fires.
   - Develop a community zone plan for the Municipality of Crowsnest Pass and the Castle Mountain resort areas in conjunction with other jurisdictions and stakeholders, the intent being to reduce the risk of high intensity fire to communities.

   The wildfire threat assessment must be incorporated into the timber supply analysis and spatial harvest sequence.

4. Forest Protection Division (FPD) will utilize the Canadian Wildland Fire Growth Model (Prometheus) during 2006-2007 to complete fire growth simulations on the C5 FMU. The modeling exercise will be ready to submit 12 months from the date of final plan approval. Prometheus will allow for operational and strategic assessments of spatial fire behaviour on the landscape to evaluate:
   - The fire behaviour potential or burn probability on the landscape created by different forest management strategies and practices.
   - The effectiveness of various forest and fire management strategies aimed at reducing large fire potential.
   - The potential wildfire threat to communities, recreational facilities, forest management units, and other values-at-risk.

5. ASRD shall extinguish all wildfires. Prescribed fires may be used to achieve management objectives for an area. This includes potential FireSmart, wildlife habitat and ecological restoration objectives developed and coordinated with ACD and ASRD divisions.

6. The ongoing development and refinement of natural disturbance models for forested landscapes, and research on historical fire cycles and fire regimes for the C5 forest, will provide an important basis for informed decision making in the future. A C5 Fire Regime Analysis has been completed and is located in Appendix 10A. Appendix 10B contains a FireSmart-Wildfire Threat Assessment of the Spatial Harvest Sequence for the C5 FMU. Additional study is required.

7. Accessible, merchantable timber that is fire damaged, and which is not needed to meet wildlife and ecological objectives, must be salvaged.

8. Burnt timber salvage operations must comply with ASRD's fire salvage policies.

9. All disposition holders/operators are responsible for extinguishing all fires associated with debris pile burning. The option exists to use "cold trailing" or infrared scanning to detect holdover fires. Infrared scanning is required for

	large debris burning operations, while cold trailing (checking by hand) is acceptable when only a small number of piles are being burned. Appropriate action must be taken to prevent a fire outbreak. 10. Partial cut systems (e.g., selection and shelterwood systems) may be the preferred vegetative management strategy for the area immediately adjacent to municipal boundaries in the 10 km FireSmart community zone. A variety of other silvicultural practices will be considered in the remainder of the 10 km zone. Partial cut systems may also be considered throughout the FMU to meet FireSmart objectives.
Monitoring Procedures	The Forest Protection Division will maintain yearly fire statistics/records for the C5 FMU.
Implementation Schedule	Implementation is ongoing.
Forecasting Assumptions and Analytical Methods	FireSmart harvest design considerations that are associated with the interface between the C5 FMU boundary and private land in the Municipality of Crowsnest Pass were incorporated in the spatial planning component of the timber supply analysis.
Linkages between Strategic and Operational Plans	The harvesting of high-risk timber types, determined through the wildfire threat assessment program of FireSmart, will be authorized for approval through the AOP review process. Proposed stands have been specifically targeted for shelterwood removal as part of the TSA process. Planning for FireSmart landscapes may also need to be integrated with other issues and priorities (e.g., control of mountain pine beetle infestations).

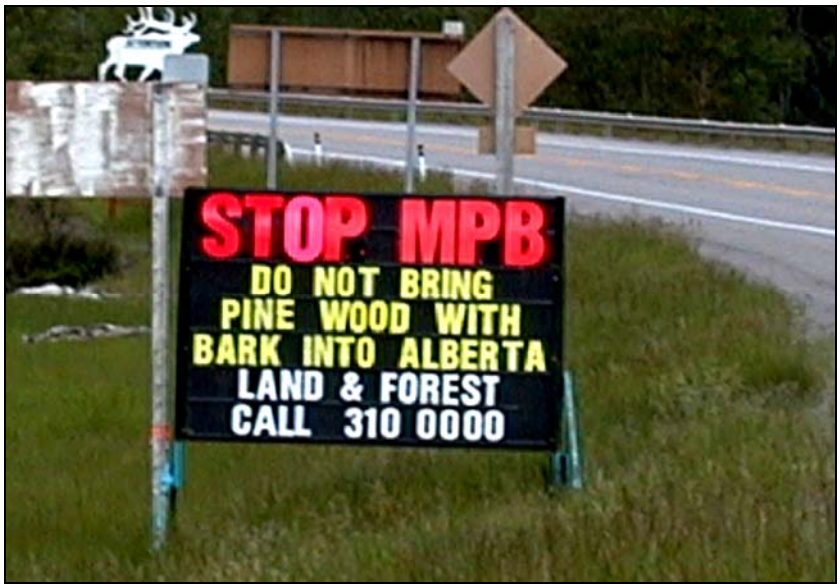
Objective 16

2.1.3 To minimize the impacts of pests (i.e., insects and disease), which have the ability to kill healthy trees.

Current Status	Mountain pine beetle (MPB) infestations have mainly affected the South and West Castle drainages and Waterton Lake National Park from 1977 through to the mid 1980s. Over one million trees were killed during this outbreak. Between 1980-1985, approximately 106,400 trees were treated at a cost of $6.15 million to stop the outbreak. Extensive harvesting occurred to salvage the affected stands; harvested areas have been regenerated successfully. The Forest Health Section (ASRD) has been monitoring MPB activity in southwestern Alberta since 1995. Aerial surveys and pheromone-baited trees have been used to monitor the MPB. These efforts were intensified with the detection of MPB-killed trees in Banff National Park in 1998. The departmental MPB management strategy is described in *Mountain Pine Beetle Management Strategy* (ASRD 2002). The *Mountain Pine Beetle Management Guide* is available from the Forest Health Website (http://www.srd.gov.ab.ca/forests/health/index.html). ASRD's MPB strategy entails working in close collaboration with the B.C. Ministry of Forests to ensure B.C. addresses MPB infestations occurring close to the B.C./Alberta border. A program to extend Alberta's cooperation in dealing with the current infestations in the B.C. Peace River area is being developed. Alberta's survey programs concentrate on mountain passes and border areas with B.C. to detect and promptly deal with any new infestations occurring on the Alberta side of the border.
Indicator	Aerial extent of trees killed each year by mountain pine beetle, spruce beetle, Douglas fir beetle and other pests.
Target and Acceptable Variance	Contain pests within a 1 km radius of a known outbreak area.
Forest Management Activities	1. To minimize pest-related impacts, and in accordance with the Alberta Forest Health Strategy: Shared Roles and Responsibilities Between SRD and Forest Industry (Dec. 10, 2003), ASRD shall: • Undertake annual aerial surveys. • Undertake pheromone baiting. • Undertake stakeholder and staff training. • Ask disposition holders and operators to inform the Department of any pest sightings. 2. Encourage timber disposition holders to work with ASRD to undertake ground surveys wherever aerial surveys have confirmed the existence of pest problems. In addition, timber disposition holders can assist with identifying affected trees or the extent and severity of infestations while completing pre-harvest assessments, silvicultural surveys, etc.).

	3. ASRD shall remain aware of, and review pest survey findings from adjoining jurisdictions. 4. ASRD shall make immediate adjustments to forest operational plans to address insect and pest outbreaks. A recalculation of the TSA would be dependent on the extent of pest outbreaks, and could result in development of a new spatial harvest sequence. 5. ASRD shall work toward reducing the overall hazard from insect and disease outbreaks by creating a tree mosaic of different age classes and species within the FMU.
Monitoring Procedures	ASRD shall actively track forest pests using provincial data management systems. Stewardship reports will provide updated information on forest health issues and actions that are being taken to contain or exterminate pests.
Implementation Schedule	ASRD's ongoing pest surveillance and treatment strategies and research programs will be maintained. Timber disposition holders will be notified in writing as to how they can assist ASRD with forest pest management to improve the government's effectiveness in controlling the spread of pests.
Forecasting Assumptions and Analytical Methods	Pine stands rated high or extreme were prioritized by compartment and affected the decision as to what compartments would be open for harvest removal in the first 10-year period. This included a number of stands (primarily on the north side of the Crowsnest Pass corridor) that were pre-selected for removal based on outputs provided by the Canadian Forest Service predictive model for mountain pine beetle. A 2.5645% reduction for cull losses was included in calculating the AAC. This was based on existing log scale information for the forest.
Linkages between Strategic and Operational Plans	ASRD shall make immediate adjustments to forest operational plans to address insect and pest outbreaks. If a natural disturbance event affects more than 2.5% of the net forest landbase, a new TSA will be undertaken and a revised spatial harvest sequence will be prepared.

Mountain pine beetle and the damage it causes.



Mountain pine beetle epidemic active directly west of the C5 FMU in British Columbia.

Objective 17	2.1.4 To maintain the long-term sustainability of the landbase by managing those forest health agents that can reduce growth, alter form, or kill trees after several years of infection/attack.

Current Status	Armillaria root rot has been noted in some regenerating blocks within the Allison Chinook Forest Land Use Zone. Currently dwarf mistletoe is found sporadically throughout the C5 FMU, and is not deemed a serious health threat by extent or impact in the Forest Management Unit. Provincial policies are in place to restrict the importation of unprocessed logs from other jurisdiction that may be carriers of pests or disease. Weed management activities along LOC roads within the C5 are ongoing throughout each summer season.
Indicator	Change in forest health agent impacts before and after harvest (i.e., following the treatment phase — full harvest or a sanitation cut — to determine whether the pest is continuing to spread).
Target and Acceptable Variance	Decrease (or no increase) in forest health agent incidence after harvest and throughout the second rotation period.
Forest Management Activities	1. Where harvesting of mistletoe-infected stands occurs, the following is required: • Clear cut is the accepted harvest removal method. • Residual stand structure shall exclude pine species and emphasize all other species. • Retained buffers of 30 m around mistletoe-infested blocks will be identified to arrest the spread of mistletoe in the rejuvenating stand. Within these areas, reforestation shall be to other acceptable coniferous species. • Where field assessment of mistletoe is required, the Hawksworth six-class dwarf mistletoe rating system shall be used. • Where there are other important values to consider, the quota holder will work with SRD and other stakeholders to arrive at an acceptable harvest design and operational strategy. 2. Consider stump removal for root diseases. 3. Prevent the introduction of non-native insects and diseases that could negatively affect commercial timber values (see Directive No. 2001-06: *Weed Management in Forestry Operations* [May 24, 2001] or its replacement). 4. Manage weed species infestations on cutblocks that could interfere with seedling establishment. 5. ASRD must work jointly with disposition holders to address epidemics and halt their spread. 6. ASRD shall participate with industry and the Canadian Forest Service on

	provincial (and regional) Integrated Pest Management Working Groups. 7. Maintain an annual forest health-monitoring program (e.g., aerial overviews, ground assessments) for the C5 FMU and develop action plans for potential pest epidemics. Appropriate control measures and/or salvage programs shall be used to respond to pest infestations. These plans will be developed in cooperation with: • Community Development in the protected areas of C5 FMU; • All divisions of ASRD where pest epidemics are found in the passive landbase outside the protected areas managed by Community Development; • C5 FMU Quota disposition holders. 8. Incorporate windthrow management in the design and orientation of cutblocks. 9. Accessible merchantable timber resulting from windthrow events shall be scheduled for recovery in the upcoming AOP.
Monitoring Procedures	Ground and aerial monitoring and information tracking will continue to be undertaken to detect and monitor the location and spread of forest pests.
Implementation Schedule	Continue with ongoing departmental activities. Take action whenever new infestations are reported, in accordance with ASRD policies and procedures.
Forecasting Assumptions and Analytical Methods	No direct implications for the timber supply analysis.
Linkages between Strategic and Operational Plans	ASRD shall make adjustments to operational plans to promptly address insect and pest outbreaks. Subsequently, the spatial harvest sequence will be adjusted once a new TSA has been completed — or if the natural disturbance event affects more than 2.5% of the C5's net timber production landbase.

Objective 18	2.1.5 To prevent the establishment of and control the spread of restricted and noxious weed species.

Current Status	Directive 2001-06: *Weed Management in Forest Operations*, requires that holders of dispositions under the *Forests Act* implement an effective weed management program in accordance with section 63 of the *Public Land Act* and section 31 of the *Weed Control Act*. This affects all noxious and restricted weeds on dispositions issued under the *Forest Act*. Local authorities employ weed inspectors and agricultural fieldmen, who are charged with the task of eliminating restricted weeds and reducing the spread of noxious weeds.
Indicator	Area and severity of restricted and noxious weed infestations within the FMU.
Target and Acceptable Variance	a) Prevent the introduction of restricted and noxious weed species into previously uninfested areas. b) Absence of restricted weeds. c) Reduce or prevent an increase in the canopy cover, density and distribution of noxious weeds.
Forest Management Activities	1. ASRD shall work with disposition holders and rural municipalities to identify, monitor and address weed problems. 2. Operators need to comply with provincial and municipal weed legislation including the Alberta Weed Control Act, associated regulations, municipal bylaws, and government policies. 3. Weed eradication treatments shall be carried out within the FMU by ASRD and disposition holders. (Note: Municipalities have the responsibility for weed control along secondary road rights-of-way in the Forest Reserve.) 4. PLFD will take a lead role in completing weed surveys and maintaining an inventory of weed infestation locations. 5. PLFD shall prioritize control actions and coordinate spraying programs within the Forest Reserve on lands not under disposition. 6. Any pre-harvest assessments must address weed issues (existing infestations and resulting infestations following disturbance). 7. Seed mix approvals are required from land managers (to confirm seed content and purity) before commencing with any re-vegetation activities. 8. A certificate of seed analysis shall be required for seed mixes that are to be used in reclamation work.
Monitoring Procedures	a) Field inspections for weed species (determining their distribution and extent) shall be completed by ASRD and municipal staff in accordance with the jurisdictional responsibilities of each level of government.

	b) Disposition holders will be invited to assist in reporting weed infestations (the extent and severity of infestations) and the effectiveness of any weed treatment efforts that are undertaken.
Implementation Schedule	Ongoing. Appropriate action will be undertaken (by ASRD, quota holders, municipalities) as reports of weed outbreaks are received.
Forecasting Assumptions and Analytical Methods	Not applicable.
Linkages between Strategic and Operational Plans	Specific actions that are to be undertaken in response to known weed infestations will be identified in operational plans, work plans and treatment strategies. ASRD, quota holders and municipal representatives should communicate with each other and coordinate their respective weed control activities to ensure weed control actions are carried out in a timely, effective and integrated manner.

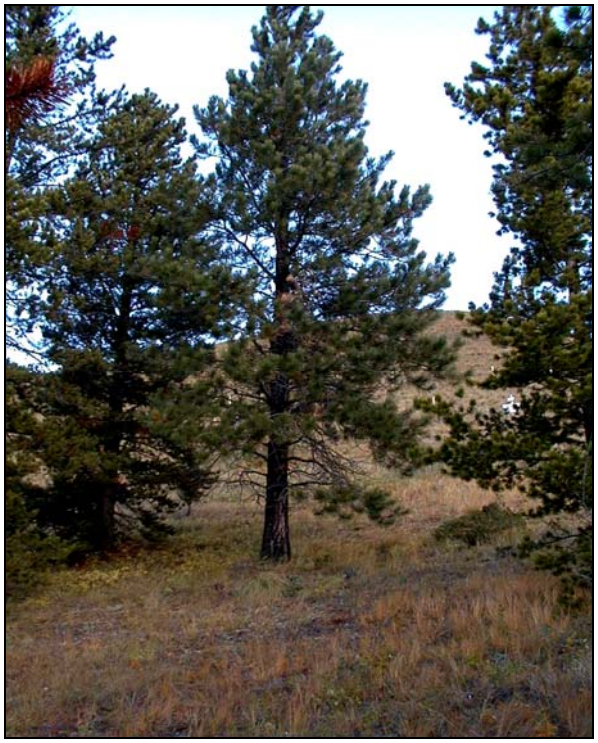
Objective 19	2.1.6 To incorporate new research findings or recommendations (where applicable) into future forest management strategies and practices that are responsive to climatic and environmental factors and large disturbance events.

Current Status	A wide range of meteorological phenomena are observed in the C5 FMU due to its geographic location. Regional and local weather conditions (extreme temperature fluctuation, aridity/drought, heavy snow accumulations, Chinook winds, high rainfall, flooding, etc.) can present numerous challenges when implementing silvicultural treatments. ASRD has been working with quota holders to develop unique harvesting alternatives for Douglas fir-dominated stands in the Porcupine Hills. ASRD has initiated a process to identify and address potential global warming scenarios and their possible impacts on the C5 FMU, particularly in the Porcupine Hills area.
Indicator	Adaptable silvicultural standards.
Target and Acceptable Variance	Field operations and forest management requirements/standards are tailored to new or re-occurring climatic and environmental conditions.
Forest Management Activities	1. Develop silvicultural/harvest systems that are responsive to site, species, climate and other conditions within the C5 FMU (e.g., reforestation to Douglas fir in the Porcupine Hills). Appendix 9b contains a strategy entitled *Porcupine Hills Harvesting and Silviculture Strategies: Minimizing the risks to successful regeneration of cutovers* that will be used and modified over time to ensure best management practices are established for the reforestation of Douglas fir in the Porcupine Hills. 2. ASRD shall examine the need for adopting site preparation and reforestation standards that are sufficiently flexible to accommodate climate (e.g., drought) and other environmental conditions. For example, a site's regeneration period could be extended if low soil moisture conditions persist over time. 3. ASRD shall assess the feasibility of establishing controlled research trials for introduced tree species (e.g., ponderosa pine, Siberian larch) that are suited to geo-climatic conditions in the C5 FMU. ASRD shall also undertake an assessment of former Forest Resource Improvement Program (FRIP) sites. 4. The ongoing development and refinement of natural disturbance models for forested landscapes, and research on historical fire cycles and fire regimes for the C5 forest, will provide an important basis for informed decision making in the future. A C5 Fire Regime Analysis has been completed and is located in Appendix 10. Additional study is required. The findings, results and conclusions obtained from this and future modeling and research endeavors may, among other things, provide a legitimate basis for establishing new: • cutblock sizes; • age-class distributions; • harvest sequences and patterns (i.e., patch configurations);

- refinements to FireSmart landscapes, etc.

5. The outcome of any pertinent research and modeling work that relates to the C5 FMU will be analyzed by ASRD staff and identified in 5-year stewardship reports and, as part of the adaptive management process, could potentially lead to recommendations for proposed amendments to the C5 FMP. Future TSA updates will also incorporate the findings of accepted and applicable studies, research and modeling work.

Monitoring Procedures	ASRD shall evaluate whether existing standards are responsive to new environmental and climatic conditions.
Implementation Schedule	The need for new or revised silvicultural practices that are responsive to weather-related factors must be demonstrated. New silvicultural approaches will be identified, evaluated, and if appropriate/suitable, adopted.
Forecasting Assumptions and Analytical Methods	Not applicable.
Linkages between Strategic and Operational Plans	The mandate for proceeding with research trials or demonstration sites is sanctioned through this management plan. Commencement with these activities will occur based on the availability of funding, establishment of partnerships, and the willingness of industry to proceed with operational trials, (which need to be approved through annual operating plans).



Ponderosa pine on a south-facing slope near the Livingstone Gap.

Objective 20

2.1.7 To use prescribed fire for achieving forest protection, forest productivity, forest health and biodiversity objectives.

Current Status

Prescribed fire is defined as the application or use of fire as a tool on a specified landscape to achieve pre-determined management objectives (e.g., community protection, forest health, biodiversity, ecological restoration, research, hazard reduction, habitat development, etc.)

Prescribed fire in standing green timber has not been used as a management tool in the C5 FMU, although burning logging debris piles during winter months has been a common practice for several decades. Unpredictable winds are a major negative factor in proceeding with prescribed burns.

A new Prescribed Burn Program has been developed by ASRD to successfully achieve desired management results. This new program allows for the safe and effective delivery of prescribed fire at various landscape scales.

Prescribed fire is an integral component of the FireSmart landscape planning initiative.

Indicator

a) Percentage of identified high and extreme hazard stands (occurring on the non-active forest landbase) treated over a 10-year period (2006-2016).

b) Number of hectares burned to maintain biodiversity values.

c) Number of hectares burned to achieve improved forest productivity, or to address forest pest and blowdown problems.

Target and Acceptable Variance

a) Percentage of areas to be treated will be determined through a wildfire threat assessment.

b) Number of hectares burned shall be established once fire strategies have been prepared.

c) Number of hectares burned shall be established upon completion of the wildfire threat assessment.

Forest Management Activities

1. FPD, PLFD, FWD, ACD and Alberta Conservation Association, working together, must explore the need for using prescribed burns to improve or create a diversity of wildlife habitat conditions and to achieve biodiversity objectives.

2. Once agencies have identified and reached agreement on prescribed burn goals and objectives, FPD will develop a prescribed burn plan. PLFD will be involved in reviewing such plans to ensure an alignment exists with any approved forest management plan, land management plan and relevant policies.

   - Objectives and criteria tailored to the unique circumstances of individual

sites must be prepared to guide prescribed burns for target areas.

- FPD (in conjunction with other stakeholders) shall coordinate the identification, evaluation and prioritization of areas in which fire could be used as a management tool.

3. Prescribed fire, in conjunction with other management approaches, will be considered to reduce the threat of catastrophic, large-scale disturbances.
4. Low-intensity prescribed burns shall be considered in the Porcupine Hills to maintain the Montane ecosystem and Douglas fir stands.
5. ASRD shall consult with adjacent stakeholders to achieve FireSmart landscape objectives.
6. When a prescribed burn is planned, the department will provide the relevant First Nations with adequate notice of the burn and with an opportunity to be consulted about the planned burn.

Monitoring Procedures	The use of, or failure to use, prescribed fire in the C5 FMU will be described in five-year stewardship reports.
Implementation Schedule	Prescribed burns that are aligned with FireSmart objectives are initially proposed for the following areas: 2 sites bordering (or near) the Municipality of Crowsnest Pass, and in an undetermined location within the Castle River drainage. These prescribed burns should be completed by 2008-2010.
Forecasting Assumptions and Analytical Methods	Merchantable stands along the FMU boundary in the Crowsnest corridor were identified for removal in the TSA. No merchantable timber types were identified in the TSA for prescribed burns, although some areas that fall outside the net productive landbase for timber production are being considered for future burns as part of a comprehensive FireSmart plan for the 10 km zone around the Municipality of Crowsnest Pass.
Linkages between Strategic and Operational Plans	Goals and objectives that are to be achieved through prescribed burns include habitat improvement, range improvement, Douglas fir ecosystem restoration, meeting FireSmart objectives, etc. The implementation of prescribed burns will need to follow established government protocols and administrative processes which include public consultation, notification, and obtaining ASRD approvals.

Criterion 3: Conservation of soil and water resources.

Elements:

3.1	Soil quality and quantity — Conserve soil resources by maintaining soil quality and quantity. *(CSA SFM Element 3.1)*
3.2	Water quality and quantity — Conserve water resources by maintaining water quality and quantity. *(CSA SFM Element 3.2)*

Values:

Given its re-occurring scarcity and its fluctuating and unpredictable supply, water is a resource of great importance in southern Alberta. Water has become a critical limiting factor to future development in the region.

Objectives that relate to Criterion 3 are listed below and are discussed in greater detail in the pages that follow.

Table 12. List of objectives for Criterion #3.

FMP Unique Number	Matrix Number*	Objective
21	3.1.1	To conserve soil and organic matter, and maintain soil productivity.
22	3.1.2	To minimize soil erosion and slope failure.
23	3.2.1	To ensure that all forest industry practices are conducted in a manner that places a priority on the protection of water quality.
24	3.2.2	To manage forest cover in a manner that places a priority on the conservation and protection of watersheds.

** Matrix numbers are based on the numbering scheme that has been applied to "Elements".*

Objective 21	3.1.1 To conserve soil and organic matter, and maintain soil productivity.

Current Status

Because soil productivity is critical to the sustainability of forest ecosystems, various processes have been put in place (e.g., operating ground rules, field inspections) to ensure site degradation does not occur and that remedial actions are taken when it does occur.

Site productivity is the result of complex interactions between physical soil features such as rooting depth, structure, bulk density and moisture, and chemical features such as nutrient supply and soil pH. These interactions are further complicated by the high spatial and temporal variations in these features that characterize forest soils typically found throughout the Foothill Region.

Forest management has the potential to impact site productivity by adversely affecting soil structure and bulk density. Decreasing the long-term nutrient supply capability of a soil by excessive removal of nutrients can further impact long-term site productivity. These adverse effects may not be readily apparent. Rather, these negative impacts may only become evident during the mid-to-late stages of stand development as nutrient supply becomes increasingly constrained due to humus formation and a concomitant decrease in soil temperatures.

Up to this time, requirements for coarse woody debris have not been formalized or considered by ASRD. Historically, timber harvesting has occurred in very old age classes where the main challenge has been coping with excessive debris.

Indicator

a) Level of compliance with Alberta's Soil Conservation Guidelines.

b) Amount of coarse woody debris on-site following timber harvesting. (See also Objective #1 – Value 1.1.2 in Criterion 1.)

Target and Acceptable Variance

a) 100 percent compliance with Alberta's *Soil Conservation Guidelines*.

b) Amount, size and distribution of debris on-site following logging shall approximate pre-harvest levels

Forest Management Activities

1. The quota holder and ASRD, in the case of the CTP program, shall:
   - Visually assess the coarse woody debris of stems greater than 7.5 cm of the stand during pre-harvest conditions, and make an assessment after the harvest and initial silviculture treatments are completed on the percentage of the total harvest area (expressed as hectares) that contain CWD greater than 7.5 cm. CWD greater than the pre-harvest levels can be accepted as "equivalent", provided slash and debris levels meet pertinent regulations.
   - The CWD hectares for each block following site scarification can be noted in the post harvest assessment expressed as hectares of the block meeting pre-harvest equivalent conditions, and shall be included as a summary in the following year's annual operating plan.

	2. Regional OGRs (and AOPs) shall identify scarification restrictions to minimize the displacement of forest floor materials. Regional OGRs shall also identify limits for mineral soil exposure on cutblocks and landings to prevent excessive scarification that leads to site degradation. 3. ASRD shall determine and convey to timber disposition holders what constitutes excessive scarification and site disturbance. 4. Site preparation treatments shall be determined in advance (in AOPs; silvicultural plans) based on ground conditions, environmental and ecological factors (e.g., climate, biodiversity and habitat goals) and subsequent land uses. 5. Timber disposition holders shall be encouraged to distribute debris/slash throughout the cutblock.
Monitoring Procedures	a) Industry shall self-report on all soil disturbance that exceeds established guidelines on an annual basis (to be summarized in 5-year stewardship reports). b) The monitoring and measurement of coarse woody debris levels shall be in accordance with regional OGRs and the stand retention guidelines found in Appendix 7.
Implementation Schedule	The implementation of this objective will occur primarily through specific direction contained in the regional OGRs and stand retention guidelines in Appendix 7, which will be adopted and implemented May 1, 2006.
Forecasting Assumptions and Analytical Methods	Not applicable.
Linkages between Strategic and Operational Plans	The Spatial Harvest Sequence provides a first attempt at identifying road requirements for an access development plan. The access development plan will provide a context for future access management planning and the review of operational approvals and reclamation activities administered under disposition management by ASRD

Acceptable scarification will yield natural regeneration.

