

Slave Lake Pulp Corporation

2000 Detailed Forest Management Plan

1.0 Introduction

Slave Lake Pulp is obligated under its Forest Management Agreement to develop a Detailed Forest Management Plan that will replace the existing Detailed Forest Management Plan. The new DFMP was due on November 15, 2000. However, due to delays in inventory approval, landbase determination and yield analysis combined with the occurrence of the 2001 Chisholm Fire an extension was granted. The revised submission date was May 15, 2002. A copy of the DFMP deadline extension correspondence is provided in Appendix A.

1.1 Plan Purpose

The mandate of this DFMP is defined within the Forest Management Agreement (See Appendix B):

"On or before November 15, 2000, the Company shall submit for the Minister's approval a detailed forest management plan for the revised forest management area."¹

"The Company shall prepare the forest management plans in accordance with the forest management planning manual prepared by the Minister, as amended from time to time."²

"The management strategies in the detailed forest management plan shall a) provide for the maintenance of the annual allowable cut for both the coniferous and deciduous species subject to the occurrence of natural disasters; and b) account for both the coniferous and deciduous components of the growing stock in all stands in the forest management area, and shall ensure that these components are being replaced through strategies acceptable to the Minister through the approved forest management plans and annual operating plans."³

The purpose of the plan is to build upon the previously approved Forest Management Plan to further integrate social, environmental and economic aspects into the forest management strategy for the FMA. The forest companies recognize that differences in management philosophies may exist and commit to creating opportunities for integration of those different philosophies. The goals and objectives, developed jointly within this plan, recognize the rights of the companies to utilize the forest resource while mitigating the impacts of forestry operations on the other users of the forest..

This Detailed Forest Management Plan will describe how Slave Lake Pulp will:

- ◆ *Manage for perpetual sustained fibre in accordance with the principles of sustainable forest management.*
- ◆ *Integrate FMA and quota holder planning and operations in the spirit of cooperation and trust.*
- ◆ *Maintain the cost competitiveness of the forest industry by maintaining high wood quality and minimizing delivered wood costs*
- ◆ *Conduct woods operations in a manner to optimize operating efficiency while minimizing adverse environmental impacts*

¹ Paragraph 10(4) SLPC FMA Agreement

² Paragraph 10(6) SLPC FMA Agreement

³ Paragraph 10(7) SLPC FMA Agreement

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- ♦ *Minimize wood losses due to fire, insects, disease and blowdown*
- ♦ *Manage the FMA in a manner to provide society the opportunity to meet economic needs while maintaining ecological integrity and social/cultural values.*
- ♦ *Provide the opportunities to improve the fibre supply through enhanced forest management.*
- ♦ *Maintain and enhance a forest inventory that will provide sound data for forest management planning and operations.*