Objective 22	3.1.2 To minimize soil erosion and slope failure.

Current Status	Steep terrain is a re-occurring feature in the C5 FMU. Soil erosion and slope failure have received extensive coverage in the *Provincial Timber Harvest Planning and Operating Ground Rules*.
Indicator	a) Conformity with regional OGRs. b) Erosion control and reclamation strategies in place.
Target and Acceptable Variance	a) Zero erosion or slumping events attributed to road construction and timber harvesting. b) Presence of erosion control and reclamation strategies in approved AOPs. The acceptable variance is zero.
Forest Management Activities	1. Operators must comply with regional OGRs and any applicable provincial guidelines/requirements. 2. When operating on continuous slopes having a sustained grade of greater than 45%, a detailed block plan (in which slope stability is addressed) must be submitted to ASRD. A slope/terrain stability assessment may be required for slopes less than 45% if signs of slope instability exist. 3. Regional OGRs shall provide guidelines to prevent soil, debris and deleterious materials from entering watercourses at water crossing sites (i.e., ensure that bridge decks and bridge structures are constructed to prevent soil and debris from entering water courses).
Monitoring Procedures	a) ASRD staff shall undertake periodic field inspections to ensure conformity with regional OGRs. b) Quota holder self-reporting will reveal whether erosion or slope failure problems have been encountered and what follow-up actions were taken by operators. c) Should an erosion or slope failure event take place, the operator assuming responsibility will need to monitor the effects (i.e., success) of any remedial action that was undertaken).
Implementation Schedule	This management plan and the regional OGRs will take effect May 1, 2006.
Forecasting Assumptions and Analytical Methods	Not applicable.

Linkages between Strategic and Operational Plans	Quota holder standard operating procedures that are in compliance with the regional OGRs are a primary operational link with this objective. Site-specific remediation/restoration plans will guide rehabilitation efforts after a serious erosion or slope failure event has occurred.

Objective 23	3.2.1 To ensure that all forest industry practices are conducted in a manner that places a priority on the protection of water resources.

Current Status	Companies are required to comply with all federal and provincial regulations and policies, including the provincial *Timber Harvest Planning and Operating Ground Rules*. Codes of Practice (e.g., *Code of Practice for Watercourse Crossings*) that relate to Alberta's *Water Act* are in place. Monitoring watercourse crossings at spring breakup has not been mandatory, but is sensible. Road management plans have been required in annual operating plans since 1994. Adherence to Standards and Guidelines for Operating Beside Watercourses (Table 2 in the *Timber Harvest Planning and Operating Ground Rules*) was not consistent in the 1990s; however, with the increased presence of Fisheries and Oceans Canada personnel in the region, deviations from stream reserve standards have ceased.
Indicator	a) Degree of compliance with federal and provincial regulations, standards, and policies pertaining to road construction and maintenance, stream crossings and retention of buffers. b) Adverse changes to fish habitat.
Target and Acceptable Variance	a) 100 percent adherence to existing and/or new requirements. b) No harmful alteration, disruption, or destruction of fish habitat as a result of operations unless approved by the appropriate regulatory body.
Forest Management Activities	1. Prescribed fire, in conjunction with other management approaches, will be considered to reduce the threat of catastrophic, large-scale disturbances. 2. Timber disposition holders, contractors and operators are responsible for ensuring that water quality is not degraded, and must take immediate action in response to any water quality concern/issue resulting from their operations. 3. Timber disposition holders and License of Occupation (LOC) holders are to contact appropriate provincial/federal agencies when a water quality issue arises (e.g., siltation, pollution, deleterious substances affecting fish habitat). 4. Timber disposition holders must document and report on mitigation measures taken in response to any siltation event as part of their annual road maintenance inspections and abandonment reports. 5. Maintain streamside buffers through implementation of regional OGRs. 6. Timber disposition holders must inspect, monitor and report (in their AOPs) on: • all watercourse crossings; • all constructed roads/trails; • all reclamation/restoration work.

7. Road and stream crossing inspections must be conducted by timber disposition holders during the course of operations. Maintenance issues shall be promptly addressed. *The department will conduct random spot checks of stream crossings to ensure compliance and to address deficiencies in a timely manner with timber disposition holders.* AOPs shall identify all stream crossing points for permanent water courses with the intent of minimizing the number of stream crossings. (Note: it is also desirable to identify stream crossing points for intermittent and ephemeral streams since seasonal use of these areas may be extremely important to the life cycle and processes of many fish and wildlife species.)
8. ASRD shall promote the adoption of best practices for riparian management.
9. Timber disposition holders shall comply with the provincial Watercourse Crossing Code of Practice where applicable (note: the Code identifies Green Area exemptions that apply to timber operators), Alberta's Environmental Protection and Enhancement Act, Alberta's Water Act, and the federal Fisheries Act.
10. Timber disposition holders and LOC holders are encouraged to consult with Fisheries and Oceans Canada prior to road construction to ensure all stream crossing structures (or other works and undertakings), which have the potential to affect fish and fish habitat, are of suitable design and capacity to allow unobstructed fish movement.
11. Regional OGRs are to address the following:
    - maintenance of natural drainage patterns;
    - maintain the integrity of all water source areas and water bodies;
    - no net loss of fish habitat;
    - inclusion of a recommendation that timber disposition holders undertake field consultations with DFO and ASRD staff prior to commencing with field operations.

Monitoring Procedures	a) ASRD shall undertake one audit per disposition holder for each 5-year period (i.e., quadrant period) to ensure compliance with provincial requirements. b) Timber disposition holders to complete self-inspections where agreements with ASRD exist to do so (see Forest Management Activities 5 and 6 of this objective).
Implementation Schedule	Requirements for safeguarding watercourses are largely in place; however, some new forest management activities will be captured in regional OGRs that will take effect May 1, 2006.
Forecasting Assumptions and Analytical Methods	Stream buffers, as dictated by the 1994 *Timber Harvest Planning and Operating Ground Rules*, were removed from the productive landbase in the netdown process prior to running the TSA. Specific figures can be found in the landbase netdown summary (Appendix 6A). Stream buffer removals are included in the seral stage summaries for the entire C5 FMU (Appendix 6A).

Linkages between Strategic and Operational Plans	Harvest planning and operations will be guided by the new regional OGRs, compartment plans and annual operating plans. Regional OGRs contain standards that are based on direction provided in this Forest Management Plan.

Proper temporary bridge installation will protect streams.

Objective 24

3.2.2 To manage forest cover in a manner that places a priority on the conservation and protection of watersheds.

Current Status

Watershed protection was one of the fundamental reasons for establishing the Rocky Mountains Forest Reserve in Alberta. A high priority on watershed protection was also expressed in Alberta's *Eastern Slopes Policy* and in subsequent Integrated Resource Plans for the Castle River and the Livingstone-Porcupine Hills.

An emphasis on watershed management and planning is contained within the provincial government's 2003 policy: *Water for Life: Alberta's Strategy for Sustainability*.

Few assessments of water quantity and quality have been made in the C5 FMU. Notable exceptions include an analysis of the Dutch Creek Drainage (see *Summary Report* for the *Southern Rockies Landscape Planning Pilot Study*) and upstream water sampling that was completed as part of the Oldman River Water Quality Initiative.

Hydrologic data is being gathered on southwestern Alberta's streams and river by Alberta Environment and Environment Canada.

Various watershed studies have been initiated in selected drainages following the 2003 Lost Creek Fire.

Indicator

a) Effective disturbance area (as expressed in *ECA Alberta*).

b) Compliance with stream crossing requirements.

c) Integrity of water source areas, watercourses and water bodies.

Target and Acceptable Variance

a) 100% compliance with provincial stream crossing requirements.

b) Protect all hydrological features (e.g., wetlands, springs, streams, rivers, lakes, groundwater/water table) from disturbance-related impacts.

Forest Management Activities

1. The department, in cooperation with other stakeholders, and with relevant First Nations, shall identify data/information gaps and monitoring needs pertaining to watershed protection, including: obtaining existing hydrological data for specific watersheds/sub-basins; developing and/or applying watershed assessment (modeling) tools and procedures in the C5 FMU.

2 .ASRD shall use appropriate models and consult with experts to determine harvest levels and appropriate silvicultural practices that should be adopted in watershed sub-basins (identified in the project Landscape Assessment, see Appendix 4) to maintain or improve downstream water yields.

1. Adopt a dual model watershed review process by:
   - Using an Equivalent Clearcut Area (ECA) approach (using the *ECA Alberta* model developed by Uldis Silins, University of Alberta) to

determine maximum allowable harvest levels that can occur in a defined watershed.

- Using the model Water Resource Evaluation of Non-point Silviculture Sources–Alberta (WRENSS–AB model) for more detailed modeling of selected drainages based on ECA outputs and professional reflection on ECA Alberta results and the preferred forest management scenario spatial harvest sequence.

Modeling outputs from ECA Alberta and WRENESS–AB shall be considered in modifying and confirming the spatial harvest sequence of the PFMS in TSA.

2. Modeling outputs and objectives derived from ECA Alberta analysis shall be incorporated within the C5 TSA.
3. Encourage progressive site reforestation following timber harvesting to achieve accelerated "hydrological recovery".
4. ASRD shall inform timber disposition holders of the need to retain downed woody debris and stand structure to maintain snowpack and promote runoff infiltration.
5. Timber disposition holders are encouraged to follow DFO's Habitat Conservation and Protection Guidelines and Alberta Environment's Code of Practice for Watercourse Crossings regarding any vegetation clearing/site modifications adjacent to watercourses or any in-stream work associated with watercourse crossings.
6. ASRD shall support Alberta's Water For Life Strategy in the following areas:
   - Participate in watershed management planning activities through advisory councils and stewardship groups.
   - Encourage watershed research that addresses Alberta's priority areas with a focus on improving forestry practices; i.e., capturing baseline data (stream flow, water quality, channel morphology, riparian condition), and options for stream flow management using alternate silvicultural systems.

Monitoring Procedures	a) Timber disposition holders are to report on their conformity with the spatial harvest sequence, which is based on ECA Alberta outputs. b) Five-year stewardship reports shall identify the degree to which the spatial harvest sequence was followed.
Implementation Schedule	When the spatial harvest sequence was developed, consideration was given to minimizing watershed impacts. The spatial harvest sequence will be followed starting May 1, 2006. Timber disposition holders will need to transition from existing to new compartment and annual operating plans and general development plans.
Forecasting Assumptions and Analytical Methods	*ECA Alberta* analysis was completed for six watershed sub-basins. Details are available in the timber supply analysis (Appendix 6). The analysis confirmed that forecasted harvest levels (i.e., timber removals that are required as part of the spatial harvest sequence) will not produce significant flow increases.

Linkages between Strategic and Operational Plans	Compartment and Annual Operating Plans must follow the spatial harvest sequence as illustrated in Appendix 6B.

Star Creek stream buffer (photo courtesy of Robert Pisko.)

Criterion 4: Forest ecosystem contributions to global ecological cycles.

Forest ecosystem contributions to global ecological cycles — Maintain forest conditions and management activities that contribute to the health of global ecological cycles.

Element:

4.1 Forest ecosystem contributions to global ecological cycles — Maintain forest conditions and management activities that contribute to the health of global ecological cycles. *(CSA SFM Element 4.1)*

Values:

None identified.

Objectives that relate to Criterion 4 are listed below and are discussed in greater detail in the pages that follow.

Table 13. List of objectives for Criterion #4.

FMP Unique Number	Matrix Number*	Objective
25	4.1.1	To adopt and implement provincial carbon protocols as they are developed

** Matrix numbers are based on the numbering scheme that has been applied to "Elements".*

Objective 25	4.1 To adopt and implement provincial carbon protocols as they are developed.

Current Status	Concern about greenhouse gas emissions is growing. Canada is a signatory to the Kyoto Protocol, which came into force February 16, 2005. Current provincial policy, *Albertan's and Climate Change: Taking Action*, outlines Alberta's goals, targets and actions to reduce greenhouse gas emissions in the province. Since log processing (mills) and recommendations on logging technologies fall outside the scope of this plan, this FMP has a limited influence on greenhouse gas emissions in the C5 FMU.
Indicator	Not available at this time.
Target and Acceptable Variance	Not available at this time.
Forest Management Activities	1. The Government of Alberta will work with the Government of Canada to establish harmonized carbon policies and protocols. 2. ASRD shall determine the implications of greenhouse gas emission policies on the forestry sector, and propose suitable forest management policies.
Monitoring Procedures	Not available at this time.
Implementation Schedule	As carbon policies and protocols are developed by the Government of Alberta, ASRD will develop forest management strategies that comply with provincial climate change polices. Timber disposition holders will be notified of any new forest management strategies that are linked to climate change policies. Climate change policies will be addressed in quadrant reviews and reported in 5-year stewardship reports.
Forecasting Assumptions and Analytical Methods	Not available at this time.
Linkages between Strategic and Operational Plans	Not available at this time.

Criterion 5: Multiple benefits of forests to society.

Multiple benefits of forests to society — Sustain flows of forest benefits for current and future generations by providing multiple goods and services.

Elements:

5.1 Timber and Non-Timber Benefits — Manage the forest sustainably to produce an acceptable and feasible mix of both timber and non-timber benefits. *(CSA SFM Element 5.1)*

5.2 Communities and Sustainability — Contribute to the sustainability of communities by providing diverse opportunities to derive benefits from forests and to participate in their use/management. *(CSA SFM Element 5.2)*

Values:

Values identified through the public involvement process are as follows:

Element 5.1:

a. Multiple use: ensure the needs of all legitimate users are recognized and accommodated.

b. Balance the need for access with the need to restrict access to protect resource values.

c. Social benefits derived from forest ecosystems include recreational opportunities, wilderness experiences, natural environments for spiritual contemplation and rejuvenation, destination for leisure-time activities, a place to escape and find solitude, nature enjoyment and education.

d. Forests are an integral part of our "home place". Healthy forests contribute to our quality of life and well-being.

e. Forest landscapes possess desirable aesthetic qualities.

Element 5.2:

a) People whose subsistence and livelihood are dependent on the forest should have an ongoing opportunity to maintain essential interactions with the forest.

b) A well-managed forest and a strong forest-based economy contributes to the future sustainability of communities and the well-being of area residents and businesses.

c) A prosperous and sustainable local/regional economy is dependent on the forest for:

- timber and wood fiber for forest products and consumer goods;
- forage and rangeland resources for livestock grazing and consumer goods;
- fish/game species and fur-bearers that have economic importance;
- clean water and air;
- natural, aesthetic environments which attract visitors.

d) Renewable and non-renewable resource-based industries (e.g., logging, oil/gas, agriculture), and the jobs they provide, contribute to the maintenance of a strong and stable local/regional economy, which in turn contributes to a high standard of living.

e) The tourism and recreation industry (e.g., skiing, snowmobiling, off-road vehicle use,

camping, fishing, hunting, hiking, equestrian use, guiding and outfitting) make a significant contribution to the local and regional economy.

f) Well-managed forests provide opportunities for future economic diversification and value-added industries.

g) Well-managed aesthetic forests attract visitors whose expenditures on goods and services support the local/regional economy.

Objectives that relate to Criterion 5 are listed below and are discussed in greater detail in the pages that follow.

Table 14. List of objectives for Criterion #5.

FMP Unique Number	Matrix Number *	Objective
26	5.1.1	To maintain sustainable timber harvest levels; i.e., timber harvesting shall not exceed the forest's productive (renewal) capacity.
27	5.1.2	To maintain or increase the net forest (commercial timber harvesting) landbase in the C5 FMU.
28	5.1.3	To ensure all harvested areas are re-forested.
29	5.1.4	To achieve optimal utilization of wood fiber during logging operations.
30	5.1.5	To consider visual impacts during the development of harvest plans.
31	5.1.6	To allow the general public and various user groups to benefit from the C5 forest.
32	5.1.7	To provide reasonable access for recreational and industrial purposes while maintaining the ecological integrity of the forest.
33	5.1.8	To promote cooperation between forest harvesting operators and other forest users.
34	5.1.9	To ensure broad participation of disposition holders in forest management decision-making processes.
35	5.1.10	To integrate recreational activities with forest management practices.
36	5.1.11	To integrate rangeland management activities with forest management practices
37	5.1.12	To integrate trapping with forest management practices.
38	5.1.13	To integrate energy/mineral (exploration and development) activities with forest management practices.
39	5.1.14	To integrate the commercial recreation and tourism sectors with forest management practices.
40	5.2.1	To ensure that local/regional businesses have an opportunity to share in the economic benefits that can be derived from the C5 forest.
41	5.2.2	To maintain the ongoing (long-term) viability of the forest sector by encouraging companies to consider value-added manufacturing and/or improved wood utilization and processing.
42	5.2.2	To maintain the ongoing (long-term) viability of the forest sector by encouraging companies to consider value-added manufacturing and/or improved wood utilization and processing.

** Matrix numbers are based on the numbering scheme that has been applied to "Elements".*

Objective 26

5.1.1 To maintain sustainable timber harvest levels; i.e., timber harvesting shall not exceed the forest's productive (renewal) capacity.

Current Status

ASRD supports sustainable forest management which results in the provision of ecological, economic, social and cultural benefits and opportunities for present and future generations. This entails that timber harvesting be managed to ensure that logging activity does not exceed the sustainable level represented by the approved AAC.

The amount of timber that may be harvested in a year as stipulated in the pertinent quota certificate approved by the Minister of Sustainable Resource Development under sustained-yield management. The AAC is monitored by periodically analyzing data on the state of the forest area and its growth rate.

The Province identified sustainable harvest levels for the C5 FMU in 1986, and has modified the harvest level several times in response to new information or disturbance events. Delivered volumes from logging operations are being measured, documented and balanced on a 5-year basis.

Indicator

a) Amount of wood harvested in relation to the approved AAC on a quadrant basis.

b) Operable growing stock.

c) Timber harvest age.

Target and Acceptable Variance

a) The approved AAC is set at approximately 209,414 m^3 for coniferous timber.

Variance
Coniferous harvest levels are controlled on a quadrant system (a quadrant is a five-year period established by the Province). The average annual harvest level within the quadrant should not exceed the AAC by more than 10%. If it does, the Province will reduce the harvest level during the next quadrant by an amount equivalent to the entire volume in excess of the AAC. Exceptions are allowed for salvage cuts to address disturbance events such as forest fires, and insect and disease infestations.

b) The amount of operable growing stock at the end of the planning horizon must be equal to or greater than the average growing stock levels on the net landbase throughout the entire 200-year planning horizon (Alberta Forest Planning Management Standard 2005).

c) The minimum age of coniferous species at the time of harvesting shall be equal to, or greater than, 90 years unless action must be taken in the case of MPB infestion, where harvest age would be reduced to 80 years. (Note: actual age figures are LMU dependent).

Variance
Stands will be scheduled for harvest in the TSA when they reach 90 years of age. Variances to allow for thinning of stands to improve stand characteristics or to address operational constraints, minimize erosion or reduce the access footprint will be considered within the SHS compliance policy (i.e., timber disposition holders can deviate from the spatial harvest sequence by 20%).

Forest Management Activities

1. A sustainable AAC shall be determined, using ASRD's Timber Supply Analysis (TSA) protocols, based on direction contained in this FMP.
2. The volume of timber harvested shall be balanced out within the approved 5-year allowable cut. Variances in the annual harvest of allocated timber volumes (as identified in provincial legislation, regulations and policies) must be balanced out over a 5-year quadrant period.
3. Timber harvesting that exceeds the AAC may be permitted to allow for salvage operations in timber stands affected by fire, insects and disease.
4. The AAC shall be revised when more than 2.5% of the net landbase is impacted due to a disturbance. The AAC shall be reduced by an amount equal to the percentage of the net landbase deletion.
5. To account for loss of productivity due to roads and decking areas, a 5% reduction in AAC is to be applied as a default if the following is not provided:
   - Quantify the area (ha) disturbed by roads and decking areas (within and between harvested areas) for the past 2 years.
   - Establish a strategy and program to monitor the performance of regeneration on roads and decking areas (PSPs, regeneration monitoring).
   - Report actual performance every 5 years in stewardship reports.
6. Identify detailed silviculture tactics for reclamation work.
7. Incorporate Target C (above) as eligible volume for timber harvesting scheduling in the TSA modelling process.
8. ASRD shall develop a growth-and-yield monitoring program as part of this FMP (see Appendix 8B).
9. ASRD shall maintain records identifying the volume of timber delivered to mills. ASRD shall:
   - conduct log scale checks;
   - conduct timber hauling, truck, and weigh scale inspections;
   - monitor haul records;
   - maintain log scale population data;
   - conduct mill studies and inspections, and administer mill scale population checks.
10. Operators must achieve full compliance with pertinent legislation, regulations, approved plans and policies (i.e., zero infractions).
11. A minimum harvest age protocol will be adopted in the TSA model.
12. Continue to improve our understanding of forest stand dynamics and growth modeling through permanent sample plots, temporary sample plots and (as opportunities allow) research projects. ASRD shall complete necessary evaluations and then determine if adjustments are required to established yield curves. If necessary, yield curves shall be adjusted to correspond with research findings, and if warranted, predicted yield curves shall be adjusted to correspond with actual scaled timber volumes.
13. It is acceptable to carry out harvesting of small diameter trees—less than 90 yr. of age—when the intent is to improve full-rotation stand characteristics.

Monitoring Procedures	a) ASRD shall monitor 5-year quadrant records to compare delivered wood volumes against the approved AAC. b) ASRD shall complete an AAC re-calculation if a disturbance impacts more than 2.5% of the net landbase. ASRD shall report on yearly compliance success in preparation for 5-year stewardship reports. c) Collect data obtained from permanent and temporary sample plots and analyze results. d) 5-year stewardship reports shall report on any variances from the approved harvest sequence and the rationale for each variance. e) 5-year stewardship reports will identify the status and findings of all research projects.
Implementation Schedule	The new sustainable forest management AAC will be implemented May 1, 2006.

Forecasting Assumptions an Analytical Methods	The timber harvest level and spatial harvest pattern were, in the broadest sense, chosen based on the three pillars of sustainability (social, environmental and economic considerations). Maximization of AAC was sacrificed to ensure other forest values and activities were considered. Special themes used in determining the spatial pattern are noted in the forecasting assumptions and analytical methods of Objective 6. Attributes and assumptions unique to the C5 cut calculation are identified in Section 4.2 of this plan, and provide a more detailed picture of how the desired future forest AAC and spatial pattern were developed. The aspatial model *Woodstock* by Remsoft Inc. (Interpreter Version 3.27.0 and LP Report writer 3.27.0), the model *Spatial Woodstock* by Remsoft Inc. (Version 3.27.0) and the spatial model *Patchworks* from Spatial Planning Systems (Version 1.3) were the primary tools used to analyze the many different forest management scenarios that were developed. Sensitivity analyses were completed using the most appropriate tool. The major deliverables that were prepared through the analysis were: • A forest management strategy, expressed as an AAC in m^3 per year • An accompanying spatial harvest sequence map.
Linkages between Strategic and Operational Plans	C5 quota holders will develop Compartment, General Development, and Annual Operating Plans that follow the spatial harvest sequence presented in this plan.

Objective 27	5.1.2 To maintain or increase the net forest (commercial timber harvesting) landbase in the C5 FMU.

Current Status	The forested landbase that contributes to the AAC is known as the timber harvesting forest landbase (net or active landbase) commercial timber harvesting landbase. The net landbase for the C5 FMU currently stands at 117,551 ha. This is similar in size to the 1986 net landbase; however, a new net landbase configuration exists due to land use changes (which reduced the net) and modifications to the way marginal merchantable stands are addressed in the timber supply analysis which increased the net landbase. New yield curves were developed and are summarized in Appendix 8A.
Indicator	a) Land removed from forest production (i.e., loss of productive forested land to alternative uses). b) Area of disturbed sites (e.g., roads/ trails, landings, abandoned mineral/mine sites) that are reclaimed to become part of the productive forest landbase.
Target and Acceptable Variance	a) Net deletions from the net forested landbase should not exceed 1% (approximately 1175 ha) over a 10-year period. b) Net loss of forest cover from the gross forested landbase should not exceed 1% (approximately 3520 ha) over a 10-year period. c) All disturbed sites having potential since productive forest land shall be inventoried and prioritized for reclamation.
Forest Management Activities	1. ASRD shall monitor previously withdrawn lands under forest cover (e.g., reclaimed LOC roads, reclaimed mines and well sites) that have been returned to timber production. 2. Deletions from the net forest landbase (i.e., land use conversions) should be offset through means such as prompt reforestation of formerly withdrawn lands. 3. The provincial Special Places program has been concluded. As a result, no new protected areas are contemplated for the C5 FMU in the future. 4. Industrial disposition holders shall be encouraged to integrate and coordinate their activities to minimize the industrial footprint on the forest landbase. 5. ASRD shall maintain records identifying any additions and deletions to the C5 gross forested landbase 6. The TSA model shall be used to update the AAC in response to changes in the net forest and base. The AAC shall be revised when more than 2.5% of the net landbase is impacted due to a disturbance. The AAC shall be reduced by an amount equal to the percentage of the net landbase deletion. 7. "Never merchantable" stands will be included as a subjective landbase deletion during the TSA process. 8. ASRD shall track burned areas to determine whether regeneration has been successful. Where lands are found to be regenerating naturally, disposition holders shall have the option of completing regeneration surveys or a

regenerated stand inventory to confirm stocking levels.

9. Access development plans shall identify the lifespan of new road networks (i.e., plans will identify which roads are to be reclaimed).
10. ASRD (in collaboration with disposition holders) shall identify sites that may be reclaimed and re-vegetated on an annual basis.
11. Reclamation activities should follow the *Native Plant Revegetation Guidelines.*

Temporary roads are required for access to decked logs (road in this photo not yet constructed).

Monitoring Procedures	a) Monitor (track) landbase deletions and the size of the industrial footprint on the landscape using LSAS and GIS analysis. b) Report on landbase deletions in yearly summaries for five-year stewardship reports. c) ASRD shall track previously withdrawn lands that are being reclaimed and reforested.
Implementation Schedule	Sites that can be successfully reclaimed and reforested will be identified by ASRD by 2011.

Forecasting Assumptions and Analytical Methods	Industrial dispositions are identified as removals from the net landbase when they show up as a disturbance and are mapped in the Alberta Vegetation Inventory. A landbase net-down summary, which identifies access deletions (e.g., roads, cutlines, seismic trails) from the net productive landbase, is provided in Appendix 6A).
Linkages between Strategic and Operational Plans	Areas being reclaimed and reforested will be considered for inclusion in the net landbase during the next net landbase determination process and timber supply analysis (to occur in 2016). Reclamation plans are typically prepared to guide site reclamation efforts.

Objective 28

5.1.3 To ensure all harvested areas are re-forested.

Current Status

For coniferous blocks, silvicultural tracking begins with the approval of a harvest design that assigns a unique opening number to each cutblock. At the conclusion of stand falling and skidding, a skid clearance date is established for each block. This date sets the silvicultural time clock at year zero. Reforestation treatment must occur within 2 years of a block's skid clearance date. An establishment survey is then required from year 4 to no later than year 8. A performance survey is required from year 8 to no later than year 14. When a block passes a regeneration survey, it is declared satisfactorily restocked (SR).

Where a regeneration survey is not satisfactorily restocked (NSR), reforestation treatment must occur within one year of the date the block was declared NSR. Should the second survey fail, a re-treatment is required within 1 year, and the block must be resurveyed in the third year of that treatment. The *Alberta Regeneration Survey Manual* should be consulted for further details on requirements for reforesting harvested areas.

Knowledge of this process is necessary to interpret reforestation summaries. The 8-year delay period between harvest and the first survey must be accounted for but not misconstrue the interpretation of the actual performance results.

Significant provincial reforestation dates include the following:

- Harvest and skid clearance dates prior to March 1, 1991.
- Harvest and skid clearance dates from March 1, 1991 to April 30, 1995.
- Harvest and skid clearance dates after April 30, 1995.

The following three tables summarize the reforestation status of the C5 forest as of May 13, 2005. Since this is a snapshot in time, and blocks are being added and status updated systematically throughout the year, these results cannot be duplicated. They do, however, provide a useful look at reforestation success and status.

Blocks that have not been surveyed are considered to be NSR. The NSR blocks can be broken down into three groups: waiting for first survey, blocks re-treated and waiting for the required follow-up survey, and blocks not yet re-treated after the NSR survey.

Table 15 indicates a reforestation success rate (to full stocking levels) of 93.23%. Outstanding NSR blocks may be just under fully stocked; however, in most cases the stem density or height may be limiting. There are few absolute reforestation failures.

Table 15. Harvest and skid clearance data before March 1, 1991.

	Total Harvested Blocks	Satisfactorily Restocked			Not Satisfactorily Restocked		
		Industry	PLFD	FRIAA	Industry	PLFD	FRIAA
Number of blocks	915	400	453	0	32	30	0
Percentage of total blocks	100%	43.72%	49.51%	0	3.5%	3.28%	0
Hectares	11667.6	5272.4	5694.4	0	386.2	314.6	0

NSR First Survey Pending			NSR Re-treatment Survey Pending			NSR No Re-treatment Survey Pending		
Industry	PLFD	FRIAA	Industry	PLFD	FRIAA	Industry	PLFD	FRIAA
1	0	0	15	14	0	16	16	0
0.11%	0	0	1.64%	1.53%	0	1.75%	1.75%	0
115.4	0	0	154.5	154.4	0	116.3	160.2	0

Table 16 indicates a first-treatment reforestation success rate of 52.16%. NSR blocks may be fully stocked but under-height; thus, forest managers must decide on a block-by-block basis whether to retreat or wait additional years to meet the requirements.

Tables 16. Harvest and skid clearance data from March 1, 1991 to April 30, 1995.

	Total Harvested Blocks	Satisfactorily Restocked			Not Satisfactorily Restocked		
		Industry	PLFD	FRIAA	Industry	PLFD	FRIAA
Number of blocks	209	88	20	1	72	21	7
Percentage of total blocks	100%	42.11%	9.57%	0.48%	34.45%	10.05%	3.35%
Hectares	2911.2 ha	1208.4 ha	328.7 ha	19.4 ha	866.8 ha	393.2 ha	94.7 ha

NSR First Survey Pending			NSR Re-treatment Survey Pending			NSR No Re-treatment Survey Pending		
Industry	PLFD	FRIAA	Industry	PLFD	FRIAA	Industry	PLFD	FRIAA
15	9	2	34	3	3	23	9	2
7.18%	4.31%	0.96%	16.27%	1.44%	1.44%	11.00%	4.31%	0.96%
199.9 ha	143.7 ha	12.0 ha	363.2 ha	53.5 ha	45.0 ha	303.7 ha	196.0 ha	37.7 ha

Little can be ascertained from Table 17 because of the eight-year delay between skid clearance and the first regeneration survey. This is because many of the blocks in this listing have only recently been harvested and the seedlings need time to establish and grow.

Table 17. Harvest and skid clearance data from April 30, 1995 to May 13, 2005.

	Total Harvested Blocks	Satisfactorily Restocked			Not Satisfactorily Restocked		
		Industry	PLFD	FRIAA	Industry	PLFD	FRIAA
Number of blocks	402	24	0	4	309	8	57
Percentage of total blocks	100%	5.97%	0	1.0%	76.87%	1.99%	14.18%
Hectares	5847.5	274.4	0	26.4	4780.7	69.3	696.7

NSR First Survey Pending			NSR Re-treatment Survey Pending			NSR No Re-treatment Survey Pending		
Industry	PLFD	FRIAA	Industry	PLFD	FRIAA	Industry	PLFD	FRIAA
259	8	55	22	0	0	28	0	2
64.43%	1.99%	13.68%	5.47%	0	0	6.97%	0	0.5%
4181.2	69.3	689.2	210.0	0	0	389.5	0	7.5

Indicator	a) Reforestation timeframe and standards. b) Percentage of area successfully reforested.
Target and Acceptable Variance	a) All areas shall be reforested to provincial regeneration standards unless approved otherwise under section 143 of the *Timber Management Regulation*. b) 100% compliance with existing provincial reforestation regulations regarding block treatments and achieving survey timelines.
Forest Management Activities	1. Regeneration requirements and standards shall be outlined in the *Alberta Regeneration Survey Manual*, regional OGRs, and in provincial policies. 2. Provincial reforestation standards may be modified or waived by the Minister or his/her designate (through delegation of authority) as per section 143 of *Timber Management Regulation*. The Minister or his/her designate (i.e., Forest Management Director) can waive reforestation standards. 3. Regeneration requirements shall be tailored to site-specific conditions, and shall be dependent on values that are to be retained or enhanced at the site in question. 4. Timber disposition holders are to ensure the site preparation treatments being used are conducive to prompt regeneration while minimizing environmental (ecological) degradation (see Objective 21). Timber disposition holders will meet or exceed provincial free-to-grow standards on cutblocks. 5. ASRD shall encourage research into alternative harvest strategies (for example, see Objective 19 Forest Management Activity #1.) 6. To maintain the species composition found in the forest, all harvested sites should be reforested to reflect the yield strata[1] proportions that existed before harvesting occurred. The original species mix and proportion can be achieved (balanced out) on a landscape management unit (LMU) basis at the end of

	each quadrant period. Implementation of this forest management activity will be identified in the regional OGRs. *([1] By definition, strata for the C5 FMP include: Fa, Fd, Pl , Sx and CD. See Glossary of Terms for a detailed definition.)*
Monitoring Procedures	a) Timber disposition holders are to submit regeneration reports on an annual basis. Reports shall be reviewed by ASRD. b) ASRD shall maintain annual records of reforestation activities and compliance with provincial guidelines. Reforestation success shall be identified in 5-year stewardship reports. c) ASRD shall monitor reforestation performance.
Implementation Schedule	Existing (ongoing) ASRD policies, directives, and requirements will guide regeneration activities.
Forecasting Assumptions and Analytical Methods	The TSA observes a 5-year delay in regeneration establishment for all coniferous species except Douglas-fir, which has a 10 year delay, and is based on a green-up period of 30 years. These assumptions are based on tree establishment history (both planting and seeding), and the need to ensure the C5 forest is being managed in recognition of other values such as recreation and aesthetics.
Linkages between Strategic and Operational Plans	The spatial harvest pattern was significantly influenced in the timber supply analysis by the regeneration and green-up constraints. The resulting spatial pattern will affect General Development Plans, Compartment Plans and Annual Operating Plans of quota holders. Monitoring of deviations from the spatial harvest sequence will occur in Compartment and Annual Operating Plans and summarized in 5-year stewardship reports. In addition, reforestation summaries will be monitored by ASRD to ensure the species mix and species proportions, by strata, are being maintained.

Objective 29

5.1.4 To achieve optimal utilization of wood fiber during logging operations.

Current Status

Clearcut harvesting to a 15 cm stump diameter (outside bark) and an 11 cm (inside bark) have been in effect since the 1986 management plan. Quota holders operate according to the utilization standard identified in their current quota certificates.

Salvage operations have been initiated for fire and insect attacks in the past. Industrial disposition holders are required to develop timber salvage plans as part of the ASRD Timber Salvage Authority and Records, TM88 program.

Stump-side processor (photo courtesy of Spray Lake Sawmills).

Indicator

a) Compliance with direction contained in regional OGRs on the volume of wood to be salvaged following industrial disturbances.

b) Volume of wood salvaged following natural disturbances.

Target and Acceptable Variance

a) Requirements contained in regional OGRs for timber recovery, which is part of salvage operations, shall be met or exceeded.

b) Salvage 100% of the accessible, economically recoverable wood having merchantable value.

c) Salvage all accessible, economically recoverable wood having merchantable value except stems and stands that are needed to achieve structural retention objectives and targets (see Objective 4).

Forest Management Activities

1. ASRD shall develop regional OGRs in consultation with timber disposition holders, other stakeholders, and a member of the public. The regional OGRs shall be a "living" document; i.e., quadrant (5-year) updates of the regional OGRs shall be completed.

2. The Timber Supply Analysis shall use the same utilization standards as are identified on the C5 quota holders certificates. This is commonly referred to as the 15/11 cm standard which will be applied to all logging operations in green timber. Alternate utilization standards can be proposed and must be approved by SRD prior to the initiation of any salvage operations.
3. ASRD shall communicate timber salvage requirements to industrial disposition holders when new dispositions are being issued.
4. ASRD shall encourage quota holders to become proactive and acquire the industrial salvage volume for their areas of interest (i.e., quota spheres).
5. Quota holders shall be required to report all industrial salvage into Timber Productivity Rating System (TPRS) using their assigned salvage disposition number.
6. ASRD shall track any removals from the net landbase due to industrial development and account for the salvage timber. Timber volumes will be reconciled at the end of every five-year period according to the "Accounting for Industrial Timber Salvage" policy, which is as follows.

Accounting for Industrial Timber Salvage

Accounting for timber volume resulting from non-forestry industrial operations is a requirement of the C5 Forest Management Plan. The C5 quota holders must report industrial timber volume as drain to the annual allowable cut to ensure their approved quota AAC is not exceeded. The province will collect Timber Damage Assessment (TDA) for non-forestry industrial salvage.

ASRD will track industrial dispositions on the land base and account for the merchantable timber as production chargeable to the C5 AAC. Each quota holder will record the volume of salvage and/or unsalvaged wood on each non-forestry industrial disposition, based on the procedures stated below, and report these volumes to the Southern Rockies Area (SRA).

The SRA will work with the quota holders (Crowsnest Forest Products Ltd., Spray Lake Sawmills Ltd., 770538 Alberta Ltd. and 7793128 Alberta Ltd.) to develop the logistics required to ensure that accounting for industrial salvage is applied fairly to each quota holder and in a limited manner to the Community Timber Program.

Procedures

The procedures and requirements for tracking industrial salvage are as follows:

- Where the province receives TDA compensation for timber volumes from industrial dispositions, timber dues have been included in the TDA estimates; therefore, no dues are required from the salvage recipient.
- SRA will work with quota holders to implement a program where the majority of the timber loss to industrial dispositions is utilized and all timber volume is accounted for within the C5 FMU.
- Merchantable timber volumes from non-forestry operations shall be counted as production for cut control purposes and recorded as AAC drain.
- Non-forestry disposition volumes must be tracked and reported. ASRD is considering how this can be accomplished with industrial disposition holders.
- Volumes from normal geosphysical (i.e., seismic lines exceeding 2.5 m) will be charged as AAC drain against the appropriate timber quote, and in a limited manner to the CTP program.
- Volumes from low impact geophysical (i.e., programs that average 2 m

wide or less, with no portions exceeding 2.5 m in width), where the Province does not receive any TDA compensation, will not be charged as AAC drain.

- When all or part of an industrial disposition falls within the net land base, the total volume for the disposition will be charged. If the entire disposition falls outside the net land base, the volume will not be charged. The SRA will use available maps and "spatial GIS" (when available) to determine if a disposition is chargeable.
- Dispositions will be tracked by weigh scale volume and TDA average volume. The TDA average volume used shall be the provincial average volume/ha for coniferous species (37.3 m3/ha), based on Exhibit 3 in the Timber Damage Tables for 2004/2005 (http://www.srd.gov.ab.ca/land/m_li_timberdamage_2003_2004.html).
- Where scaled volumes are used for chargeability, quota holder RFP validation of the percentage of merchantable volume salvaged from a disposition is required. Where merchantable volume salvaged is less than 100% of that available, the unsalvaged percentage will be estimated and multiplied by the provincial average volume, and this volume added to the scaled volume to determine the total chargeable volume. For example:
  - *If a disposition is 10 ha, the estimated salvageable volume is calculated:*
    10 ha x 37.3 m^3/ha (Prov. avg. TDA) = 373 m^3.
  - *If 200 m3 were logged and scaled at the mill and the company RFP estimates 75% of the merchantable timber is salvaged, then:*
    25% is applied to the 373 m^3 to determine the unsalvaged portion of the disposition (i.e., 25% x 373 m^3 = 93.25 m^3);
    scaled volume + unsalvaged volume = total volume chargeable (i.e., 200 m^3 + 93.25 m^3 = 293.25 m^3).
- Volumes will be charged to quota holders on the basis of who has accepted the volume. If volume is not salvaged, or is taken by a party that does not hold a timber disposition within the C5 FMU, then the volume will be charged to unit disposition holders and in a limited way to the Community Timber Program (see table below for specifics) as a percentage of AAC entitlement.
  - Volume calculations for salvaged volumes will use scaled volumes if available.
  - Volume calculations for salvaged volumes not scaled will use the TDA provincial average volume (stated above).
  - Volume calculations for unsalvaged volumes will use TDA provincial average volume (stated above).
- Quota holders, and in a limited way the Community Timber Program, will share the drain from unsalvaged merchantable volume or merchantable volume leaving the FMU in proportion to their periodic/quadrant allowable cut, with a limit placed on the Community Timber Program. The Community Timber Program will share the charged AAC equally with the Quota Holders on the first 5000 m^3 recorded for the FMU in the 5 year quadrant period. Once salvage volumes exceed 5000 m^3 in a 5 year quadrant period, the Community Timber Program will be exempt from the chargeability allocation and the remaining quota dispositions will accept a greater chargeability percentage as identified in the table below.

  Two example calculations are provided below in Table 1. In the event of

a significant industrial salvage event, this policy document shall be reviewed; in addition, a review shall occur every 5 years and be reported on the stewardship document. Over a 10-year period, if natural disturbance events such as wildfire occur, and when combined with the industrial salvage disturbance, the total disturbance area to the net productive coniferous forest landbase of the forest management unit exceeds 2.5%, a revised AAC will be determined.

- Each quota holder will report annually the estimated volume of unsalvaged wood and the volume of salvaged wood that crossed their weigh scales by disposition number for the previous year. The reported volumes will also be submitted on company timber returns to the Timber Production, Auditing and Revenue Section, Forest Management Branch.
- SRA will track all volumes (scaled volumes and TDA volumes) from all disposition holders for roll-up in the 5-year stewardship report.
- ASRD will review circumstances where unanticipated late influxes of volumes from industrial salvage cause a quota holder to exceed their approved periodic/quadrant allowable cut and decide whether over-production penalties will apply.
- SRA shall indicate on all land use dispositions that all reasonably accessible and economically recoverable merchantable wood is to be salvaged. SRA shall also provide the quota holder's names and contact information to each industrial disposition applicant and encourage the applicant to contact the quota holder regarding salvage.
- AAC drain against the quotas holders due to industrial timber salvage will be entered into TPRS as it is received. Each quota holder's GDP and AOP shall reflect this total volume.
- This process shall commence May 1, 2006.
- SRD shall review the process during the 2006 operating year and resolve the policy issues, including the tracking and reporting of industrial salvage of non-forestry disposition holders in the 2007 operating year.

Percent allocation based on AAC.

Operator	Species	Quota Holder percentage of AAC	Allocation percentage of first 5000 m^3 of salvage	Allocation percentage of all volume exceeding 5000 m^3
Spray Lake Sawmills Ltd. CTQC050008	Conifer	29.07	29.07	30.9948
Crowsnest Forest Products Ltd. CTQC050009	Conifer	58.69	58.69	62.576
770538 Alberta Ltd CTQC050005	Conifer	4.38	4.38	4.67
7793128 Alberta Ltd. CTQC050002	Conifer	1.65	1.65	1.7592
Community Timber Program	Conifer	6.21	6.21	0

AAC chargeability examples.

Operator	(a) % of AAC	(b) Chargeability % of first 5000 m^3	(c) Allocation % on all volume exceeding 5,000 m^3 in a 5 year period.	Example 1* 3600 (m^3) ([b%*3600]/100)	Example 2** 8000 (m3) ((b%*5000)+ c%*3000)/100)
Spray Lake Sawmills Ltd. CTQC050008	29.07	29.07	30.99	1046.52	2383.34
Crowsnest Forest Products Ltd. CTQC050009	58.69	58.69	62.58	2112.84	4811.78
770538 Alberta Ltd CTQC050005	4.38	4.38	4.67	157.68	359.10
7793128 Alberta Ltd. CTQC050002	1.65	1.65	1.76	59.40	135.28
Community Timber Program	6.21	6.21	0.00	223.56	310.50

*Example 1: Here the total volume for the 5 year period from all sources (scaled volumes and TDA volumes) amounted to 3600 m^3, and the chargeability rate was applied the same as for the AAC %.

**Example 2: Here the total volume from all sources exceeded the 5000 m^3 limit, so the allocation changed with the AAC % applied to all operators on the first 5000 m^3 and the remaining 3000 m^3 was applied at the column C allocation %. Note that 310.5 m^3 is the maximum chargeable volume to the CTP program in a 5 year period.

Grapple skidder (photo courtesy of Spray Lake Sawmills).

Monitoring Procedures	a) ASRD shall complete site examinations following industrial (e.g., energy) disturbances to determine the level of site impacts. b) ASRD shall use ASRD's Timber Damage Assessment (TDA) protocol to track timber salvage operations.
Implementation Schedule	Provisions in this section take effect May 1, 2006.

Feller-buncher (photo courtesy of Crowsnest Forest Products Ltd.).

Forecasting Assumptions and Analytical Methods	Not applicable.
Linkages between Strategic and Operational Plans	TDA tracking for the first 10-year period of this plan will influence the industrial timber salvage deductions that will be included in the next TSA.

Picker truck loading logs in C5 FMU (photo courtesy of Crowsnest Forest Products Ltd.).

Objective 30

5.1.5 To consider visual impacts during the development of harvest plans.

Current Status

It is the aim of ASRD to minimize the impacts of timber operations on the visual quality of forest landscapes. This policy is expressed in the *Alberta Timber Planning and Operating Ground Rules* (1994) Section 4.8, and in the following provincial documents that address landscape aesthetics:

- A Field Guide to Visual Resource Assessment in Alberta (1999).
- Forest Landscape Management Strategies for Alberta (1988).

The existence of sophisticated computer models now make it possible to simulate the appearance of landscapes following logging, and in subsequent regeneration time intervals.

Indicator

Achievement of Visual Quality Objectives based on the percent alteration of the green portion of the landscape or of a particular landscape scene.

Target and Acceptable Variance

Visual Quality Objectives for "high" visually sensitive zones are as follows (note: percent figures indicate anticipated alteration proportions within each "sensitive zone"):

Preservation	0 %
Retention	0-2 %
Partial Retention	2.1-8 %
Modification	8.1-20 %
Max. Modification	20.1-35 %

(Note: Percentage figures apply to the visible green areas of the landscape; rock and barren ground are excluded).

Forest Management Activities

1. Aesthetic design considerations and logging practices must be adopted for all sites that fall within high visually sensitive zones identified in the C5 FMU visual sensitivity map.
2. Aesthetic practices must be adopted for all other industrial disturbances within high visually sensitive zones.
3. Landscape aesthetics shall be addressed following direction contained in ASRD's Forest Landscape Management Strategies for Alberta and A Field Guide to Visual Resource Assessment in Alberta.
4. ASRD's three-class visual sensitivity rating system (i.e., high, medium, low) shall be used when completing visual assessments.
5. ASRD shall complete a visual resource inventory, which will then be used in preparing a visual sensitivity map for the C5 FMU, and visual quality objectives for each identified sensitive zone.
6. Timber disposition holders shall complete a visual impact analysis and total resource design in consultation with ASRD.
7. If harvest systems other than clearcutting are used, such as partial cutting, the proportion of the area to be altered must be defined based on the harvest (silvicultural) system being used.

	8. ASRD will complete a visual assessment of the Livingstone Range as seen from viewscapes along the North Burmis Road. 9. Star Creek will be managed in a shelterwood/partial cut regime to ensure other values (relating to the close proximity of the drainage to the local community and historical uses that include, but are not limited to, hiking, mushroom picking, and intrinsic, spiritual and aesthetic values, etc.) are recognized and elk habitat is favoured. Portions of the Star Creek drainage identified in the FireSmart conceptual plan will be harvested to allow for 3 m crown spacing or small patch removals that will also achieve the FireSmart objective of reducing fire behaviour potential (i.e., crown fires). Considerations of blowdown potential will affect harvest block retentions.
Monitoring Procedures	a) Compare the actual percentage of area altered with the percent alteration allowed as per each visual quality objective. b) Compare on-the-ground harvest block designs with the approved total resource design.
Implementation Schedule	The visual resource inventory map will become a reference for harvest planning review processes effective May 1, 2006.
Forecasting Assumptions and Analytical Methods	The visual resource inventory map prepared by PLFD was used in developing the spatial harvest sequence, and will become a reference for future harvest planning review processes.
Linkages between Strategic and Operational Plans	The visual resource inventory map (which may be subject to revisions in the future) will be consulted when reviewing Compartment and Annual Operating Plans to ensure that forest aesthetics are being addressed satisfactorily.

Aesthetic considerations south of Highway 3.

Objective 31	5.1.6 To allow the general public and various user groups to benefit from the C5 forest.

Current Status	Integrated resource management plans (i.e., *Eastern Slopes Policy*, *Livingstone-Porcupine Hills Sub-regional IRP*; *Castle River Sub-regional IRP*, and *Crowsnest Corridor Local IRP*) have identified the range of acceptable uses for the C5 FMU. These plans have been in place for approximately 20 years. Referrals are used by government agencies when reviewing land use disposition and development applications. Conformity with existing government policy provides an important basis for making decisions on development applications.
Indicator	Number of user permits and land and resource dispositions issued.
Target and Acceptable Variance	Applications will be reviewed subject to government policies and approval processes that are in place.
Forest Management Activities	1. Existing IRPs, water basin management plans, strategic land use plans, and inter-agency referrals shall continue to be used to determine compatible uses and activities within the C5 forest. 2. ASRD and timber disposition holders will ensure the full range of compatible uses (as identified in IRPs, in any agreements and government policies) are considered in forest planning exercises and during timber harvesting operations. 3. ASRD shall continue to issue land and resource dispositions, licenses, and permits using current administrative processes.
Monitoring Procedures	The monitoring of land uses that are permitted in the C5 FMU are shared by several provincial departments. Government staff complete on-site inspections from time to time.
Implementation Schedule	Existing processes are ongoing.
Forecasting Assumptions and Analytical Methods	Land use policies of the provincial government influenced the establishment of the net landbase for timber production in the TSA. Existing dispositions, agreements and land/resource entitlements must be honored throughout the C5 FMU.

Linkages between Strategic and Operational Plans	ASRD and timber disposition holders will ensure the full range of compatible uses (as identified in IRPs, any agreements and government policies) and existing legitimate uses are considered in forest planning exercises and during timber harvesting operations. Detailed operational plans or agreements may need to be developed for different sectors to ensure integration and address land use conflicts.

Objective 32

5.1.7 To provide reasonable access for recreational and industrial purposes while maintaining the ecological integrity of the forest.

Current Status

Public demand for motorized access in the Rocky Mountains Forest Reserve has been increasing over the years. A substantial access network exists throughout much of the FMU due to past industrial activity.

Three forest land use zones (FLUZ) currently exist in the C5 FMU:

- Castle Special Management Area;
- Allison/Chinook;
- Cataract Creek Snow Vehicle.

Forest land use zones identify motorized recreation restrictions that must be observed in each FLUZ. Motorized access restrictions are also typically in place for designated protected areas. An access management plan has been prepared for the Castle Special Management Area. Unless posted or gated, all access roads established through industrial activity (outside FLUZs) are accessible to the general public. Concerns have been expressed over grizzly bear mortality that appears to be linked to access roads.

Grizzly bear north of Coleman.

Indicator

a) Number of entry points into the C5 FMU.
b) Kilometers of forestry access roads.
c) Plans in place to manage forestry-related access.

Target and Acceptable Variance	a) All major existing public entry points into the FMU shall be retained unless public safety or environmental matters become an issue. b) Interim road density figures (for "open" motorized roads) will be established once the provincial grizzly bear recovery plan has been approved. c) Completion of an industrial access development plan shall be initiated following FMP approval.
Forest Management Activities	1. Disposition holders may, in consultation with ASRD, prevent or limit public access on specific industrial access roads for legitimate reasons. Public notification shall occur through signage and other means (e.g., pamphlets, meetings, media announcements, signage on gates). 2. In areas identified as having high habitat and conservation values (i.e., having critical importance for wildlife), access restrictions and controls shall be considered to help meet conservation objectives (e.g., grizzly conservation area plans, elk calving grounds and winter ranges). Conditions of Approval for LOC roads and AOP roads will identify access control, signage, road closure and any public notification requirements. 3. ASRD shall give consideration to the establishment of additional forest land use zones within the C5 FMU to manage recreational access. 4. ASRD shall identify open/active and closed/inactive motorized routes (and the road density for each) by subregion and LMU within the FMU. 5. ASRD shall monitor road density changes and compare them against baseline data obtained through completion of strategy #4 for pre-determined areas. Road density targets will be established for each LMU as part of access development planning. The upper density for open roads in each LMU will be influenced by wildlife (e.g., grizzly), environmental, and economic/social needs. 6. ASRD shall encourage reclamation of all abandoned roads and trails not required for industrial activity, while respecting traditional access. 7. ASRD shall initiate the development of an access development plan to forecast access needs, identify and coordinate key industrial access roads in the FMU, and identify preferred road corridor locations to access future timber stands. The access development plan will provide a basis for developing future access management plans. 8. New forestry access roads must be integrated with forest land use zone road networks where FLUZs exist. 9. Underlying principles for access management planning include: • Promote shared access by all users. • Prevent proliferation of access (i.e., minimize the road/trail footprint). • Establish and maintain a sustainable trail system. • Access decisions must consider species and habitat issues/needs and various social and economic factors. • Minimize environmental impacts. • Road location/standards to consider the future (long-term) status and use of roads and trails. • Progressive reclamation of temporary forestry roads (i.e., class 4 and 5 roads) when operations are completed. • Use public notification (signage, gating, brochures) to inform the public of the status of roads/trails.

Grizzly bear near Livingstone River.

Monitoring Procedures	a) ASRD staff shall complete patrols, monitor public motorized access, document the status of forestry roads, and note compliance with road/trail closures. b) ASRD shall monitor road density changes using GIS analysis and confirm existing road densities within LMUs. c) Access plans are to be completed, and be consistent with the underlying principles identified in strategy 7. d) As funding and partnership opportunities present themselves, vehicle use on select forestry roads (i.e., season of use, number of vehicles, time of day, etc.) will be monitored.
Implementation Schedule	Many of the listed forest management activities are ongoing. The preparation of an access development plan will commence in 2006 and serve as a precursor to the development of additional access management plans in the C5 FMU.
Forecasting Assumptions and Analytical Methods	The spatial harvest sequence provides a first estimate of road requirements to access scheduled stands, and provides the basis for preparing an access development plan.

Linkages between Strategic and Operational Plans	Preliminary access roads, as identified through the spatial model “Patchworks”, will be considered when an access development plan is being prepared. Upon completion, the access development plan will be incorporated into the disposition review process of ASRD, and influence the road reclamation and abandonment process. The access development plan will provide an important context for subsequent access management planning and for the review of operational approvals and reclamation activities administered by ASRD through disposition management.

Objective 33	5.1.8 Promote cooperation between forest harvesting operators and other forest users.

Current Status	ASRD has been informally addressing this objective for some time, although no formal requirement for tracking complaints was in place. Integrated land and resource management continues to be a fundamental principle of the provincial government, and is recognized in Section 4 of the provincial *Timber Harvest Planning and Operating Ground Rules* (1994). Formal complaints about land use issues that are conveyed in writing to elected officials (MLAs, Cabinet Ministers and the Premier) are dealt with using the provincial government's Action Request (AR) system.
Indicator	a) Number of ARs issued by the Minister's office of ASRD. b) Number of complaints received.
Target and Acceptable Variance	a) ASRD managers and staff shall complete all assigned ARs. b) Number of complaint letters and forms on file.
Forest Management Activities	1. ASRD shall develop a complaint form to receive feedback from forest users. ASRD shall maintain records of public concerns and complaints received. 2. Specific user conflicts shall be addressed in detailed sector plans or resolved through ASRD mediation processes. 3. Provincial agencies shall implement education and awareness programs to reduce user conflicts (e.g., Shifting Gears; Castle Education Initiative, Random Camping Users Guide; Respect the Land program).
Monitoring Procedures	Tracking mechanisms (i.e., departmental ARs and Southern Rockies correspondence/complaint file system) shall be used to register all complaints received and the follow-up actions taken.
Implementation Schedule	Tracking complaints will begin in May 2006. Other processes are ongoing.
Forecasting Assumptions and Analytical Methods	Not applicable.
Linkages between Strategic and Operational Plans	The tracking of complaints will affect all operational processes of ASRD.

Objective 34	5.1.9 To ensure broad participation of disposition holders in forest management decision-making processes.

Current Status	Integrated land and resource management continues to be a fundamental principle of the provincial government, and is recognized in the provincial *Timber Harvest Planning and Operating Ground Rules*. Progress is being made in the areas of information dissemination and the issuance of notifications to legitimate stakeholders. Depending on the initiative in question, different forms of consultation are being used to seek input and feedback from involved stakeholders.
Indicator	Number of consultations with disposition holders.
Target and Acceptable Variance	Timber disposition holders will contact other disposition holders (e.g., trapping, outfitting, grazing, oil and gas disposition holders) that are directly affected by logging operations when developing harvesting plans.
Forest Management Activities	1. Timber disposition holder requirements for notifying and consulting with other disposition holders shall be identified in regional OGRs. 2. Timber disposition holders shall seek input from other disposition holders, organized user groups, and interested parties on their activities prior to developing harvest and silvicultural plans. Regional OGRs will provide direction for public consultation. 3. New non-timber disposition holders shall be encouraged to become informed of all existing dispositions that apply to a given areas, and be aware of operators that use (frequent) an area of interest. 4. ASRD shall inform timber disposition holders of stakeholders that must be contacted before a initiating a public consultation campaign.
Monitoring Procedures	Timber disposition holders and ASRD shall assess whether a cross-spectrum of interests are better informed and have become meaningfully engaged through public consultation events that were offered.
Implementation Schedule	Ongoing practice.
Forecasting Assumptions and Analytical Methods	Not applicable.
Linkages between Strategic and Operational Plans	Affects all new disposition applications and processes of ASRD, and the operational plans of disposition holders.

Aesthetic planning for highly visible areas is required.

Objective 35	5.1.10 To integrate recreational activities with forest management practices.

Current Status	Management activities within the Allison Chinook Forest Land Use Zone (5 km^2) and bordering affected lands within 1 km of the west and northwest (west of Allison Creek above the dam) FLUZ boundary will be managed for motorized and non-motorized recreational activities as outlined in the FLUZ Regulations. Special forest management strategies will be employed within this FLUZ, and in particular within or adjacent to the cross-country ski trail system. This cross-country trail system is currently being maintained by the Municipality of the Crowsnest Pass with assistance from the Crowsnest Cross Country Ski Association. The Allison Chinook Forest Land Use Zone Is affected by two integrated resource plans. The Livingstone–Porcupine Hills Sub-Regional Integrated Resource Plan affects the north and west side. The Crowsnest Corridor Local Integrated Resource Plan covers the south and east side. Both IRPs identify compatible land use activities by zones.
Indicator	Number of Action Requests issued by the Minister's office of ASRD.
Target and Acceptable Variance	ASRD managers and staff shall complete all assigned Action Requests.
Forest Management Activities	1. For harvesting in the existing Allison Chinook Forest Land Use Zone and any expansions of that zone, an integrated management approach is to be used to ensure that current and future recreational facilities and opportunities are maintained with timber harvesting activities. This management strategies will be implemented with the following provisions that harvesting: • does not negatively impact the existing cross-country ski trail system; • allows for future expansion of the existing cross-country trail system and the existing Allison–Chinook Forest Land Use Zone; • allows for the establishment of a continuous uneven-aged forest over time for the maintenance of landscape and stand level biodiversity; • includes the completion of FireSmart partial cut removals along the south boundary powerline; • considers reforestation of multiple species, including deciduous, to address long-term FireSmart planning and biodiversity objectives; • allows for the removal of individual trees or clumps of trees to address natural disturbance events, such as wildfire and insect and disease, that will minimize impacts on recreational trails and especially cross-country ski trails. Mutual agreement between the Crowsnest Pass Cross-Country Ski Association and Sustainable Resource Development would be required to implement operational plans; • requires the use of low impact harvest methods to address the sensitivity of these recreation trails to capture and maintain snow cover during the period when trails are designated for cross-country skiing by signs or notices posted in the FLUZ. All logging equipment and methods must

ensure that the goal of low impact harvesting is achieved.

- recognizes the unique tree species of the Allison Creek drainage, namely a core population for western red cedar (Thuja plicata), as it occurs along the flanks of Tecumseh Mountain (between the cross-country ski trail network, Allison Creek above the dam and Deadman Pass); and
- ensures that log haul, debris cleanup and disposal occur progressively and outside of the winter skiing season, which is identified as Dec 1 to May 15 of each year.

2. ASRD shall develop a recreation sites theme map that must be considered when the C5 net landbase is established.
3. No new protected areas or recreation areas are being contemplated in the C5 FMU with the completion of the provincial government's Special Places initiative.
4. High-use random campsites shall be inventoried and monitored by forest guardians, administered by PLFD and FPD. High-use random campsites will not be included in the timber harvest landbase (except in the case of salvage removals following forest fires, insect outbreaks, or other natural disturbances). The impacts of random camping on adjacent logging areas shall be minimized.
5. Traditional recreational uses and use patterns shall be recognized and respected by timber disposition holders.

Monitoring Procedures	ASRD to periodically examine buffers retained around traditional random campsites.
Implementation Schedule	Not applicable.

Staging areas are identified for ATV off-loading, and have become choice locations for random camping.

Random camping is common in the C5 FMU.

Forecasting Assumptions and Analytical Methods	A recreation sites theme map was prepared and consulted when the net landbase was determined as part of the TSA. Knowledgeable departmental staff have a good awareness of random campsites that receive continuous use, year after year. Merchantable timber stands and productive land areas (falling outside stream buffers and within 100 m of the GPS-identified random campsites) were removed from the net productive landbase. Traditional random campsites identified on the recreation sites theme map will be managed for their recreational and aesthetic values.
Linkages between Strategic and Operational Plans	General Development Plans, Compartment Plans and Annual Operating Plans will have to consider road access and harvesting operations that do not negatively impact recreational sites.

Objective 36	5.1.11 To integrate rangeland management activities with forest management practices such that long-term relationships between grazing disposition holders and forest operators are developed to sustain fiber and forage resources.

Current Status	Integrated land and resource management continues to be a fundamental principle of the provincial government, and is recognized in the provincial *Timber Harvest Planning and Operating Ground Rules.* Livestock grazing and timber harvesting have operated successfully on the same landbase for a long period of time. In recent times, a desire to manage the fiber resource more intensively has resulted in a need to make certain these two resource users communicate and work cooperatively to ensure that issues and conflicts are minimized. ASRD is developing a province-wide strategy to improve the integration between the livestock grazing and timber harvesting sectors. It is anticipated this strategy will be completed in 2006.
Indicator	a) Number of Action Requests issued by the Minister's office of ASRD. b) Communication, data sharing, collaboration and agreements supporting sustainable forest and range resource management. c) Grazing–forestry operational agreements. d) Rangeland/livestock management improvements. e) Livestock grazing levels/grazing capacity (AUMs).
Target and Acceptable Variance	a) ASRD managers and staff shall complete all assigned Action Requests. b) Records demonstrate that communication, data sharing, collaboration and agreements supporting sustainable forest and range resource management have occurred. c) Completed grazing–forestry operational agreements as defined by evolving policy. d) Retention or restoration of existing rangeland/livestock improvements. e) No net loss of livestock grazing capacity due to forest management operations.
Forest Management Activities	1. Foster improved communication, cooperation, and collaboration between the two resource sectors through data sharing and collaborative planning at all stages of rangeland and forest operations. At the earliest planning stages, forest and rangeland operators shall contact disposition holders within their operating area and advise them of any proposed activities, and promote communication in order to help identify concerns. 2. Quota holders shall undertake effective notification and consultation with grazing disposition holders at the compartment planning stage and at subsequent stages in forest management planning (i.e., pursue early notification and face-to-face consultations). The location of all range

	improvements, range infrastructure (i.e., water developments, corrals, trails and fence lines), natural fence barriers, important springs and other features will be identified and mapped. 3. Coordinate range and timber operations to minimize negative interactions at all stages of plan development and operations. 4. Timber and range disposition holders shall develop grazing–forest operational agreements that are in accordance with ASRD's integration of grazing and timber operations (directive and manual) in conjunction with ASRD during the harvest design stage. These agreements will outline potential and known issues and conflicts (including natural fence barriers), and describe how impacts to these will be mitigated. Grazing–forest operational agreements shall be recognized in Annual Operating Plans. 5. Adopt any applicable provincial standards and guidelines which may exist or need to be developed to integrate timber harvesting with domestic grazing. 6. Grazing shall be managed under detailed rangeland management plans and operational management plans. 7. ASRD shall ensure rangeland management plans contain strategies to minimize livestock impacts on seedlings. 8. Timber disposition holders shall ensure that timber operations do not negatively impact range management of the grazing disposition. This will be achieved through the retention and/or restoration of the existing rangeland resource infrastructure (and improvements) such as fences, water development sites, corrals, trails, and range improvement clearings. If the rangeland or livestock infrastructure (and improvements) are damaged through logging activities, restoration must be undertaken by the operator to achieve the state, condition and function that existed prior to harvesting. 9. Rangeland and livestock considerations shall be explicitly addressed in regional OGRs. 10. The timber operator shall strive to ensure that timber operations do not reduce the range carrying capacity for domestic livestock grazing. Any impacts to forage productivity and availability will be addressed in grazing–forestry operational agreements.
Monitoring Procedures	a) Annual summaries and stewardship reports will identify the existence of any working agreements, progress made in achieving high levels of integration and cooperation between the grazing and timber sectors, activities undertaken by forestry companies to restore previously existing rangelands and livestock improvement infrastructure, status of the range carrying capacity, etc. b) ASRD staff to complete AOP checklists to ensure that range management concerns are being addressed.
Implementation Schedule	New activities outlined in this Objective will come into effect May 1, 2006.
Forecasting Assumptions and Analytical Methods	Not applicable.

Linkages between Strategic and Operational Plans	Forestry plans (i.e., Compartment Plans, General Development Plans and Annual Operating Plans) and Rangeland Management Plans should be mutually supportive of each other to demonstrate that integration between the two sectors is being achieved. Grazing–forestry operational agreements will identify how potential issues and existing conflicts will be overcome.

Cattle in the Porcupine Hills.

Objective 37	5.1.12 To integrate trapping with forest management practices.

Current Status	Integrated land and resource management continues to be a fundamental principle of the provincial government, and is recognized in the provincial *Timber Harvest Planning and Operating Ground Rules*. Annual Operating Plans have for many years required that quota holders correspond with trappers (through mailout, visits, invitations to open houses, field review of maps and plans), notifying them of proposed timber harvesting operations. The Alberta Trappers' Compensation Program, administered by the Alberta Trappers' Association, is recognized throughout Alberta. This program requires both trappers and industry to recognize each other's right to the same land area, and awards compensation when necessary to trappers with proven losses or who can demonstrate extra costs were incurred as a result of timber harvesting. A Trappers Compensation Board reviews claims that cannot be resolved through direct negotiations between the timber disposition holder and the trapper.
Indicator	Number of Action Requests issued by the Minister's office of ASRD.
Target and Acceptable Variance	ASRD managers and staff shall complete all assigned Action Requests.
Forest Management Activities	1. The Alberta Trappers' Compensation Program (administered by the Alberta Trappers' Association) shall apply when trappers prove losses or who can demonstrate extra costs were incurred as a result of timber harvesting on existing registered trap lines. 2. Timber disposition holders are to address concerns raised by trappers and make efforts to minimize impacts to traplines, trappers' trails, cabins and equipment 3. Timber disposition holders shall minimize impacts to known First Nations trapping sites, cabins, equipment and activities carried out pursuant to First Nations' trapping rights for food under s.12 of the NRTA in the planning of their timber harvest operations. 4. Trappers shall be contacted by timber disposition holders during the General Development Plan and Annual Operating Plan stages. 5. ASRD staff will develop AOP checklists, a component of which will be to ensure that trapper concerns are being addressed.
Monitoring Procedures	Annual summaries will be completed (in preparation for stewardship reports) to document trapper concerns and any actions taken by timber disposition holders to mitigate logging impacts.

Implementation Schedule	Existing processes are ongoing.
Forecasting Assumptions and Analytical Methods	Not applicable.
Linkages between Strategic and Operational Plans	Compartment Plans and Annual Operating Plans will identify how trapping issues are to be addressed.

Trapping set location—should not be disturbed.

Objective 38

5.1.13 To integrate energy/mineral (exploration and development) activities with forest management practices.

Current Status	Integrated land and resource management continues to be a fundamental principle of the provincial government, and is recognized in the provincial *Timber Harvest Planning and Operating Ground Rules*. The Energy and Utilities Board Informational Letter (IL) 93-9 *Oil and Gas Developments Eastern Slopes (Southern Portion)* confirms the requirements for all oil and gas operators regarding developments along the southern portions of Alberta's Eastern Slopes.
Indicator	a) Integrated access development plan. b) Number of Action Requests issued by the Minister's office of ASRD.
Target and Acceptable Variance	a) Completed access development plan for the C5 FMU. b) ASRD managers and staff shall complete all assigned Action Requests.
Forest Management Activities	1. Existing processes for reviewing energy/mineral exploration and development applications shall apply. 2. Industrial disposition holders shall be encouraged to integrate and coordinate their activities to minimize the size of the industrial footprint on the forest landbase. 3. The department shall work with affected industrial users and/or Canadian Association of Petroleum Producers (CAPP), and consult with Treaty 7 First Nations and the Alberta Chamber of Resources (ACR) when creating a landscape access development plan.
Monitoring Procedures	a) Concerns between the two sectors and any actions taken to mitigate concerns will be summarized in annual summaries and stewardship reports. b) ASRD staff shall complete AOP checklists to ensure that energy sector concerns have been addressed.
Implementation Schedule	Existing processes are ongoing.
Forecasting Assumptions and Analytical Methods	Not applicable.
Linkages between Strategic and Operational Plans	The completed access development map will be consulted when reviewing dispositions and in decision making with regard to road reclamation.

Integration of access development/resource activities is desired to minimize industrial footprint in the C5 FMU.

Objective 39	5.1.14 To integrate the commercial recreation and tourism sectors with forest management practices.

Current Status	Integrated land and resource management continues to be a fundamental principle of the provincial government, and is recognized in the provincial *Timber Harvest Planning and Operating Ground Rules.* The Alberta Tourism Recreational Leasing Program (ATRL) process is designed to handle unsolicited tourism and commercial recreation development proposals on public land on a first come–first served basis. Generally, these are private sector developments that offer tourism and commercial recreation opportunities to the public.
Indicator	Number of Action Requests issued by the Minister's office of ASRD.
Target and Acceptable Variance	ASRD managers and staff shall complete all assigned Action Requests.
Forest Management Activities	1. ASRD's existing tourism disposition application process (i.e., Alberta Tourism Recreational Leasing Program) shall be used to review and approve development applications. 2. PLFD shall establish a mechanism for receiving, tracking and responding to complaints from the tourism sector. 3. Timber disposition holders shall be made aware of other disposition holders and operators affected by timber harvesting activities. 4. Adopt alternative silvicultural systems for areas having high recreation and tourism potential.
Monitoring Procedures	a) Concerns between the two sectors and any actions taken to mitigate concerns will be summarized in annual summaries and stewardship reports. b) ASRD staff shall complete AOP checklists to ensure that tourism sector concerns have been addressed.
Implementation Schedule	Existing processes are ongoing.
Forecasting Assumptions and Analytical Methods	Not applicable.
Linkages between Strategic and Operational Plans	Compartment Plans and Annual Operating Plans will be reviewed against an expanded checklist that includes references to the needs and concerns of the commercial recreation and tourism sectors.

Temporary ford on South Lost Creek showing erosion.

Objective 40	5.2.1 To ensure that local/regional businesses have an opportunity to share in the economic benefits that can be derived from the C5 forest.

Current Status	As of 2005, the C5 FMU's annual allowable cut had been fully allocated to 4 quotas and the Community Timber Program (which includes Coniferous Community Timber Permit (CCTP), Commercial Timber Permit (CTP), Local Timber Permit (LTP) and TM66 programs).
Indicator	Volume of coniferous timber (percentage of AAC) made available to timber disposition holders.
Target and Acceptable Variance	ASRD shall ensure timber allocations (expressed as a percentage of the AAC) are provided to quota holders and CTP.
Forest Management Activities	1. ASRD will honour all commitments contained in quota certificates. 2. The Community Timber Program shall continue to be administered by ASRD. Wood allocated through CTP to local commercial and non-commercial operators and users will be made available through: • Coniferous Community Timber Permits • Commercial Timber Permits. • Local Timber Permits (LTPs) for personal use. • TM66 program (i.e., Christmas trees, firewood, posts, rails). 3. Three areas will be managed to promote the maintenance of uneven-aged coniferous stands (part of the Allison/Chinook Forest Land Use Zone, an area adjacent to the Elkhorn Ranch [near the end of the north Burmis road] and the Castle cross country ski area).
Monitoring Procedures	a) ASRD shall maintain timber return records by quadrant and disposition holder. b) ASRD shall maintain inspection and audit records.
Implementation Schedule	Existing processes are ongoing.
Forecasting Assumptions and Analytical Methods	To facilitate efficient harvest scheduling (address economic considerations) and minimize the number of access roads required during any one 10-year period (address environmental and social considerations), the Timber Supply Analysis model was constrained by compartment, recognizing existing quota spheres where possible. The TSA illustrates the 60-year compartment constraint that was instituted to achieve the desired future forest (which in turn will be achieved by following the spatial harvest sequence). Harvest designs in place or under development by quota holders and ASRD under the CTP were pre-determined for scheduling purposes in the TSA. Areas along Kananaskis Road (north of Coleman), in Lyndon Creek (Porcupine Hills) and Mill Creek (south of Hwy 3) were identified for CTP harvest during the lifespan of this plan.

Linkages between Strategic and Operational Plans

Operational harvest plans will need to conform with the TSA, the AAC and spatial harvest sequence.

Spray Lake Sawmills Ltd. (above and below) (photos courtesy of Spray Lake Sawmills).

Objective 41	5.2.2 To maintain the ongoing (long-term) viability of the forest sector by encouraging companies to consider value-added manufacturing and/or improved wood utilization and processing.
Current Status	This is a new area of focus (not addressed in the 1986 FMP), and is based on the social, economic and environmental sustainability of the C5 forest and those industries and communities dependent on it. ASRD has only a limited role in attaining this objective.
Indicator	Number of businesses that are manufacturing intermediate and final value-added (wood) products in the region.
Target and Acceptable Variance	a) Increase the amount of feedstock available for intermediate and final forest product operations. b) Increase the number of value-added businesses in the region. c) Increase the amount of value-added equipment installed to diversify existing wood operations (e.g., production of wood pellets from planer shavings).
Forest Management Activities	1. ASRD will, along with Alberta Economic Development and local/regional economic development organizations, encourage market-driven opportunities in the intermediate and final value-added products industry in the region. 2. Companies are encouraged to become familiar with ASRD's *Strategic Forestry Initiatives – Preliminary Action Plan*. 3. Information will be provided to timber disposition holders of potential wood products that can be derived from cut logs of different quality and type.
Monitoring Procedures	The Strategic Forestry Initiatives Division (ASRD) and other organizations (e.g., Alberta Forest Products Association) maintain statistics on the forest sector. Changes in the local forest economy will be reflected in updated statistics.
Implementation Schedule	May 1, 2006.
Forecasting Assumptions and Analytical Methods	Not applicable.
Linkages between Strategic and Operational Plans	Not applicable.

Objective 42	5.2.3 To provide economic opportunities for forest-dependant businesses while maintaining the integrity of the C5 forest ecosystem.
Current Status	This objective is part of the CSA SFM Z809-02 standard and is a new initiative for the C5 forest. ASRD has only a limited role in the attainment of this objective. *A Socio-Economic Overview of the Crowsnest Pass* was prepared under the auspices of the Canadian Forest Service in October 2002. This overview concluded the forestry sector in the Crowsnest Pass employs 238 residents and contributes $56 million annually in revenues to the regional economy.
Indicator	a) Number of local/regional viable (sustainable) business enterprises dependant on the C5 forest. b) Employment levels in the local/regional forest sector.
Target and Acceptable Variance	a) Maintain, diversify or increase the number of businesses dependant on the C5 forest (e.g., fiber-related industries) from current levels. b) Increase the volume of premium logs/wood moving into the value chain. c) Maintain or increase current direct and indirect employment levels in the region.
Forest Management Activities	1. ASRD will work with Alberta Economic Development and local economic development organizations in promoting and attracting markets and customers. 2. ASRD will work with local and regional primary/intermediate and final product manufacturing to strengthen the raw material supply chain. 3. ASRD will work with Alberta Economic Development to promote the use of high-grade raw materials for medium-to-high value end uses using log sorting techniques. 4. ASRD's existing disposition application and administrative processes shall be used to approve business and development applications (e.g., Alberta Tourism Recreational Leasing Program). 5. The feasibility of establishing tourism based facility nodes in the C5 FMU shall be explored (led by Alberta Economic Development).
Monitoring Procedures	Local economic development organizations are encouraged to maintain records of businesses operating in the region, local labor force statistics, revenues generated through the forestry sector, etc.
Implementation Schedule	May 1, 2006
Forecasting Assumptions and Analytical Methods	Not applicable.
Linkages between Strategic and Operational Plans	Not applicable.

Criterion 6: Accepting society's responsibility for sustainable development.

Elements:

6.1 Aboriginal and Treaty Rights — Recognize and respect Aboriginal and treaty rights. *(CSA SFM Element 6.1)*

6.2 Respect for Aboriginal Forest Values, Knowledge and Uses — Respect traditional Aboriginal forest values and uses identified through the Aboriginal input process. *(CSA SFM Element 6.2)*

6.3 Public participation — Demonstrate the SFM public participation process is functioning to the satisfaction of the participants. *(CSA SFM Element 6.3)*

6.4 Information for Decision-Making — Provide relevant information to interested parties to support their involvement in the public participation process, and increase knowledge of ecosystem processes and human interactions with forest ecosystems. *(CSA SFM Element 6.4)*

Values:

Elements 6.1 and 6.2:

The Alberta Government has developed the document, *Strengthening Relationships: the Government of Alberta's Aboriginal Policy Framework*: "The Aboriginal policy framework sets out the basic structure for existing and new Government of Alberta policies to address First Nation, Métis and Aboriginal issues in Alberta."

Element 6.3:

Decisions affecting public land and resources should be made through public consultation processes. (CrowPAC)

Element 6.4:

Well and poorly managed forests are needed to allow researchers/scientists to study the many different facets of naturally functioning ecosystems. Forest ecosystems may hold the secrets, and offer solutions, for tomorrow's society.

Planning and monitoring are important activities in managing the C5 forest management unit.

Objectives that relate to Criterion 6 are listed below and are elaborated on in greater detail in the pages that follow.

Table 18. List of objectives for Criterion #6.

FMP Unique Number	Matrix Number*	Objective
43	6.1.1	"The Government of Alberta is committed to meeting all of its treaty, constitutional and legal obligations respecting the use of public lands." (p. 14) *Aboriginal Policy Framework.*
44	6.2.1	To undertake effective and meaningful consultation with Aboriginal communities.
45	6.3.1	To proactively and meaningfully involve directly affected users and the interested public in forest planning and decision-making processes.
46	6.3.2	To raise public awareness of forest management issues and activities.
47	6.3.3	To be responsive to local and regional input concerning forestry planning and operations.
48	6.3.4	To be responsive to changing social values concerning sustainable forest management.
49	6.4.1	To pursue active adaptive management when managing forest resources in the C5 FMU.
50	6.4.2	To remain informed of scientific advances, emerging technologies, and new knowledge in managing forest ecosystems.
51	6.4.3	To protect historical resources where appropriate.
52	6.4.4	To obtain current information on forest resources.
53	6.4.5	To manage the C5 FMU as part of a larger regional landscape.

***** *Matrix numbers are based on the numbering scheme that has been applied to "Elements".*

Objective 43	6.1 "The Alberta Government is committed to meeting all of its treaty, constitutional and legal obligations respecting the use of public lands." (p.14) Strengthening Relationships – The Government of Alberta's *Aboriginal Policy Framework*

Current Status	The Alberta Government's *Strengthening Relationships – The Government of Alberta's Aboriginal Policy Framework* was released in September 2000. The Framework sets out the basic structure for Alberta government policies that address the needs of First Nations, Métis and other Aboriginal people in Alberta. A Framework newsletter is published twice yearly. During the preparation of this plan the provincial government was in the process of developing the *Government of Alberta's First Nations Consultation Policy on Land Management and Resource Development.* This plan acknowledges this Policy and any amendments to the policy and its associated guidelines.
Indicator	a) Opportunities provided for input by Aboriginal communities. b) Aboriginal attendance at public events, scheduled meetings and Public Advisory Committee (PAC) meetings.
Target and Acceptable Variance	a) Aboriginal input shall be sought by ASRD b) Aboriginal representatives will be notified of all scheduled meetings where their involvement is sought.
Forest Management Activities	1. Where appropriate, consult with affected Aboriginal people about proposed regulatory and development activities that may adversely impact on First Nation rights and Traditional Uses. 2. Work with affected Aboriginal communities and industry to use existing mechanisms and, where necessary, develop new ones for appropriate consultation on resource development and land-use decisions, and identify opportunities to participate in the associated benefits. 3. ASRD shall provide information to the following First Nations: Blood Tribe, Peigan, Siksika, Stoney Tribal Administration (Bearspaw, Chiniki and Wesley), and Tsuu T'ina designated representatives on matters pertaining to the C5 Forest Management Plan and other relevant subjects, including timber allocations and potential opportunities for contracting and employment. 4. ASRD staff are available to meet with Aboriginal people and legitimate representatives of Aboriginal communities who are pursuing business opportunities in the C5 FMU. 5. ASRD shall notify and invite Aboriginal communities to convey their interests at future meetings and public events. 6. ASRD shall establish a position for the following First Nations: Blood Tribe, Peigan, Siksika, Stoney Tribal Administration (Bearspaw, Chiniki and Wesley) and Tsuu T'ina representatives on the new C5 Public Advisory Committee which will assist in the implementation of the C5 FMP.

Monitoring Procedures	Annual summaries will identify the involvement and outcome of Aboriginal participation and note how Aboriginal input was considered in decision-making. Annual summaries will be consolidated into stewardship reports every fifth year.
Implementation Schedule	ASRD staff will determine when and how to engage First Nations (based on consultation preferences identified during the C5 FMP plan development process) when: • implementing the C5 FMP; • when addressing resource management issues in the FMU; • when embarking on new policy initiatives that pertain to the C5 FMU. ASRD will establish a Public Advisory Committee to assist with the implementation of this plan. Band Councils will be notified and invited to send representatives to become members on the PAC.
Forecasting Assumptions and Analytical Methods	Not applicable.
Linkages between Strategic and Operational Plans	Several provincial government ministries were involved in the development of the *Government of Alberta's First Nations Consultation Policy on Land Management and Resource Development (May 16, 2005).* When completed, this plan may need to be amended to comply with new provincial polices that are part of the Consultation Policy.

Objective 44	6.2.1 To undertake effective and meaningful consultation with relevant Aboriginal communities.

Current Status	Further clarity on how the Government of Alberta will consult with First Nations will be provided in the *Government of Alberta's Proposed First Nations Consultation Policy on Land Management and Resource Development* and the associated guidelines once they have been approved and adopted. Contact with Band Council members and administrators will help clarify each Band's preferences for future consultations. ASRD has maintained varied contacts with the Piikani Nation (Peigan I.R. 147), Kainaiwa Nation (Blood I.R. 148), and Eden Valley (Stoney I.R. 216) Reserve over the years.
Indicator	Early consultation before decisions are made.
Target and Acceptable Variance	Notify and seek input from Aboriginal communities before commencing with the implementation of decisions/actions of interest or concern to Aboriginal communities.
Forest Management Activities	1. Identify contact people in each Aboriginal community. 2. ASRD will keep a record of all communications that occur with Aboriginal communities. 3. Where possible, ASRD will provide training opportunities for Aboriginal people (e.g., wildland forest fire suppression work). 4. ASRD will invite Aboriginal communities to provide data/information on the existence of cultural, historic and heritage resources within the C5 FMU. 5. ASRD shall undertake consultations with Aboriginal communities to determine if data sharing agreements should be put in place. 6. Aboriginal Traditional Use Studies (made available to ASRD) will be consulted in planning and field operations. 7. In a spirit of cooperation for continual improvement SRD will consult with Treaty 7 First Nations specifically for the purpose of assessing the successes and failures of the consultation process associated with the implementation of the C5 Forest Management Plan over the previous 5 year period and to discuss ways to improve relations and ongoing monitoring processes. Summary notes from these meetings will be included in the 5 year Stewardship Report.
Monitoring Procedures	Annual summaries will identify the involvement and outcome of Aboriginal participation and note how Aboriginal input was considered in decision-making. Annual summaries will be consolidated into stewardship reports every fifth year.

Implementation Schedule	The timing of future consultations with First Nations will be dependent on the types of issues that emerge and the preferences of Band Councils and administrators to become involved.
Forecasting Assumptions and Analytical Methods	Not applicable.
Linkages between Strategic and Operational Plans	ASRD will work with the following First Nations: Blood Tribe, Peigan, Siksika, Stoney Tribal Administration (Bearspaw, Chiniki and Wesley) and Tsuu T'ina band administration offices to ensure that Traditional Use studies, where they exist, are considered in operational harvest planning to protect those sites and values that are identified in Traditional Use studies.

Objective 45	6.3.1 To proactively and meaningfully involve directly affected users and the interested public in forest planning and decision-making processes.

Current Status

Public participation (public involvement) is a fundamental tenet of the Government of Alberta. ASRD regularly consults with stakeholders, interest groups and the general public on a wide range of matters.

A public advisory committee (i.e., CrowPAC) was established as part of the public consultation process used for developing this plan. CrowPAC was disbanded with the completion of the plan. It will be replaced by a successor Public Advisory Committee to assist with implementation of the C5 FMP.

Previous to 2002, no public advisory committee was in place. A local advisory committee (LAC) associated with the Community Timber Program was disbanded in 1996. Other means adopted by ASRD to keep the public informed have included:

- presentations to the Municipality of Crowsnest Pass, surrounding MDs, and various interest groups;
- distribution of printed materials;
- advertising in newspapers;
- open houses.

Indicator

a) Frequency and type of public consultation.

b) Frequency of Public Advisory Committee (PAC) meetings.

c) Satisfaction of PAC members.

Target and Acceptable Variance

a) The type of consultation approach used, and the number of public events held, will depend on the type of issues being addressed and level of input needed.

b) PAC will meet at least twice annually.

c) High levels of PAC member satisfaction.

Forest Management Activities

1. ASRD shall establish a Public Advisory Committee having balanced sectoral representation. PAC will conduct itself in accordance with a Terms of Reference developed by ASRD and PAC members. Among other things, PAC will:
   - Provide advice on when and how public consultation should occur.
   - Provide input on implementation of the C5 FMP (activities being undertaken and results achieved).
   - Review and comment on C5 FMP monitoring activities and monitoring findings.
2. ASRD and PAC will together ensure that PAC meetings are effective and productive. ASRD will keep PAC members informed to ensure the Committee's effectiveness. Information will be provided on:
   - noteworthy FMU developments;

- relevant issues;
- government policies;
- government and industry initiatives and programs;
- harvesting operations in the FMU;
- scientific advances;
- best practices.

3. The manner of public notification, and the public involvement mechanisms that are adopted, will be tailored to the unique circumstances of each public consultation campaign.
4. Surveys, interviews or other techniques may be used to assess PAC member satisfaction.

Monitoring Procedures	Synopses of public involvement campaigns/events and PAC meetings will be prepared for annual summaries and presented in 5-year stewardship reports.
Implementation Schedule	A successor Public Advisory Committee will be convened when this plan has been approved. The development of Terms of Reference will be one of the first tasks of PAC.
Forecasting Assumptions and Analytical Methods	Not applicable.
Linkages between Strategic and Operational Plans	PAC's mandate will include monitoring activities undertaken to meet FMP objectives. If an objective or forest management activity in this plan is no longer relevant or attainable, such statements will be amended so they are relevant and achievable. PAC will also be involved in any modifications to this plan.

Objective 46

6.3.2 To raise public awareness of forest management issues and activities.

Current Status

Of the many mechanisms used by ASRD to disseminate information on forest management issues and activities, several are listed here for illustrative purposes:

- departmental website;
- printing and distribution of literature (brochures, fact sheets, reports, updates);
- departmental news releases;
- staff response to client and public questions;
- presentations (pre-established and customized);
- Junior Forest Warden program;
- field tours;
- open houses/public meetings.

The topics that are addressed in awareness initiatives are numerous and wide-ranging, dealing with many aspects of forest ecology and forest management.

Specific program areas in which ASRD has been disseminating information include: FireSmart, Shifting Gears, Respect the Land, and Mountain Pine Beetle Awareness. Special coordinated events have included the Ed Greggor Stewardship Day in the Crowsnest Pass.

Indicator

a) Amount of literature provided, presentations given, on-site tours conducted, materials placed in libraries, educational sessions offered, expert presentations given.

b) Number of web page updates, Stewardship days, Presentations to schools, municipal districts, watershed groups and stakeholders.

Target and Acceptable Variance

a) Information will be made available on an ongoing basis, using various methods and different media, and will be provided in a timely manner.

b) Two C5 web page updates per year, one stewardship day per year, one presentation to a school, municipal district, non-governmental organization (NGO), watershed groups and stakeholder per year. These targets are the minimum requirement.

Forest Management Activities

1. ASRD, with input from disposition holders, will develop and implement education and awareness strategies and programs. Public awareness materials will be distributed using dissemination strategies that have a high likelihood of reaching target audiences.
2. ASRD will develop and maintain a list of stakeholder and public contacts that have an interest in forest management activities in the C5 FMU.
3. ASRD will keep a record of public awareness materials that have been distributed.

	4. Copies of the C5 FMP and five-year stewardship reports will be made available in local and regional libraries. Approved AOPs and GDPs will be available for public viewing in PLFD and quota holders offices. The Forest Management Plan and stewardship reports will be posted on the Internet. 5. Educational opportunities will be pursued at non-government organization and industry meetings, conferences and workshops, and in classrooms as opportunities arise.
Monitoring Procedures	a) Feedback will be sought from participants and the public on the usefulness and effectiveness of public awareness activities and materials. b) Annual summaries and 5-year stewardship reports will identify all public awareness activities undertaken.
Implementation Schedule	Public awareness and public education are generally ongoing activities. Specific information campaigns will be launched from time to time in response to specific departmental initiatives. In addition to ASRD's involvement in raising public awareness, timber disposition holders may also wish to improve public understanding of a quota holder's roles/responsibilities, activities and resource management challenges. Wherever possible, ASRD will pursue partnerships with other government agencies, academia, industry, etc., to promote public awareness. Activities identified in this section will commence May 1, 2006.
Forecasting Assumptions and Analytical Methods	Not applicable.
Linkages between Strategic and Operational Plans	Public involvement strategies may be prepared whenever a public consultation campaign is to be initiated. Strategies will identify the objectives, intended outcome, and details of a public consultation program.

Objective 47	6.3.3 To be responsive to local and regional input concerning forestry planning and operations.

Current Status	Public input that is received is shared with appropriate professional staff and managers and considered before decisions are finalized. When responding to input, ASRD must balance competing interests and demands, consider trade-offs, uphold government policy, demonstrate wise stewardship, be responsive to new science/knowledge, operate within its legislated mandate, and other aspects.
Indicator	Issue acknowledgement.
Target and Acceptable Variance	ASRD will notify individuals and organizations (within a six-week period) that their comments were received.
Forest Management Activities	1. PAC will be periodically informed of issues pertaining to the C5 forest. 2. Identified forest management issues will be addressed by ASRD and disposition holders. 3. Public and stakeholder comments will be entered in an issue tracking system established by ASRD. Forest management issues will be analyzed, prioritized and addressed. Follow-up action(s) will be taken within the constraints of existing budgets, government legislation and policy. As appropriate, ASRD will share public comments/concerns with timber disposition holders. Issue resolution that depends on the involvement of disposition holders will be discussed with disposition holders.
Monitoring Procedures	Annual summaries and 5-year stewardship reports will identify issues raised by the public, how issues were addressed, or progress being made on issue resolution.
Implementation Schedule	Receiving, reviewing and responding to local and regional input is an ongoing activity.
Forecasting Assumptions and Analytical Methods	Not applicable.
Linkages between Strategic and Operational Plans	Obtaining public input is an integral part of virtually all provincial planning exercises. Input that is received for one initiative may well be applicable to other related initiatives. Staff involved in receiving and reviewing input should ensure that pertinent input is directed to other appropriate initiatives. Identified forest management issues encountered during operational activity will be summarized and presented in stewardship reports.

Objective 48	6.3.4 To be responsive to changing social values concerning sustainable forest management.

Current Status	Public perceptions and values are prone to change as they reflect changing times and conditions in a rapidly changing world. Societal preferences are made evident through policy review and policy development initiatives that engage communities and the general public in a meaningful manner. Changing social values are often brought to light during national, provincial, regional and local forest management initiatives that have a consultation component. The CCFM's *Criteria and Indicators Framework* and the CSA SFM Z809 – 02 Standard reflect national societal values. The 1986 C5 Forest Management Plan did not have the scope or breadth of this FMP, nor did it address themes that are characteristically part of progressive forest management planning initiatives in the 21st century.
Indicator	Adoption of pertinent future revisions to the CSA SFM Z809 Standard.
Target and Acceptable Variance	Future revisions to the CSA SFM Z809 Standard that are applicable to the C5 FMP will be noted and incorporated during any updates to the C5 FMP.
Forest Management Activities	1. ASRD staff will remain current on changes to CCFM's *Criteria and Indicators Framework* and the CSA SFM Z809 – 02 Standard. 2. The department shall consider First Nations' Treaty Rights and Traditional Uses including current use information in the development of the net landbase maps and the spatial harvest sequence for all future timber supply analysis by: ▫ Contributing known contemporary Treaty 7 First Nations' Traditional Use and practice information to Government of Alberta Geodata and Internet Mapping Framework Program ▫ Utilizing this information to identify potential adverse impacts (example: gravesites, cultural or spiritual sites) with the proposed harvest sequence maps so that appropriate consultation and modifications to proposed harvest areas can be made. Hunting Grounds can be extensive therefore the commitment here is to demonstrate a willingness to work with First Nations recognizing the dynamics of vegetation patterns and that wildlife movements adjust to changes in vegetation patterns resulting from natural and human disturbances. ▫ Relevant Treaty 7 First Nations Traditional and current Use information is to be addressed in the timber disposition holder's operational harvest plans (i.e., General Development Plan). ▫ Consultation considering the Spatial Harvest Sequence map shall be the primary means of implementing this Forest Management Activity.
Monitoring Procedures	ASRD will remain current on public views and opinions that are being brought forward by academia, public policy "think tanks", or are generated at conferences,

	symposia, public hearings and in published materials. C5 stewardship reports will propose and identify changes to future FMP versions as a result of revisions to the CSA SFM Standard.
Implementation Schedule	ASRD shall remain informed of and be responsive to changing social values regarding forest management on an ongoing basis. At the 10-year plan review stage, significant societal value changes will be incorporated in the revised C5 FMP. Changes to this FMP may be considered at the midpoint in the life of this plan (i.e., 2016). Changes will be driven by recommendations contained in stewardship reports and from other sources.
Forecasting Assumptions and Analytical Methods	Not applicable.
Linkages between Strategic and Operational Plans	ASRD forest policy initiatives that will be considered in the coming years may well identify shifting public values about Alberta's provincial forests. Pubic input obtained as a result of these initiatives will also be considered with reference to the C5 FMU.

Objective 49	6.4.1 To pursue "active" adaptive management when managing forest resources in the C5 FMU.

Current Status	ASRD has embraced adaptive management as a sound and necessary ecological principle. The Department is continuing to work to overcome various challenges in practicing adaptive management so that this approach can be employed on a regular and consistent basis.
Indicator	Monitoring programs in place.
Target and Acceptable Variance	a) Fulfill monitoring and measurement activities outlined throughout this plan. b) 5-year stewardship reports will identify how FMP objectives and targets are being met.
Forest Management Activities	1. Procedures will be developed for monitoring activities and reporting findings (to ensure consistency over time), and to verify the results achieved in implementing FMP objectives, targets and strategies. 2. The Southern Rockies Management Area will develop a five-year forest stewardship report with input from timber disposition holders and PAC. 3. Timber disposition holders are to identify any changes made to their operations as a result of feedback obtained through monitoring programs. 4. Research findings and monitoring data may result in amendments to the C5 FMP.
Monitoring Procedures	Five-year stewardship reports will indicate adaptive (progressive) management actions taken.
Implementation Schedule	There are typically logical points during a plan's implementation phase (e.g., at 5-year intervals) when monitoring results should be analyzed to determine whether management direction contained in a plan is in need of change. However, information gathering and monitoring outcomes should precipitate adaptive management whenever reasonable, and compelling reasons exist to do so; i.e., adaptive management should remain responsive.
Forecasting Assumptions and Analytical Methods	Not applicable.
Linkages between Strategic and Operational Plans	All operational inspection and review processes will contribute to the monitoring protocols developed. In turn, these will be summarized in stewardship reports. The stewardship reports will identify proposed changes to this FMP and to management practices and operations where objectives and targets are not being met. Substantive changes to the FMP will be considered at the midpoint (i.e., 2016) in the life of this plan.

Objective 50	6.4.2 To remain informed of scientific advances, emerging technologies, and new knowledge in managing our forest ecosystems.

Current Status	Professional and technical staff are encouraged to remain abreast of developments in their respective disciplines through professional and technical affiliations; training/education; attending conferences; reading trade magazines, journals, reports, etc.
Indicator	Adoption of best management practices.
Target and Acceptable Variance	ASRD will assess and set priorities for testing and applying new approaches and best management practices. If found to be favorable and feasible, new approaches and best management practices will be adopted.
Forest Management Activities	1. ASRD professional agency staff will stay abreast of developments in their respective disciplines. 2. New approaches and practices will be evaluated and, where appropriate, applied on a trial (pilot) basis by ASRD. 3. New knowledge will also include First Nations Traditional Use Studies information to be considered in operational plans (GDPs) as this information becomes available.
Monitoring Procedures	Annual summaries and stewardship reports will identify changes in forestry operations based on new science, technology, information and knowledge.
Implementation Schedule	The adoption of proven best management practices should be continuous.
Forecasting Assumptions and Analytical Methods	Adaptive management, a fundamental component of sustainable forest management, may result in changes to the harvest priority and planning rules for the next TSA review.
Linkages between Strategic and Operational Plans	Adaptive management is encouraged in this plan, and applies to all operational activities in the C5 FMU. Any changes made to the C5 FMP may necessitate corresponding changes to operational plans that are based on this FMP.

Objective 51	6.4.3 To protect historical resources where appropriate.

Current Status	Alberta Community Development (Heritage Resource Management Branch) maintains an inventory of all known significant heritage resources in the FMU. Branch staff also identify areas having high potential for historic resources.
Indicator	a) Identification of historical resources in need of protection. b) Number of historical sites identified and protected.
Target and Acceptable Variance	Protective Notations will be placed on significant resource sites that have been identified to Alberta Community Development (ACD). a) Full protection or avoidance of all known historical resources.
Forest Management Activities	1. Conduct Historical Resource Impact Assessments (HRIAs) where required by ACD. 2. Historic sites will be flagged in the Land Status Automated System (LSAS). Confidential information concerning the location and type of site will be protected. 3. The location of known historic sites will be communicated to users to mitigate impacts from industrial, commercial and recreational activities. 4. ASRD will work with quota holders and ACD to explore, develop, and implement a predictive model for C5 FMU to assess the probability of encountering historical resources during harvest planning and silvicultural operations. The predictive model will be used to identify low, medium and high probability areas for historical resources in the FMU. A draft model is presented in Appendix 4B. 5. ACD's Significant Historic Sites database and the predictive model will be consulted during forest/timber planning and field operations 6. The department will review and evaluate Traditional Use information made available by the Treaty 7 First Nations with Alberta Culture & Community Spirit (CCS) and provide the appropriate level of protection for those sites, including possible inclusion of the information in the CCS inventory of Significant Cultural sites and Areas of Historical Resource Values.
Monitoring Procedures	ASRD/ACD will maintain records of newly discovered historical resource sites and sites under protection.
Implementation Schedule	Existing processes will be ongoing, Following the adoption of this plan, ASRD will begin working with ACD to explore, develop and implement a historical resources predictive model for the C5 FMU.
Forecasting Assumptions and Analytical Methods	Analytical methods have been developed by ACD, and are presented in the draft model in Appendix 4B.

Linkages between Strategic and Operational Plans	Compartment and Annual Operating Plans must comply with the *Historical Resources Act*.

Objective 52

6.4.4 To obtain current information on forest resources.

Current Status	Schedules for updating existing information/inventories and the acquisition of new data are highly variable among the many different resource values, land uses and activities for which data are collected. Ongoing efforts are being made to capture data for specific applications or projects, and for use in a GIS environment.
Indicator	Updating of inventories.
Target and Acceptable Variance	a) Inventories, resource maps, and aerial photography will be updated as needed. b) The Alberta Vegetation Inventory (AVI) for the C5 FMU will be updated by 2014.
Forest Management Activities	1. ASRD will develop a system (procedures) and set timelines for completing and regularly updating forest inventories. A partial list of inventories includes: AVI, fire occurrences, ecological classification, insect/disease outbreaks, random camping activity, fish and wildlife species, rare and endangered species, and range resources. 2. Inventoried data will be stored so that it is available for producing updated maps and is in a form for use in a GIS environment. 3. Wherever possible, ASRD will partner with other organizations and agencies when obtaining new remotely sensed imagery, inventories, and data. 4. ASRD will confirm the status of, and summarize the results and findings obtained from, all silvicultural and other research trials undertaken in the C5 FMU thus far. This will likely entail: • site visits to confirm plots, their condition and location; • review of all existing documentation pertaining to C5 research trials; • assess whether research trials should continue (be re-activated) and what contribution they make in filling information gaps; • assess whether research trials should be combined or inter-related with other PLFD research initiatives.
Monitoring Procedures	Stewardship reports will identify inventory work that is being planned and the status of inventories which have been undertaken.
Implementation Schedule	Forest management activities associated with setting up processes and tracking mechanisms will be completed throughout the 2006-2007 operating year. An AVI update will need to be initiated and completed by May 2014 as part of the FMP's 10-year plan review process and the completion of a new TSA.

Forecasting Assumptions nd Analytical Methods	Not applicable.
Linkages between Strategic and Operational Plans	Updated resource data and inventories are crucial for informed and scientifically based decision making. Such information is also essential for running TSA models and developing GIS theme maps which are integral to the development and refinement of this FMP. Communication and inter-agency coordination allows provincial government agencies to identify data acquisition needs that serve two or more agencies.

Objective 53	6.4.5 To manage the C5 FMU as part of a larger regional landscape.

Current Status	ASRD maintains periodic contact with its jurisdictional neighbors around the C5 FMU, and participates to varying degrees on initiatives that have implications for the C5 FMU. Cross-boundary provincial issues, such as the spread of the mountain pine beetle, are being addressed on an ad hoc basis.
Indicator	Contact/communication with other resource managers and jurisdictions.
Target and Acceptable Variance	Maintain regular and ongoing contact/discussions with adjoining resource managers (i.e., have a minimum of one meeting yearly to discuss regional landscape issues).
Forest Management Activities	1. PLFD will work with other jurisdictions, agencies and organizations to pursue a level of consistency and integration in policy direction (strategic and operational) within the C5 FMU and adjacent areas. 2. ASRD to establish "list-serves" and mailing lists to facilitate communication with other agencies and organizations. 3. The department will participate (collaborate) with regional bodies, Treaty 7 First Nations and municipalities that have an interest or mandate in addressing larger landscape/ecosystem issues (e.g., Crown of the Continent – Crown Managers Partnership). 4. Agreements may be considered with other jurisdictions to address trans-boundary issues (e.g., mountain pine beetle epidemic entering Alberta from B.C.).
Monitoring Procedures	Annual summaries and stewardship reports will identify any partnerships or inter-jurisdictional initiatives that have potential implications for managing the C5 forest.
Implementation Schedule	ASRD staff will become aware of any initiative that could have an influence on the C5 FMU and adjacent lands. Departmental participation should be pursued when opportunities present themselves and where it makes sense to do so. ASRD's timely and decisive involvement may, at times, be significant.
Forecasting Assumptions and Analytical Methods	Not applicable.
Linkages between Strategic and Operational Plans	Yearly ASRD business planning sessions will identify and set priories for inter-provincial and intra-provincial collaboration.

4.4 TIMBER SUPPLY ANALYSIS

The C5 Forest Management Unit (FMU) Forest Management Plan (FMP) was developed recognizing conflicting values, priorities and uncertainties. The direction contained in the C5 FMP is anchored in the broad environmental, social and economic values outlined in Canada's six national CCFM criteria. The decision-making process used in arriving at a preferred forest management scenario (PFMS) of the timber supply analysis for the C5 FMP involved the prioritization and weighting of the various forest values (including maintenance of forest health, amount and distribution of seral stages [i.e., old-growth, timber harvest age and production], timber production, FireSmart landscapes, etc.) to reflect sustainable forest management principles and public interests.

4.4.1 Preferred Forest Management Strategy

Assumptions

Development of the PFMS has been strongly influenced by the imminent threat and the potential impact of the huge mountain pine beetle (MPB) epidemic in neighbouring British Columbia spreading into the C5 FMU. Key assumptions by the planning team in developing the PFMS include the following:

- A high probability the MPB infestation will spread into the C5 FMU and kill a large proportion of the mature and old pine in the FMU.
- A large MPB infestation in the C5 FMU would have significant impacts on the short- and mid-term timber supply, as well as on a broad range of environmental, social and economic values.
- Focusing harvest operations on pine stands with high susceptibility to MPB may reduce the probability of a large MPB infestation becoming established in the C5 FMU. The planning team recognizes that control operations in B.C. have not been successful to date. However, the natural barrier provided by the Rocky Mountains may increase the success of a proactive MPB control strategy. The potential success of this proactive strategy would benefit the full range of environmental, social and economic values.
- The PFMS balances the need to proactively address the uncertain threat of an imminent MPB invasion with environmental and social values. A purely MPB-focused approach would require harvest levels that could significantly increase risks to biodiversity, social and economic values. The PFMS is the result of balancing the uncertain risks created by MPB with the need to manage risks to other values.

PFMS

Based on these planning assumptions, the management decision involved increasing the current annual allowance cut (AAC) for 20 years to 2026, and focusing harvest primarily in pine stands that are rated high and extreme for MPB. This increase in AAC is required for the following reasons:

- The need to focus additional harvest in stands susceptible to MPB and reduce the threat of a major infestation becoming established in the C5 FMU.

- The need to reduce timber losses should an epidemic infestation occur.
- The need to increase establishment of young pine stands that would more likely escape infestation. Should an epidemic infestation occur these stands will recruit to mature and old stands earlier in the planning horizon and mitigate negative shifts in seral stage distributions created by MPB mortality.

The PFMS will be reassessed if current planning assumptions change. This will require ongoing monitoring of the MPB infestation in both B.C. and Alberta. Different future scenarios would require the following adjustments to the PFMS:

- **Scenario 1. High threat of MPB infestation maintained** — In this scenario, current PFMS assumptions are still considered valid 10 years into this plan when the next TSA is due. Current strategy adopted by PFMS would continue unless new information and strategies warrant adjustments.
- **Scenario 2. Epidemic MPB infestation in C5 FMU** — The commercial removal of infected stands will be adjusted to meet the challenge. This would require immediate changes in the PFMS spatial harvest sequence and possible changes in harvest level to allow more aggressive action to control MPB spread and recovery of affected timber.
- **Scenario 3. C5 FMU overrun with MPB** — In this scenario, MPB control has been unsuccessful and management actions will not reduce pine mortality. The PFMS would be adjusted to balance the need to salvage pine to reduce timber losses with an increased focus on management for biodiversity and social values.
- **Scenario 4. MPB threat drops significantly** — In this scenario, the threat of an MPB epidemic in C5 has dropped owing to a collapse in MPB populations in B.C. and Alberta. The next TSA following this event (2016) would develop a PFMS that is not focused on MPB control and which provides for the range of seral stages required for the maintenance of ecological and social values. This would require adjustments to the spatial harvest sequence and an earlier reduction in the AAC.

The PFMS and identified scenarios under which adjustments would be required reflect a risk management approach to balancing risks to different forest values. The Timber Supply Analysis and Spatial Harvest Sequence in the PFMS incorporate the range of management objectives and assumptions into an integrated approach that addresses economic, ecological and social values.

Concern has been raised through the public consultation process as to what conditions would "trigger" movement from Scenario 1 (**High threat of MPB infestation maintained**) to Scenario 2 (**Epidemic MPB infestation in C5 FMU**), Scenario 3 (**C5 FMU overrun with MPB**), or to Scenario 4 (**MPB threat drops significantly**). ASRD believes that detailing specific conditions would not be practical at this time. If current conditions change, ASRD would conduct a professional review of the situation based on assessing levels of MPB infestation as viewed from the perspective of forest managers and practitioners, biologists and forest health professionals. Consideration will be given to assessing conflicting objectives, values at risk, probabilities and impacts, and the management team will arrive at a direction that best meets the social, environmental and economic values for that time period. Full public disclosure will occur before a change is made.

Alberta will also be supporting research initiatives that will study fire regimes and biological diversity and old-growth to verify old-growth targets. If after 10 years the MPB is no longer a

threat, Alberta will re-assess the C5 Plan. At that time, a new TSA will be conducted and all values, including old-growth seral targets, will be reassessed.

The following text and data provides some of the details associated with the development of the C5 timber supply modeling, choice of the Preferred Forest Management Strategy, and the resulting forest harvest sequence.

4.4.2 TSA Modeling Approach

Timber supply analysis is a modeling approach that employs various analytical, spatial and aspatial tools that together are used to derive and test different forest management scenarios. Sensitivity analysis can be undertaken by changing various forest resource parameters, and by adjusting forest management constraints and assumptions to determine the effect of such changes.

Through multiple TSA runs, the modeling parameters and constraints were adjusted and fine-tuned so an outcome could be obtained that satisfied the greatest number of FMP values, targets, objectives and assorted technical requirements. Maps depicting different harvest sequences were prepared, analyzed and adjusted to address various needs and concerns. The most balanced and desirable TSA and associated spatial harvest sequence output that was obtained through multiple modeling runs is referred to as the preferred forest management scenario. When evaluated against competing strategies, this strategy is considered to provide the best approach for achieving the "desired future forest" in the C5 FMU.

The C5 project TSA was used to do the following, among other things:

- Establish a net forest landbase (timber supply landbase) for the forest management unit.
- Identify yield curves.
- Test harvest priority assumptions in developing the PFMS in order to:
    - establish an annual allowable cut;
    - provide a spatially explicit harvest schedule.

The C5 timber supply analysis is presented in Appendix 6A and 6B, and the Hydrological Effects of the Preferred Forest Management Scenario are presented in Appendix 6C.

PFMS

The PFMS complies with Alberta's Forest Management Planning Standard. Arriving at a PFMS involved a number of steps. This C5 FMP is based on factors, assumptions and criteria that are, in some instances, quite different from those used as the basis for developing the 1986 FMP. Some decisions recognized other values were embedded into the process as preparation for the timber supply runs that led to the PFMS. Some key decisions and differences are highlighted below.

Changes to the Net Landbase

- Alternate rules for "never merchantable timber" were developed for the 2006 FMP.
- The process for determining the coniferous landbase has become more refined and complex. The 1986 plan contained a large generic deduction referred to as "Operational and ground rule deletions for lands not managed by the A.F.S." Portions of this deduction are equivalent in size

to the net landbase losses that resulted from designation of the Bob Creek Wildland in the Whaleback area in 1999. The result of this is the net landbase for timber production in 2006 is similar to that of 1986, although it has been geographically re-arranged, as follows:
  - 1986 FMP net coniferous landbase area amounted to 115,511 ha.
  - 2006 FMP net coniferous landbase area will be 114,184 ha.
- Pure Douglas fir A and B density stands that do not have a coniferous understory were excluded from the net landbase in the 2006 FMP to ensure that "veteran" Douglas fir trees remain on the landscape.
- Other considerations have reduced the net landbase available for timber production in the 2006 FMP (e.g., giving recognition to repeatedly used random camping sites).

Additional details on establishment of the net coniferous landbase are provided in Appendix 6B.

Changes to Yield Assumptions

- A 5-year regeneration establishment period has been adopted for all species except Douglas fir, where the establishment period is extended to 10 years.
- A green-up constraint of 30 years was implemented to ensure adequate reforestation and recognize other forest values such as aesthetics.
- New yield curves were developed based on current sample plot data (Appendix 8A).

Changes to Management Strategies

- Moving from a non-spatial to a spatial harvest sequence. This allows for the viewing of landscape harvest patterns for longer periods. Operational changes to the plan are allowed within identified limits.
- Minimum harvest ages of trees will be increased from those used in the 1986 plan to ensure the piece size of delivered wood is suited to the sawmill economy that depends on FMU logs.
- Allowances for "in-block" stand structure were considered in assessing the harvest level.
- The inclusion of a number of fine filter species themes in the spatial harvest sequence review process has influenced harvest pattern and compartment sequencing, thereby ensuring management considerations for these species are being satisfied.
- Inclusion of a number of special management areas, such as:
  - A one mile corridor on Highway 22 and the forest boundary in the Crowsnest Corridor to address wildlife travel needs.
  - Shelterwood/partial cut harvest strategies for the Syncline sky area, in the Allison Chinook Forest Land Use Zone, and a small area adjacent to the Elk Horn Ranch.
  - FireSmart community planning for the Castle Mountain Resort and Crowsnest Corridor.
  - West Castle Wildlife corridor to address wildlife travel needs.
- In recognition of other forest values, some heavily logged compartments (e.g., the headwater basins) were deferred from harvest scheduling to allow for an extended green-up period.

SRD retained the services of Watertight Solutions Limited to complete an analysis of the hydrological effects of the proposed harvest sequence from the PFMS. The Equivalent Clearcut Area (ECA) Alberta (Silins 2000) was completed for the entire FMU, and a more detailed analysis using the WRENSS–AB hydrological model (Swanson 2000) was completed on seven sub-basins

within the Crowsnest River watershed. The results from these analyses indicated that simulated increases in annual yield, ECA, and peak flows based on the proposed harvesting sequence are not significant, and are well below the detection limit using standard hydrometric techniques. As a result, the simulated increases in annual water yield and maximum daily flows should not be a significant threat to aquatic habitats or fauna. *Hydrological Effects of the Preferred Forest Management Scenario in the C5 Forest Management Unit* is located in Appendix 6C.

PFMS – Process Used

The process used in developing the PFMS involved analyzing the results of a suite of objectives, with constraints in the Woodstock model and targets and weightings in the Patchworks model. Process results can be viewed in detail in the Timber Supply Analysis, Appendix 6B. By combining the preferred components of the different scenario runs, progression was made toward achieving desired outcomes to the greatest degree possible which resulted in the preferred scenario. The following briefly identifies the factors that influenced the decision process and progression to the PFMS.

Determining the harvest level is both an art and a science, and decisions were made recognizing the three pillars of sustainability: social, economic and ecological considerations. This, however, was challenging since objectives often conflicted. Some key factors that were considered included:

- Maximizing removal of lodgepole pine to address the impending mountain pine beetle threat from B.C. and the United States.
- Maximizing achievement of seral stage targets including mature and old growth targets.
- Maximizing harvest levels while recognizing other values.
- Maintaining acceptable growing stock at the end of the 200-year planning horizon.
- Including FireSmart community and landscape objectives.
- Addressing the challenge of an ageing coniferous landbase.
- Ensuring watershed values are protected.

The above factors are presented in the table below. When aligned with some of the most characteristic run scenarios, they can be useful for comparative purposes. These runs are characterized in some detail in the TSA summary of Appendix 6B, and are provide in simplified form below. (Note: From the more than 60 run scenarios completed for this TSA, a few representative scenarios are summarized below.)

Table 19. Run scenario descriptions.

Run #	Harvest Level* (m^3/year)	Merchantable Ending Growing Stock ('000,000m^3)	Description
71002	159,562	~3.93	This was an early set of ecological runs that drastically increased the weightings (71002) of the early and late seral stage ecological targets to force the model to meet them at the expense of all other targets. Runs 71003, 71004 and 71005 set various levels of weighting on the early and late seral stage target levels; however these runs did not include an operational compartment sequence or consider the high and extreme mountain pine beetle stands.
71003	165,362	~3.44	
71004	171,516	~2.93	
71005	173,795	~2.75	

Woodstock Run 910	159,335	~5.20	This run forced the model to try and meet the ecological indicators (i.e., high weightings to meet proposed early and late seral stage targets) and forced FireSmart actions.to occur within the first 5 years. A non-declining growing stock for the last 50 years. Did not consider targeting MBP susceptible stands.
Patchworks Run 90014	174,917	~4.50	Force model to achieve current AAC for first 21 years, plus 143,000 m^3 conifer carryover with subsequent 10% step down in harvest. This scenario used the base compartment sequence from the timber supply protocol (40% availability of compartments). No target for pine including H or E rated MPB hazard stands.
Patchworks Run 90017	176,501	~5.04	Modified compartment sequence to access compartments with high amount of area at risk for MPB and target pine stands. Coniferous carryover was included at 143,000 m^3 in the first 5 years. Model also forced E and H rated MPB stands and other pine stands. First 21 years targeted at current AAC with a step-down harvest in 30 years.
Patchworks Run 90020	295,003	~5.1	Maximize harvest in the first 21 years with a subsequent drop down to 90% of the current harvest level. During the harvest period, target E and H rated MPB hazard pine, and other pine. Carryover of 143,000 m^3. A modified compartment sequence was used based on quota sphere and concentrations of pine.
Patchworks Run 90022	209,414	~3.78	A pine strategy harvest was implemented at 120% of the current AAC for 20 years with a subsequent stepdown to 90% of the current AAC. A coniferous carryover of 143,000 was included for the first 5 year quadrant. This scenario also used the modified compartment sequence. Throughout the entire planning horizon, E and H rated MPB hazard stands were targeted for harvest. Also for the first 60 years, other pine stands were targeted for harvest.

**Excludes carryover volumes from previous quadrant.*

With the above in mind, the following table is presented to provide a view of some of the decision process used in arriving at the PFMS.

Table 20. Decision process summary table (+/– rating based on comparison to the PFMS).

Runs>> Want Items:	PFMS 90022	71002 71003 71004 71005	910	915	90014	90017	90020	COMMENTS
Maximizing harvest levels while recognizing other values.	209,414	159,562_ 165,362 _ 171516_ 173,793 _	— 159,335	— 174,935	— 174,917	— 176,501	+ + ~295,003	Social concerns and the planning manual criteria for pine strategy harvesting limited movement to the maximum AAC possible.
Maximizing achievement of seral stage targets including old and very old age classes.		+ + +	+ +	+	+	+	—	All exceeded the level 1 targets by more than 100% when viewing the entire C5 landbase. Run 910 met the level 1 or level 2 targets on the active landbase with consistency over time. The 71000 series met targets at the expense of other values.
Maximizing removal of lodgepole pine to address the impending mountain pine beetle threat.		—	—	—	+	+	+ +	Final runs focused on lodgepole pine removals.
Maintaining acceptable growing stock at the end of the 200 year planning horizon. ('000,000 m^3)	3.78	———	——— 5.2	——— ~4.3	——— ~4.5	— 5.04	+ ~5.1	High early removals favoured ending growing stock. A middle-of-the-road harvest was chosen following the planning manual. (expressed in m^3).
Including FireSmart community and landscape objectives.		———	—	—	+	+	+ +	
Addressing the challenge of an aging coniferous average harvest age.		————	————	———	———	———	+	Early pine strategy harvesting deemed a prudent strategy

In the above table, run 90020 was ranked favourable; however, this option was not chosen for the following reasons:

- The need to meet the planning manual conditions for pine strategy harvesting (maximum of 125% above the current sustainable harvest level) resulted in the decision to conduct a pine strategy harvest (i.e., resulting in the PFMS run 90022).
- Run 90022 embraces a harvest intensity that achieves significant reduction in high and extreme hazard stands while retaining old-growth on the landscape. Therefore, marginal gains from higher cut levels were viewed as subordinate to the recognition of other values.
- This increase in harvest level achieves purposeful pre-emptive removals, while allowing time to monitor the MPB infestation adjacent to C5 FMU and remove those stands that will likely get hit even under a low or moderate infestation.

Risk Assessment

The first question to ask in any potential problem analysis is: What could go wrong? Following closely behind that question is: What is the probability (high, medium, low) of this happening; what would be the impact or consequence; what would be the contingency plan? Since the timber supply is scheduled to be rerun after two quadrant periods, it is important to realize that any decision made will be reassessed in 10 years. Therefore the assessment of risk can be limited to the time period from 2006 to 2016. This approach was taken when viewing the PFMS and a summary is provided below.

Table 21. Risk assessment of PFMS 90022 for the first 2 quadrant periods (2006 to 2016).

What can go wrong	Probability of event happening	What would be the consequence or impact	What would be our default position
Wildfire will destroy all the existing old growth.	Low	The impact would be high since the old growth is scattered throughout the forest and this would imply a catastrophic fire.	The harvest will be adjusted if the disturbance is greater than 2.5%.
Wildfire will destroy some existing old growth.	Medium	Impact Low–Salvage harvesting may occur and the burned area will be reforested. Underage stands will rejuvenate naturally and be removed from the net landbase until regeneration is confirmed through a forest inventory.	If greater than 2.5% of the net landbase is burned, the AAC will be adjusted. If less then 2.5% of the net landbase is burned, the AAC will be rerun at the end of the second quadrant period.
The MPB infestation reaches catastrophic levels in the first quadrant (2006-2010) period.	Medium	Numbers of beetles and area affected to the West of the C5 is increasing. High impact – pine available to local mills would exceed capacity.	Harvest as much green and red-attack pine as is possible before the infestation. Request existing mills operate to maximum capacity and if this is not sufficient then open salvage areas for harvest under a competitive bid process.
The MPB infestation reaches catastrophic levels in the second quadrant (2011-2016) period.	High	High impact in that the amount of mature pine far exceeds the ability to manufacture with local mills. Elk Valley infestation is expected to peak in 2013.	Harvest as much green and red-attack pine as possible before the infestation. Request existing mills operate to maximum capacity, and if this is not sufficient then open salvage areas for harvest under a competitive bid process.
The MPB threat subsides.	Low	Low impact since all pine scheduled for harvested in the first 2 quadrants is mature and scheduling is consistent with approved spatial harvest sequence.	Recalculate the timber supply at the end of the second quadrant and remove the constraint that pine harvesting is a priority. Allow for harvest sequencing of the full forest profile in the subsequent harvest periods.

In developing a risk analysis, the priority is to focus attention on those potential impacts that are rated high and also where the probability is medium or high. As shown in the table above, an infestation of mountain pine beetle in the C5 FMU is deemed the greatest significant issue for this timber supply analysis. Although there are also other concerns, there are a number of options available to deal with them. The options for handling a major infestation of mountain pine beetle, however, are limited to sanitation or commercial scale harvest removals.

As a precautionary measure, and based on advice from forest health experts dealing with the MPB epidemic in B.C., the decision was made to choose an increased harvest level with a focus on pine removal. Removal of mature pine stands as green volume is preferable to harvesting red or dead pine. The time required at 2005 harvest levels to cut through the mature pine profile is estimated to approach 60 years, so early progressive and systematic reduction of mature green pine consumed as feedstock by MPB is a high priority for the C5 FMU.

Concerns Associated With "Want" Criteria

Some information on the PFMS as provided by The Forestry Corp is presented below to explain the concerns associated with some of the "Want" criteria noted in Table 20. Key "want" criteria addressed below includes harvest age, pine focus harvesting, serial stages (including old growth) and acceptable growing stock levels. This information is a subset of Appendix 6b, entitled FMU C5 Forest Management Plan — Development of the Preferred Forest Management Scenario.

Average Harvest Age

Figure 4-4 provides average harvest ages for pine, spruce and all cover types combined for the entire planning horizon for selected scenarios. It shows that in a landscape with mature forests like the C5 FMU, the average harvest tends to decrease in the second rotation. Due to the access schedule in Patchworks, which limits the model from harvesting all the older aged stands first, the average harvest age increased for the first rotation, which is the opposite trend in the non-spatial TSA scenario RUN906. At the end of the planning horizon for the preferred forest management scenario, average harvest ages are above the minimum specified harvest age. Generally, the average harvest ages are higher in spruce than the other species, which is to be expected given the minimum harvest ages in the model.

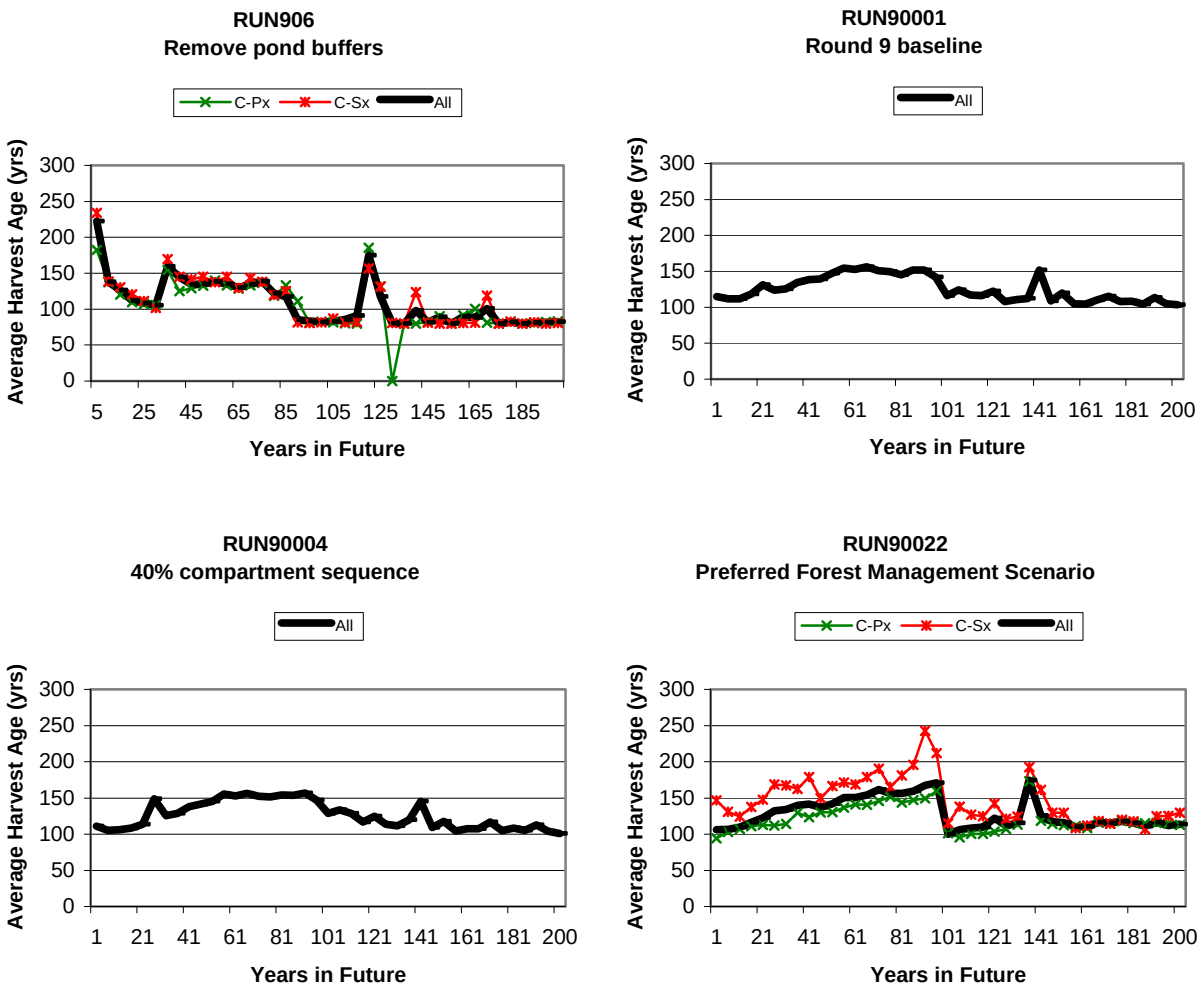


Figure 4-4: Average harvest age for selected scenarios.

Growing Stock

Merchantable growing stock is defined as the standing volume available for timber harvest; i.e., on the managed landbase and meeting the minimum harvest operability ages. The Alberta Forest Management Planning Standard requires the amount of operable growing stock at the end of the planning horizon to be equal to, or greater than, the average growing stock levels on the net landbase throughout the entire planning horizon. However, if this cannot be achieved (i.e., if there is a significant increase in average harvest age across the planning horizon), then the following was applied:

- Apply a non-declining minimum operable growing stock constraint for the last 40 years of the planning horizon.

As well, the over-arching rule that was applied was that at no time in the planning horizon was the growing stock allowed to fall further than 10% below the ending level.

A minimum merchantable growing stock level on the managed landbase was targeted to ensure there is an adequate supply of wood into the future. The minimum level of merchantable coniferous growing stock was determined to be approximately 2.9 million m^3. The PFMS resulted in an ending merchantable growing stock of approximately 5 million m^3.

Figure 4-9 shows the growing stock on the total, managed and merchantable landbases throughout the planning horizon. The managed coniferous growing stock decreases initially as forest harvesting is targeting older high-volume stands and this area is being replaced by young, low-volume stands. After approximately 50 years, the managed growing stock on the landbase stays fairly consistent throughout the rest of the planning horizon.

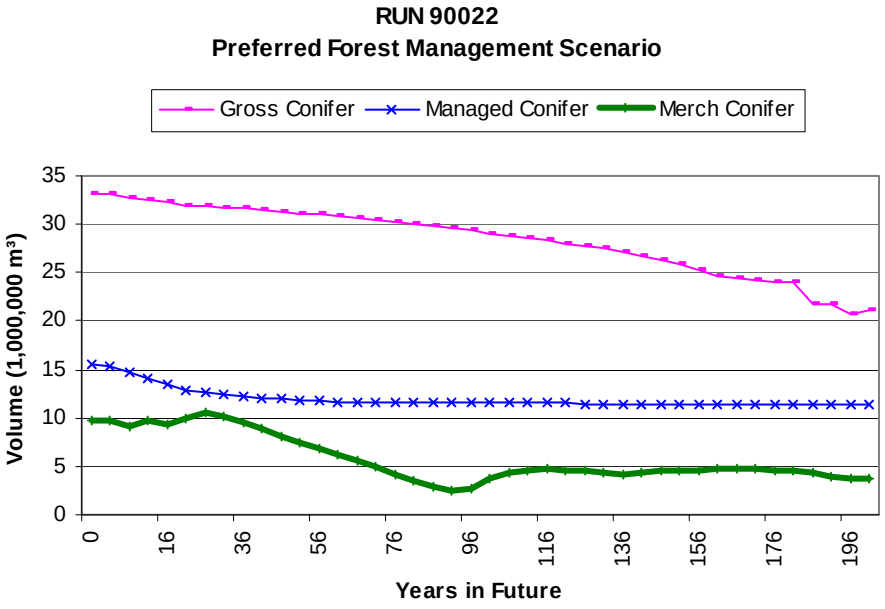


Figure 4-9: Conifer growing stock from the preferred forest management scenario.

Mountain Pine Beetle Susceptibility

Another objective that was identified was reducing the risk of mountain pine beetle outbreak on the landbase. It was recognized that currently MPB is slowly having an increasing presence on the landbase, which could increase dramatically in the near future. It was considered important to reduce the risk of an extreme outbreak; therefore, areas at extreme and high risk of MPB outbreak were targeted for harvest on the landbase wherever possible.

It was recognized that in an epidemic situation, the MPB would also target other mature pine on the landbase that were otherwise not classified as high or extreme risk by the predictive model. Therefore in the first 20 years, other mature pine was also targeted for harvest.

Areas of Pine

Results for the area over the planning horizon from the preferred forest management scenario are presented in Figure 4-12 and Figure 4-14 and for the late old growth for pine and highly susceptible pine, respectively.

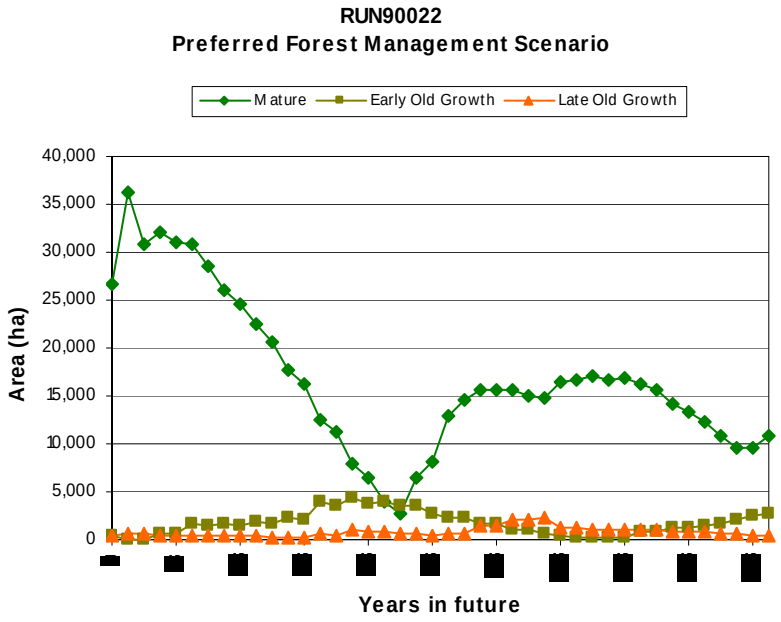


Figure 4-12: Area of pine by seral stage from the preferred forest management scenario.

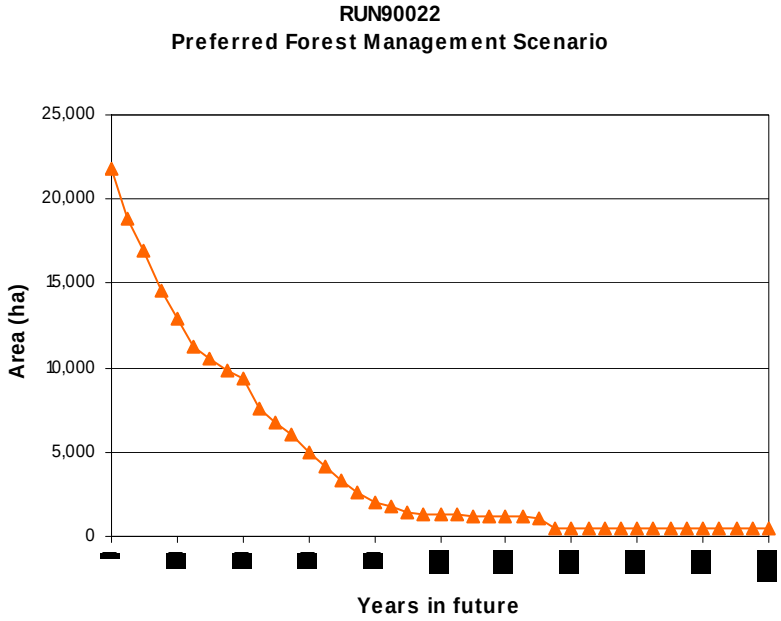


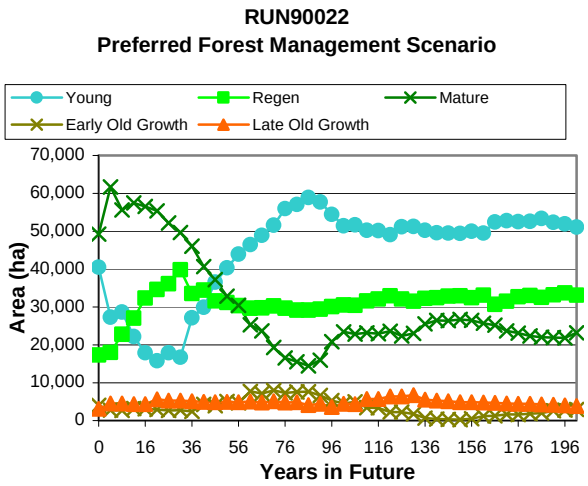
Figure 4:13: Area of highly susceptible pine from the preferred forest management scenario.

Seral Stage

The amount of area on the gross landbase by seral stage over the planning horizon that can be seen in area by seral stage from the preferred forest management scenario is provided in Figure 4-14 for the both the managed and forested landbases. The decline in old growth area near the end of the planning horizon on the forested landbase is a result of the stand break up and successional patterns built into the TSA models.

The area in hectares by seral stage at several points of time in the future from the preferred forest management scenario are provided in Tables 4-36 and Tables 4-37 for the managed and forested landbases, respectively.

Managed Landbase



Total Forested Landbase

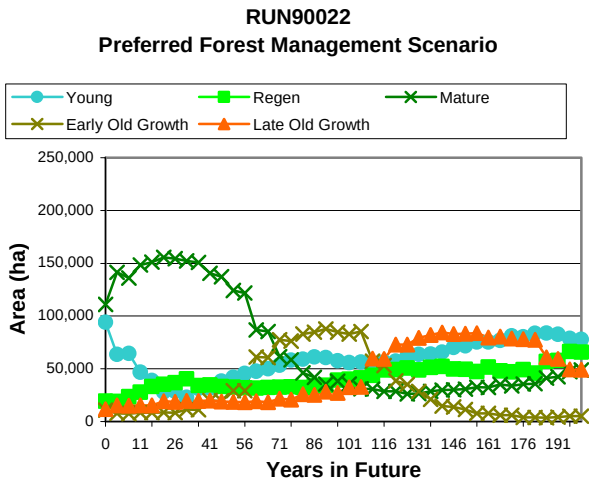


Figure 4-14: Area by seral stage from the preferred forest management scenario.

Table 4-36: Managed landbase area by seral stage from the preferred forest management scenario for selected periods.

Seral Stage	Managed Landbase Area (ha)[1] Years in Future					
	0	11	21	51	101	200
Regen	17,310	27,150	34,794	31,138	30,552	33,114
Young	40,417	22,014	15,499	40,273	51,428	50,979
Mature	49,277	57,443	55,330	32,799	23,838	23,619
Early OG	4,031	3,201	2,899	5,010	4,238	3,017
Late OG	3,150	4,369	5,655	4,958	4,121	3,449
Total	114,184	114,177	114,177	114,177	114,177	114,177

[1] Slight differences in total area are due to rounding in the TSA modelling tools.

Table 4-37: Gross landbase area by seral stage from the preferred forest management scenario for selected periods.

Seral Stage	Forested Landbase Area (ha)[1]					
	Years in Future					
	0	11	21	51	101	200
Regen	20,130	28,735	36,123	32,647	40,092	65,770
Young	93,963	46,719	28,161	42,823	55,730	77,703
Mature	111,113	148,267	155,583	124,196	37,024	49,165
Early OG	10,832	8,416	8,616	29,235	82,553	6,173
Late OG	11,658	15,524	19,177	18,760	32,262	48,850
Total	247,695	247,661	247,661	247,661	247,661	247,661

[1] Slight differences in total area are due to rounding in the TSA modelling tools.

Figure 4-15 shows the area by seral stage for each cover type in the managed and forested landbases, respectively, from the preferred forest management scenario. Area in seral stages by cover type was not a modelling target in the TSA models; however, these results are provided for comparison to ensure that old growth is not limited to just one species and is representative by cover type across the landscape.

Figure 4-16 presents the area by seral stage and C5 subregion from the preferred forest management scenario for both the managed and forested landbases to show that seral stage is representative across the geographic range of the C5 FMU. Table 4-38 and Table 4-39 provide the area in hectares by seral stage and C5 subregion for the managed and forested landbases, respectively, for selected periods from the preferred forest management scenario.

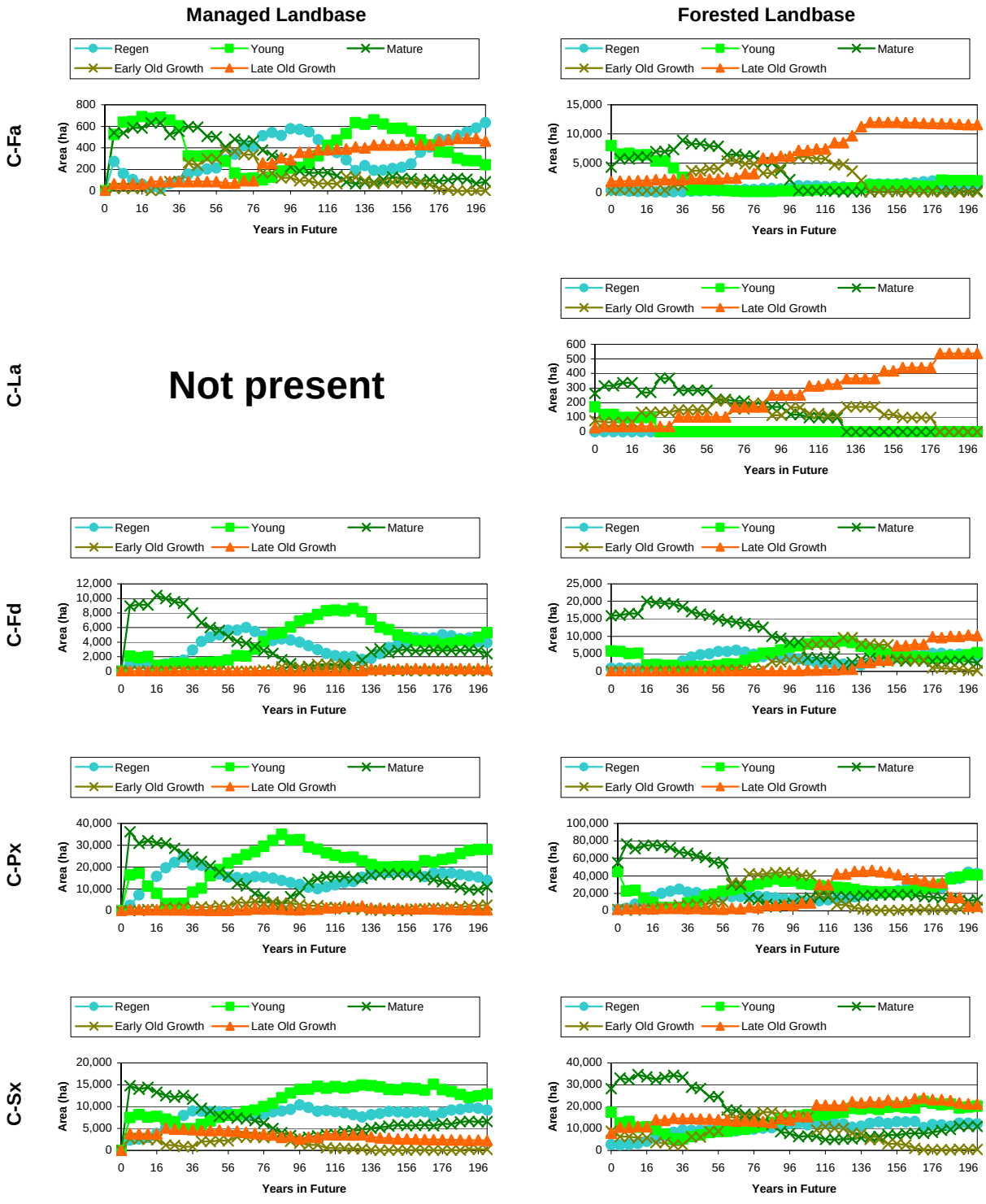


Figure 4-15: Area by seral stage and cover type from the preferred forest management scenario.

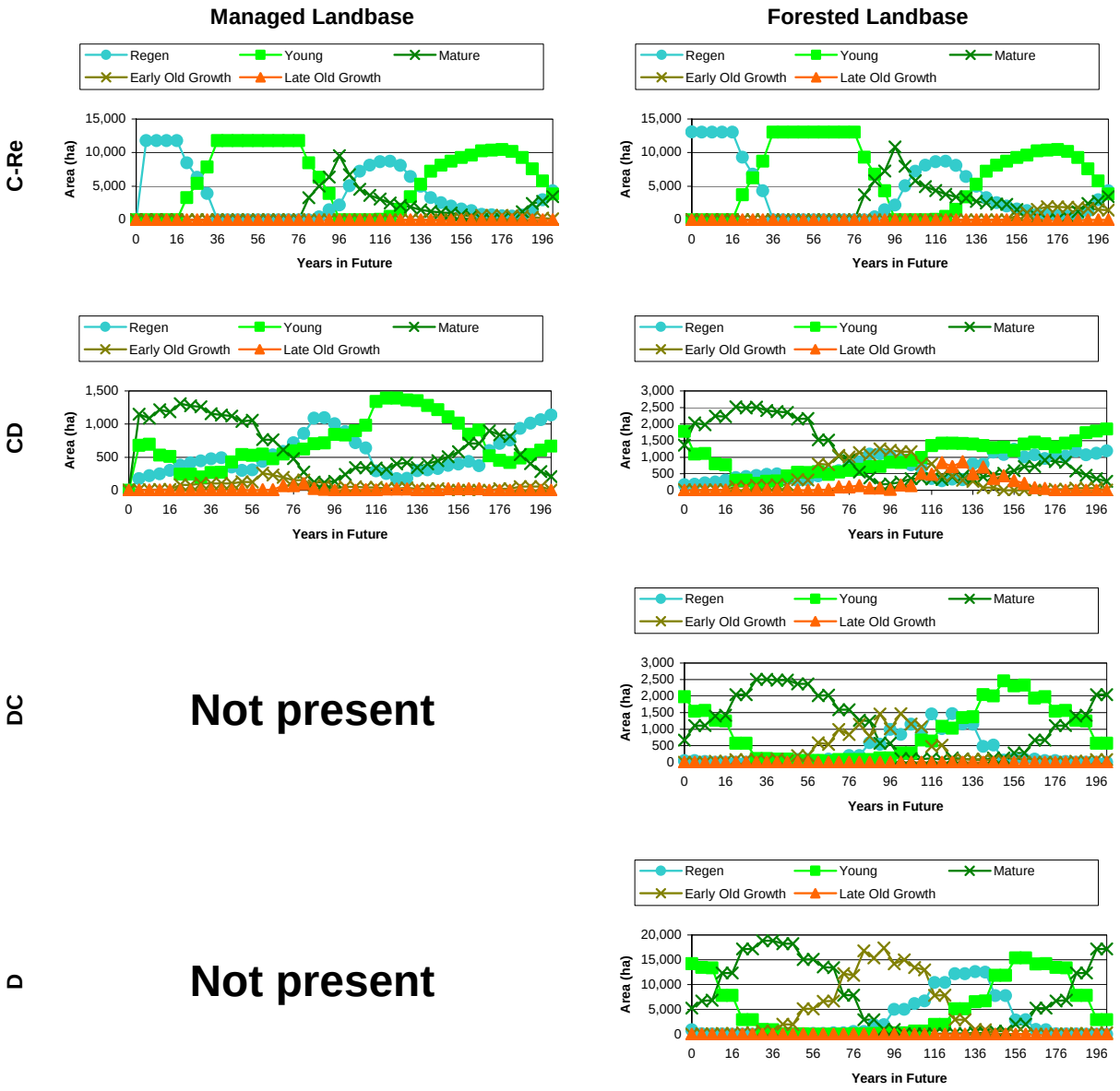


Figure 4-15: Area by seral stage and cover type from the preferred forest management scenario (continued).

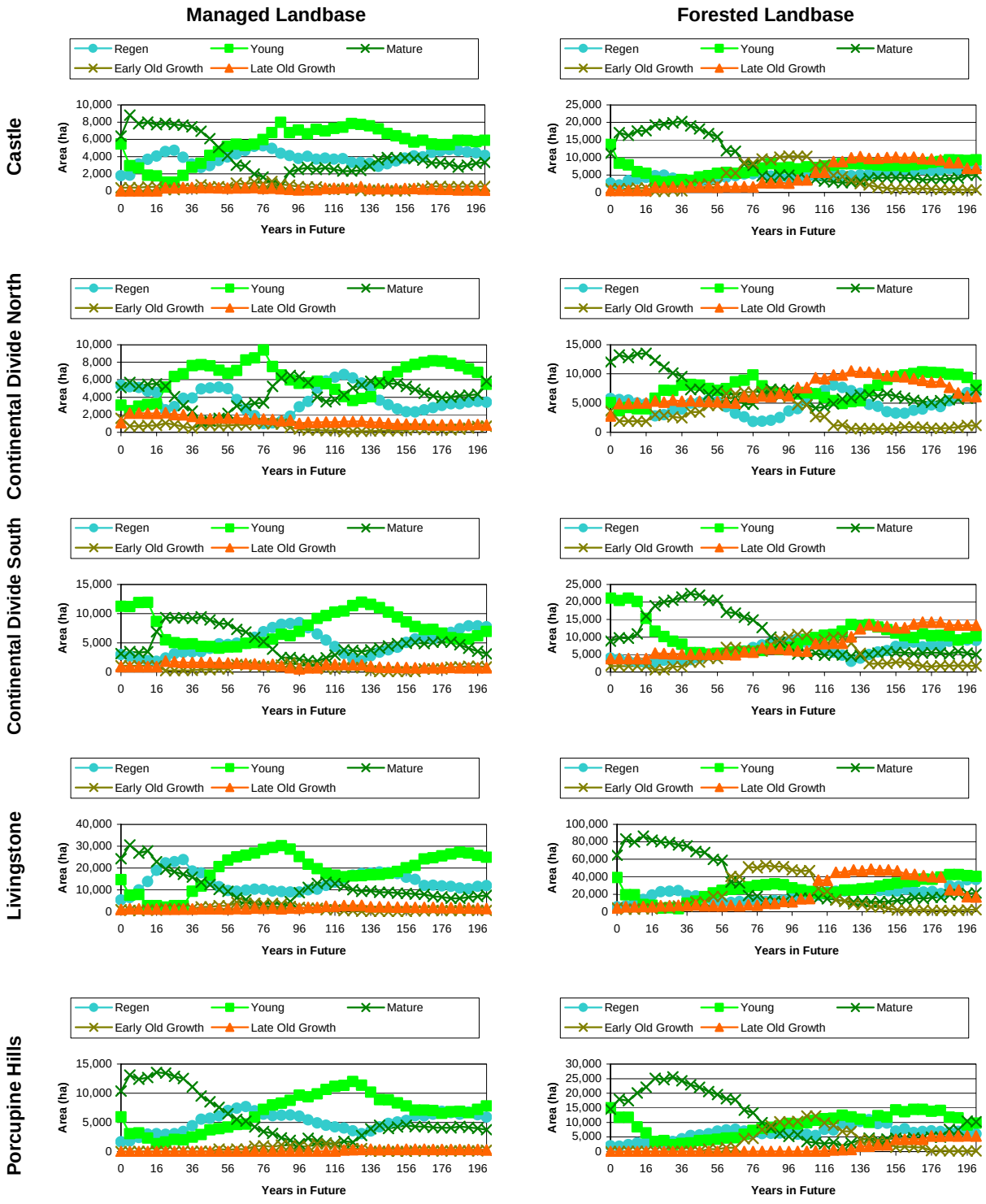


Figure 4-16: Area by seral stage and C5 subregion from the preferred forest management scenario.

Table 4-38: Managed landbase area by seral stage and C5 subregion from the preferred forest management scenario for selected periods.

C5 Subregion	Seral Stage	Managed Landbase Area (ha)[1]					
		Years in Future					
		0	11	21	51	101	200
Castle	Regen	1,780	3,668	4,590	3,532	4,017	4,146
	Young	5,447	1,848	1,023	4,556	6,646	5,898
	Mature	6,386	7,992	7,871	5,047	2,721	3,324
	Early OG	389	492	159	505	476	548
	Late OG	29	29	387	390	171	114
	Total	14,031	14,030	14,030	14,030	14,030	14,030
Continental Divide North	Regen	5,377	4,679	2,541	5,171	3,523	3,419
	Young	3,077	3,153	5,163	7,064	5,640	5,476
	Mature	5,100	5,472	5,270	1,597	5,683	5,813
	Early OG	1,587	762	1,033	745	243	695
	Late OG	1,091	2,165	2,226	1,656	1,141	828
	Total	16,232	16,231	16,231	16,231	16,231	16,231
Continental Divide South	Regen	2,996	1,965	2,401	4,821	7,585	7,751
	Young	11,236	11,928	5,512	4,077	8,033	6,925
	Mature	3,139	3,477	9,347	8,317	1,938	3,108
	Early OG	1,060	1,060	229	564	1,077	859
	Late OG	928	928	1,870	1,580	726	716
	Total	19,360	19,359	19,359	19,359	19,359	19,359
Livingstone	Regen	5,472	13,862	22,324	11,504	10,001	11,879
	Young	14,714	2,752	2,179	20,673	21,732	24,841
	Mature	24,261	27,822	19,415	10,262	11,223	7,606
	Early OG	994	856	1,449	2,767	1,545	688
	Late OG	1,101	1,247	1,173	1,333	2,038	1,526
	Total	46,542	46,539	46,539	46,539	46,539	46,539
Porcupine Hills	Regen	1,685	2,976	2,938	6,110	5,427	5,918
	Young	5,943	2,333	1,623	3,904	9,377	7,839
	Mature	10,391	12,680	13,428	7,576	2,273	3,768
	Early OG	-	30	30	428	897	228
	Late OG	-	-	-	-	45	265
	Total	18,019	18,019	18,019	18,019	18,019	18,019

[1] Slight differences in total area are due to rounding in the TSA modelling tools.

Table 4-39: Gross landbase area by seral stage and C5 subregion from the preferred forest management scenario for selected periods.

C5 Subregion	Seral Stage	Forested Landbase Area (ha)[1] Years in Future					
		0	11	21	51	101	200
Castle	Regen	2,627	3,859	4,755	3,563	4,424	7,206
	Young	13,707	5,916	3,249	4,813	6,739	9,299
	Mature	11,183	17,557	19,262	16,804	4,089	4,999
	Early OG	1,067	1,248	351	2,393	10,311	757
	Late OG	574	574	1,537	1,581	3,590	6,892
	Total	29,157	29,153	29,153	29,153	29,153	29,153
Continental Divide North	Regen	5,801	5,010	2,782	5,491	4,035	6,717
	Young	5,068	3,998	5,822	7,505	6,555	8,018
	Mature	12,050	13,385	12,343	6,473	6,357	7,312
	Early OG	3,619	1,894	3,050	4,589	4,707	1,166
	Late OG	2,792	5,040	5,330	5,270	7,674	6,114
	Total	29,331	29,328	29,328	29,328	29,328	29,328
Continental Divide South	Regen	4,009	2,760	2,810	4,863	9,487	8,981
	Young	21,084	20,174	11,607	5,142	8,145	10,367
	Mature	8,814	10,935	18,918	20,460	5,112	4,975
	Early OG	1,703	1,726	687	3,891	10,673	1,717
	Late OG	3,832	3,841	5,414	5,080	6,020	13,397
	Total	39,442	39,437	39,437	39,437	39,437	39,437
Livingstone	Regen	5,708	14,120	22,834	12,621	16,255	36,806
	Young	39,089	8,180	4,045	21,431	24,906	40,309
	Mature	64,520	86,322	79,938	59,872	15,713	21,670
	Early OG	4,429	3,495	4,476	17,449	46,454	2,265
	Late OG	4,460	6,070	6,895	6,815	14,859	17,138
	Total	118,205	118,188	118,188	118,188	118,188	118,188
Porcupine Hills	Regen	1,984	2,986	2,943	6,110	5,891	6,059
	Young	15,013	8,450	3,438	3,931	9,386	9,709
	Mature	14,546	20,067	25,122	20,587	5,752	10,210
	Early OG	14	52	52	912	10,408	268
	Late OG	-	-	-	14	118	5,309
	Total	31,558	31,555	31,555	31,555	31,555	31,555

[1] Slight differences in total area are due to rounding in the TSA modelling tools.

Appendix 6b contains substantially more information on a variety of subjects not provided above, including but not limited to the following: The spatial harvest sequence, interior old forest patches and results, green up patches, carryover volumes, ecological indicators target development, regeneration assumptions, to name a few. Readers are encouraged to review the full appendix.

Spatial Harvest Sequence

A spatial harvest sequence map showing the stands selected for harvest within the first 20 years of the planning horizon is provided in Appendix 6B. These stands will be allocated to each forest operator within FMU C5. Before they can be harvested, each operator must prepare an annual operating plan, which must be approved by ASRD staff. The harvest sequence planned for the next 10 years must be adhered to.

Table 5, Forest Management Objectives for the C5 Forest provides a complete list of the objectives of the C5 FMP. A subset of that list is provided in Table 22 below. Having reviewed the criteria used in the decision process for the Timber Supply Analysis, it is desirable to also look at how key objectives of the management plan have influenced the timber supply analysis process. Some objectives of the plan are administered through operational practices or policy not directly related to the timber supply; therefore, only those objectives that have direct influence in the TSA process are presented below.

Table 22. Key objectives influencing the TSA.

FMP Unique Number	Matrix Number*	Objective	Influence on the TSA
1	1.1.1	To maintain the full range of cover groups and seral stages.	Seral stage targets are set in the plan and priority weightings set in Patchworks.
2	1.1.2	To minimize landscape fragmentation.	A wide range of block sizes are desired to mimic patch sizes identified in the natural disturbance regime analysis.
3	1.1.3	To minimize the impacts of motorized access.	To minimize the impacts of motorized access, an attempt was made to minimize the number of compartments available for harvest in any 10-year period.
4	1.1.4	To retain stand level structural attributes.	An average of 3% was applied against the AAC to account for stand structure retained in harvested blocks. Actual structure left in blocks will range from 0 to 5% based on the size of harvest blocks.
6	1.2.1	To maintain habitat quality for species which are dependent on larger landscapes.	Compartment scheduling is a primary means of dealing with maintaining habitat at the landscape levels. For example, a short-term deferral of harvesting in the headwaters of the Castle is implemented to allow time for development of the grizzly recovery plan.
7	1.2.2	To retain, create and enhance habitats capable of supporting selected species.	A 400 m buffer has been incorporated around selected ponds to provide for habitat for the long-toes salamander and the western toad.
12	1.4.2	To retain specific wildlife features.	SHARP species, elk and grizzly maps are considered in the establishment of the spatial harvest sequence.
15	2.1.2	To minimize losses to human life, communities, soil, watersheds, natural resources and infrastructure from wildfire.	FireSmart landscape planning is considered in the Crowsnest Corridor and Castle Ski Area.
16	2.1.3	To minimize the impacts of pests (i.e., insects and	A proactive approach to an impending MPB epidemic has been proposed in the PFMS, which will see an orderly removal

FMP Unique Number	Matrix Number *	Objective	Influence on the TSA
		disease) which have the ability to kill healthy trees.	of susceptible lodgepole pine from identified harvest areas (proposed harvest sequence).
17	2.1.4	To maintain the long-term sustainability of the landbase by managing those forest health agents that can reduce growth, alter form, or kill trees after several years of infection/attack.	A proactive approach to the impending MPB epidemic has been proposed in the PFMS, which will see an orderly removal of susceptible lodgepole pine from identified harvest areas (proposed harvest sequence). Other forest health agents are monitored by the regional forest health officer, and are managed as per best management practices.
21	3.1.1	To conserve soil and organic matter, and maintain soil productivity	Disturbances resulting from forest industry roads and landings will be assessed and a plan developed to minimize the loss of forest productivity. Depending on current management practices, reforestation performance and proposed monitoring plan, a percentage reduction could be applied against the AAC.
22	3.1.2	To minimize soil erosion and slope failure	Disturbances resulting from forest industry roads and landings will be assessed and a plan developed to minimize the loss of forest productivity. Depending on current management practices, reforestation performance and proposed monitoring plan, a percentage reduction could be applied against the AAC.
23	3.2.1	To ensure that all forest industry practices are conducted in a manner that places a priority on the protection of water quality.	Harvest sequencing may have to be altered to reduce the level of forest removal if results of watershed analysis conducted in key sub-watersheds indicate higher than acceptable water yields (based on the recommendation of a professional forest hydrologist) (see Appendix 6C).
24	3.2.2	To manage forest cover in a manner that places a priority on the conservation and protection of watersheds.	Harvest sequencing may have to be altered to reduce the level of forest removal if results of watershed analysis conducted in key sub-watersheds indicate higher than acceptable water yields (based on the recommendation of a professional forest hydrologist) (see Appendix 6C).
26	5.1.1	To maintain sustainable timber harvest levels; i.e., timber harvesting shall not exceed the forest's productive (renewal) capacity.	Yield curves are developed that predict the expected forest growth over time. A TSA was used to develop a PFMS that proposes a sustainable harvest level and projects the impact of this harvest level and management objectives 200 years into the future.
27	5.1.2	To maintain or increase the net forest (commercial timber harvesting) landbase in the C5 FMU.	The TSA established the net landbase at 114,184 ha.
28	5.1.3	To ensure all harvested areas are re-forested.	A basic assumption in the TSA process. A 5 year establishment period was incorporated in the development of yield curves for all coniferous species, except Douglas-fir which received a 10 year establishment period. Silviculture management strategies have been proposed to ensure best practices are applied for reforestation on harvested blocks.

FMP Unique Number	Matrix Number*	Objective	Influence on the TSA
29	5.1.4	To achieve optimal utilization of wood fibre during logging operations	15/10 utilization standard was applied in development of the yield curves. An adjustment factor was applied to the proposed AAC to reflect current utilization of 15/11.
30	5.1.5	To consider visual impacts during the development of harvest plans.	A visual harvest theme is provided for use when developing a final harvest plan from the spatial harvest sequence.
31	5.1.6	To allow the general public and various user groups to benefit from the C5 forest.	A green-up constraint of 30 years has been applied in recognition of other values.
32	5.1.7	To provide reasonable access for recreational and industrial purposes while maintaining the ecological integrity of the forest.	A road planning theme is developed to ensure access to each compartment, and an access development map will be completed following plan approval.
33	5.1.8	To promote cooperation between forest harvesting operators and other forest users.	A 20-year spatial harvest sequence map is developed to provide forestry operators certainty as to where they will be operating, and also afford other users the ability to spatially see where development will occur. This will facilitate discussion and land use integration with other users of the C5 FMU.
34	5.1.9	To ensure broad participation of disposition holders in forest management decision-making processes.	The quota holders, stakeholders and the general public were consulted on the FMP, TSA and Spatial Harvest Sequence through various consultation processes.
35	5.1.10	To integrate recreational activities with forest management practices	A 100 m buffer was deleted from the timber harvesting landbase from high-use random camping sites.
40	5.2.1	To ensure that local/regional businesses have an opportunity to share in the economic benefits that can be derived from the C5 forest.	The Community Timber Program makes available allocations. These allocations are included in the spatial harvest sequence.
42	5.2.3	To provide economic opportunities for forest dependant businesses while maintaining the integrity of the C5 forest ecosystem.	Sustainable timber harvest levels are established that consider a variety of values: social, economic and ecological values.
45	6.3.1	To proactively and meaningfully involve directly affected users and the interested public in forest planning and decision-making processes.	The public open house and web page provided opportunities for the public to view and provide comment on the FMP and spatial harvest sequence maps.
46	6.3.2	To raise public awareness of forest management issues and activities.	A variety of quota holder, stakeholder and public consultation processes used during development of the FMP provided opportunity for the public to view and provide comment on the FMP and spatial harvest sequence maps.

FMP Unique Number	Matrix Number *	Objective	Influence on the TSA
48	6.3.4	To be responsive to changing social values concerning sustainable forest management.	A number of factors have been identified under changes to the net landbase, changes to yield assumptions, and changes to management strategies in the objectives listed above are responses to changes in social values.
49	6.4.1	To pursue "active" adaptive management when managing forest resources in the C5 FMU.	Some stands identified in the spatial harvest sequence are included to allow for special watershed harvesting in a paired catchment study scheduled near the end of the first 10-year period.
51	6.4.3	To protect historical resources where appropriate.	The net down process includes historical resources, and operational planning for the Spatial Harvest Sequence will consider this value.
52	6.4.4	To obtain current information on forest resources.	AVI data are used in the net-down process and AVI maps for reviewing the proposed Spatial Harvest Sequence

** Matrix numbers are based on the numbering scheme that has been applied to "Elements".*

This plan's primary focus is on the progressive and systematic removal of lodgepole pine to reduce the high and extreme hazard rated pine stands over a 20-year period. A revised FMP in 2016 will reassess the MPB threat. If such a threat has subsided significantly, and MPB exist within the C5 FMU in endemic proportions, the FMP will refocus the harvest to the full profile of the forest (i.e., all species proportional to maturity classes meeting minimum harvest ages).

Though the main focus of this plan is on the commercial removal of lodgepole pine, the following should be noted:

- Seral stage targets for older age classes are set for the net landbase. Targets are exceeded when viewing the entire FMU holistically (i.e., managed and passive landbase as an ecosystem). These targets will be reassessed in 10 years.
- A limited removal of species other than lodgepole pine is allowed while still maintaining the pine removal focus. This includes:
  - Accommodating removal of stands that have already been planned and approved in final harvest plans.
  - Allowing shelterwood operational trials of Douglas fir harvesting and reforestation in the Porcupine Hills.
  - Allowing for removal of species encountered as incidental to pine harvest where those individual stems are deemed poor candidates as standing live structure (specific direction is provided in the Forest Management Activities of Objective 4).
  - Allowing for removal of stands approaching the death age that are subject to rapid decline and increased fire hazard risk.
  - Accommodating one-time removal where minimizing access is deemed beneficial for environmental and/or wildlife purposes.

With the above exceptions noted, the intent of the harvest over the next 10 years is to maintain the harvest in pine-leading stands greater than 90% most of the time.

- Other pine species such as limber pine and whitebark pine are considered as endangered, are susceptible to MPB, and are currently being attacked by whitepine blister rust. No whitebark

pine or limber pine leading types are scheduled for commercial removal in this spatial harvest sequence. Should MPB infest these stands, only green-attacked trees will be considered for sanitation removals. Where these species are encountered as secondary species to lodgepole pine harvest, these trees will be left as standing structures and monitored with sanitation removals for MPB. Only green-attacked trees will be considered for sanitation removal if MPB infestation occurs.

- Though the escalation of harvest age is noted as a concern from a timber management perspective, this concern is viewed as secondary to the forest health issue of MPB.

Owing to the silvics of lodgepole pine, the primary method of removal will be clearcut harvesting with the restriction that non-pine species will remain standing and intact as stand structure. Where non-pine leading stands are scheduled for removal, stand structure strategies as identified in Objectives 4 and 24 still apply.

Specific information on the Annual Allowable Cut as a derivative of the PFMS follows.

4.4.3 Annual Allowable Cut

The annual allowable cut (AAC) is the volume of timber that can be harvested under sustained-yield timber management in any one year, as stipulated in an approved forest management plan. The intent of this plan was not to calculate the highest AAC possible, or to maximize the AAC at any cost. Rather, the intent was to optimize the cut level while giving due consideration to the many other values and interests that are an integral part of the C5 forest. A harvest level is not an AAC unless it is approved by the Minister.

The harvest level was set at 120% of the 2005 harvest level for 21 years. After 21 years, there is a proposed step-down to 90% of the 2005 harvest level (174,920 m^3). The proposed pine strategy harvest increase and decrease follows the direction provided in the Alberta Forest Management Planning Standard (2005). Achieving the desired future forest state outlined in this plan will result in an AAC volume of 209,414 m^3 per year.

A new TSA will be completed in 2016 which could result in a revised AAC based on recommendations contained in the 5-year stewardship report and the status of the MPB. As well, other inputs will be considered in the TSA at that time, such as research on fire regimes, biological diversity and old growth. A recalculation of the AAC may also be triggered if more than 2.5% change in the net landbase occurs due to a natural disturbance event. If the latter occurs, the AAC shall be reduced by an amount equal to the percentage of the net landbase deletion resulting from the disturbance.

Table 23 summarizes the coniferous AAC that will be allocated May 1, 2006 for the C5 FMU. Historical AAC volumes for the C5 forest are identified in Tables 24 and 25. Changes to the AAC established in 1986 have occurred. These changes include an increase in 1999, and two decreases due to the Cherry Hill (2000) and Lost Creek (2003) fires.

Table 23. 2006 annual allowable cut quota summary for the C5 FMU.

Disposition	Company	Percentage of AAC	Cubic Meters*
Quota Certificate CTQCO50009	Crowsnest Forest Products Ltd.	58.69	122,905
Quota Certificate CTQC050008	Spray Lake Sawmills (1980) Ltd.	29.07	60,877
Quota Certificate CTQC050005	770538 Alberta Ltd.	4.38	9,172
Quota Certificate CTQC050002	793128 Alberta Ltd.	1.65	3,455
Community Timber Permit Program (CTPP)	CTP-C5	6.21	13,005
TOTAL		100	209,414

***** *Approximate values only.*

Table 24. Pre-2006 annual allowable cut quota summary for the C5 FMU.

Disposition	Company	Percentage of AAC	Cubic Meters
Quota Certificate	Crowsnest Forest Products Ltd.	58.69	102,661
Quota Certificate	Spray Lake Sawmills Ltd	29.07	50,849
Quota Certificate	770538 Alberta Ltd	4.38	7,661
Quota Certificate	848507 Ltd	1.65	2,886
Community Timber Program	Administered by ASRD	6.21	10,863
TOTAL		100	174,920

Table 25. 1986 annual allowable cut quota summary for C5 FMU. (Approved Net AAC: 165,753 @ 15+/11 cm.)

Disposition	Company	Percentage of AAC	Cubic Meters
Quota Certificate	Revelstoke Co. Ltd.	54.60	90,505
Quota Certificate	Johnson Brothers Sawmills Ltd.	26.84	44,489
Quota Certificate	Chinook Coal Ltd.	4.04	6,701
Quota Certificate	M. Sosnowski	1.52	2,519
MTUC	Administered by ASRD	5.73	9,500
TOTAL*			165,753*

** varying harvest utilization levels resulted in actual AAC per company that dropped below the harvest level possible at a utilization level of 15/11.*

Utilization standards that were used to determine harvest levels are outlined in Table 26.

Table 26. Log utilization standards.

Tree/Log Element	Standard
Minimum top diameter, inside bark	11.0 cm
Minimum stump diameter, outside bark (butt end)	15.0 cm
Minimum log length	2.4 m
Stump height above ground	30.0 cm

A deciduous AAC has not been assigned for the FMU because the deciduous trees found within the C5 FMU are believed to have greater value for meeting aesthetic and wildlife habitat objectives

than through commercial timber harvesting. No incidental coniferous timber will be produced from these stands in the FMU.

5.0 PERFORMANCE MONITORING AND PLAN IMPLEMENTATION

5.1 PLAN IMPLEMENTATION

The C5 FMP plan will take effect May 1, 2006. At that time, provisions in this plan shall be observed by ASRD and by timber disposition holders operating in the C5 forest.

The Southern Rockies Management Area (PLFD, ASRD) will provide oversight during plan implementation and will assume primary responsibility for plan administration. To assist with plan implementation, ASRD will wish to establish annual workplans and/or operating budgets. "Summary lists" and reporting protocols will be developed in 2006 to ensure operational requirements outlined in this plan are being realized. Reporting protocols will identify processes, procedures and reporting requirements to track results achieved. This information will be incorporated within a Provincial Forest Management Assessment system (Figure 9), which in turn will be passed along and factored into a national reporting system.

Any disputes that might arise in the future about the intended meaning of provisions in this plan or their implementation will be resolved through discussions among Forest Management Branch (ASRD) representatives, the SW Region Area Manager (ASRD) and any other involved party. If necessary, a formal dispute resolution mechanism may be adopted to overcome interpretation problems and resolve emerging issues.

A comprehensive plan review will be undertaken before May 2016 (plan midpoint), and again on (or before) May 1, 2026 at the end of the plan's 20-year lifespan. The plan review process will provide opportunities for stakeholder and public input. Substantive plan amendments may be the outcome of formal plan reviews, or may be triggered by other events during the life of this plan.

5.2 OPERATIONAL PLANNING AND PRACTICES

Implementation of this FMP will result in the development of detailed forestry operational plans and Regional Operating Ground Rules, the integration of existing decision making and planning processes, the establishment of partnerships or collaborative working agreements, new working arrangements, new management practices and protocols, etc. Details concerning these activities are contained throughout Section 4.3 in this plan.

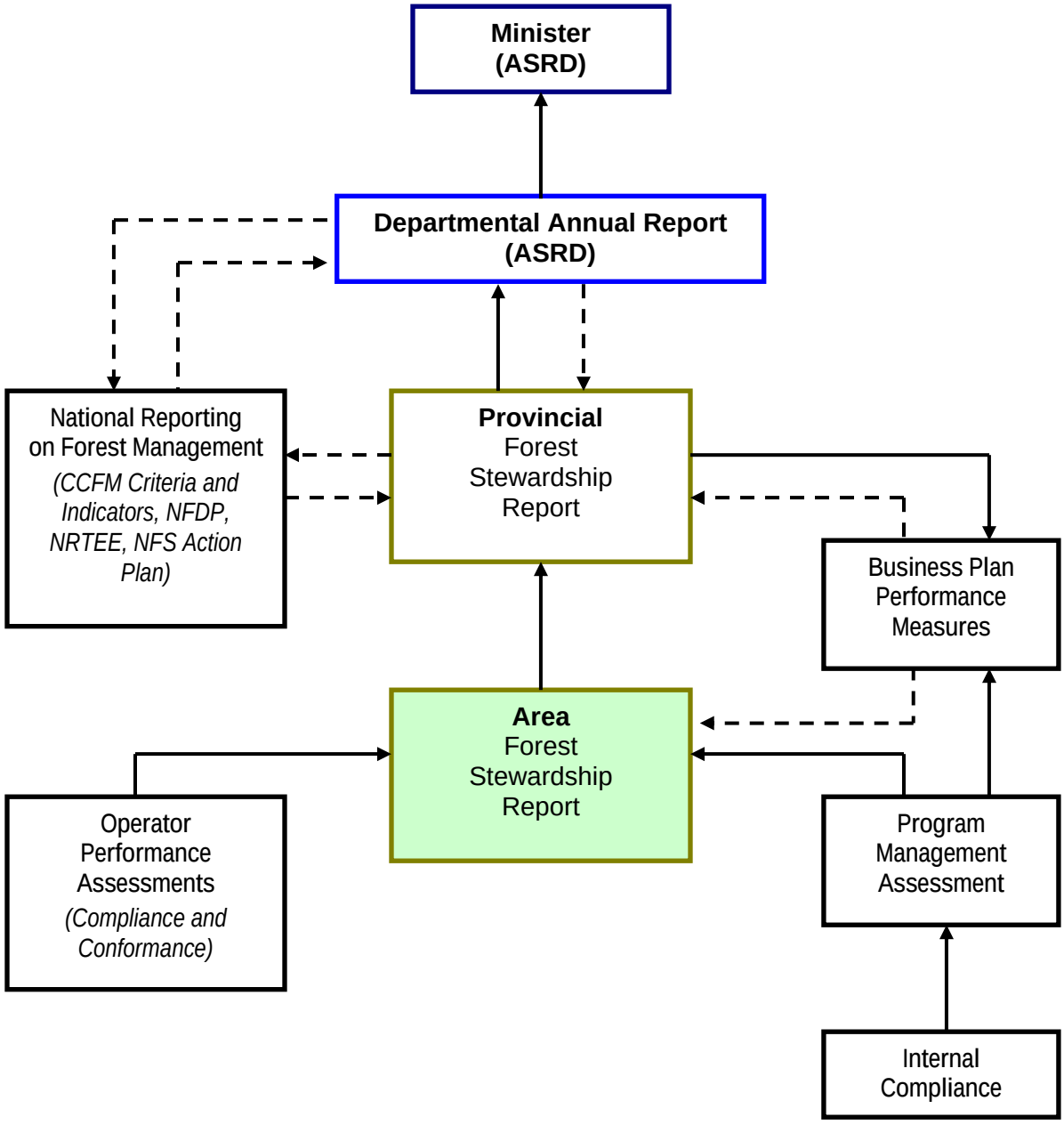


Figure 9. Alberta's Forest Management Assessment System.

5.3 OPERATING GROUND RULES

Under the leadership of ASRD, new regional *Timber Harvesting and Operating Ground Rules* will be developed for the C5 FMU. The new regional OGRs will be developed based on direction contained in this FMP, as well as other relevant information contributed by participants in the ground rules development process. The C5-C4 FMU Regional Timber Harvesting and Operating Ground Rules will be completed in 2006 and will also take effect May 1, 2006. These will replace the existing 1994 provincial *Timber Harvest Planning and Operating Ground Rules*.

5.4 ACCESS PLANNING

Using the spatial harvesting sequence as a starting point for more detailed planning, ASRD shall initiate development of an access development plan for the FMU to:

- forecast industrial access requirements;
- identify and coordinate key industrial access routes in the FMU;
- identify preferred road corridor locations to access future timber stands.

Building on initial road systems proposed through the TSA modeling process, ASRD will proceed with the development of an access development plan in 2006 in consultation with key industrial sector representative and other stakeholders. A draft plan will be presented to the newly established Crowsnest PAC and interest groups for comment. The access development plan will provide a basis for the subsequent development (or revision of existing) recreational access management plans within the C5 FMU.

5.5 PUBLIC PARTICIPATION

Meaningful public involvement will be sought during the implementation phase of this plan. An open, transparent and consultative approach will be followed, allowing affected participants to influence future decision-making. ASRD will continue to fulfill its role of informing and educating forest users.

The Crowsnest Public Advisory Committee (CrowPAC), which was established in 2002 to provide input in the development of this plan, was dissolved in March 29, 2006 following public review of the FMP. A new Public Advisory Committee, with balanced sectoral representation, will be established when this plan takes effect. The mandate and working arrangements of the new PAC will be identified in a committee Terms of Reference, to be jointly developed by PAC members and ASRD representatives.

5.6 MONITORING

Monitoring forest management activities will occur at various temporal and spatial scales:

- as part of operational activities (i.e., during field inspections, when completing resource inventories, when preparing General Development Plans, Compartment Plans, and Annual Operating Plans, when completing Silvicultural Reports, etc.);
- as part of administrative reporting activities (i.e., ARIS, LFPD Internal monitoring protocols, Land Use System);
- as part of normal agency field activities.

Monitoring responsibilities will be shared among provincial agencies in accordance with their respective mandates and work plans, and will require some level of cooperation and input from disposition holders. Monitoring requirements have been identified in Section 4.3 of this plan for each plan objective. More specific monitoring procedures and methods, assignments, and schedules (i.e., the timing and frequency of monitoring) may need to be developed in the future for several objectives. Annual monitoring reports will need to be prepared for several indicators adopted in this plan; however, 5-year stewardship reports will serve as the primary mechanism for documenting monitoring results.

5.7 STEWARDSHIP REPORTING

Understanding and documenting change over time is a key component of stewardship reporting. Stewardship reporting will occur on a five-year basis so as to be aligned with five-year quadrant reports. Stewardship reports will document the progress made in fulfilling the plan's objectives and targets and achieving the plan's resource management strategies. A template (a framework and outline) for stewardship reports will be developed by ASRD to ensure a level of consistency with similar forest reporting done elsewhere and at provincial and national levels.

The five-year stewardship report will, among other things, identify results achieved, the outcome of monitoring activities, the suitability of plan performance measures, progress made in implementing management strategies, variance from FMP standards and targets, emerging resource management issues, problems encountered in implementing the plan, new and ongoing research projects and research findings, public participation, etc.

Stewardship reports will prove useful in determining the level of success that has been achieved in implementing FMP commitments and for assessing the plan's ongoing relevancy and appropriateness. As necessary, stewardship reports will propose changes to objectives, targets, indicators and management strategies in the FMP. Recommended changes to the FMP that are identified in stewardship reports will provide a mechanism for instituting plan revisions at 5-year intervals.

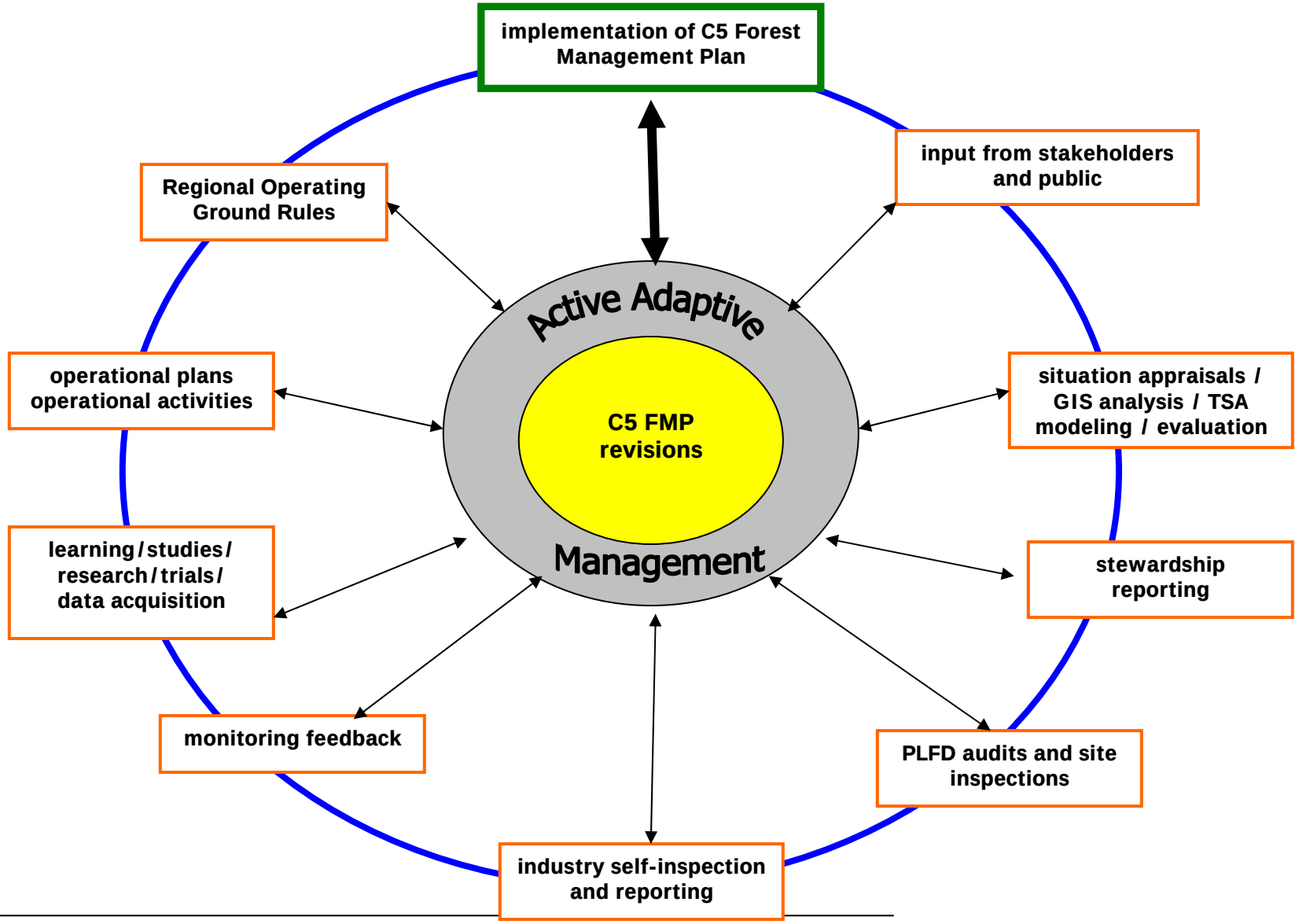
5.8 ADAPTIVE MANAGEMENT FOR CONTINUAL IMPROVEMENT

It is recognized that modeling tools have limitations in predicting the future, that societal values and preferences change over time, that new knowledge gained through research and experimentation is constantly being acquired, that ecosystems may undergo profound changes, and that plans eventually become dated. These and other factors suggest that resource management is a dynamic enterprise, and that uncertainty and change are certainties. To remain effective, forest management plans must remain open to change and be responsive to change.

Astute resource managers recognize the need to modify management direction in response to new knowledge, from insights gained through research, observation and monitoring; when recommended resource management strategies and practices are not producing desired outcomes, and when new, appropriate and proven technologies and management systems emerge. An active adaptive management system that will be employed for the C5 FMP is shown in Figure 10.

Adaptive management provides a mechanism for ensuring this plan remains responsive to a changing world, innovative management approaches and new information. When provisions in this plan are no longer relevant or seen to be unattainable, such statements will be amended to ensure this plan continues to be appropriate, effective and achievable. Unless changes are of a compelling or urgent nature, revisions to this plan will be considered at five-year intervals, the first occurring in 2011 (at the end of the first 5-year quadrant), and at five-year intervals thereafter.

Figure 10. Plan Implementation and Active Adaptive Management Cycle – C5 Forest Management Plan.



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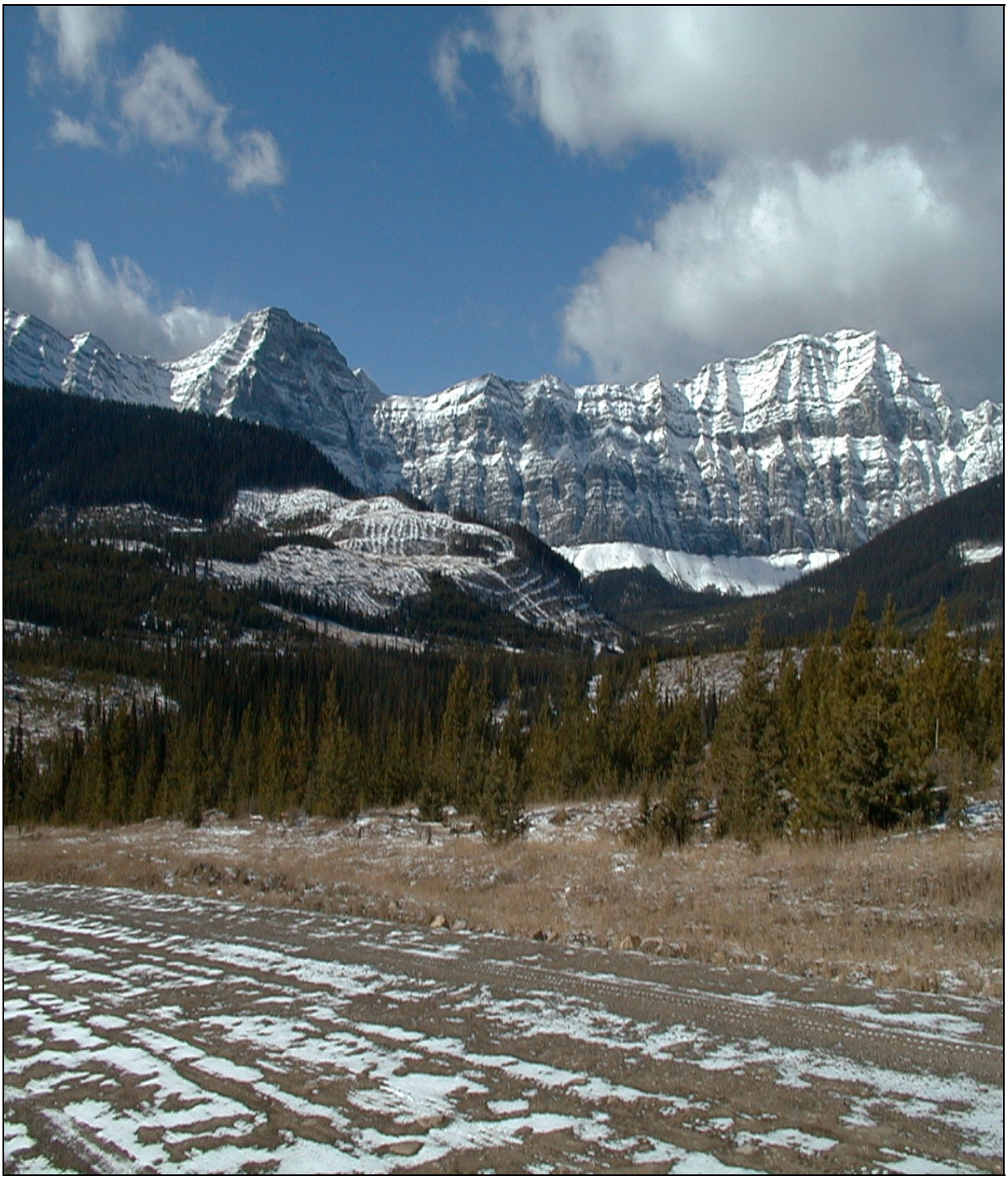
INDEX



Viewscape of historical harvesting along the front range north of Coleman on the Atlas Road.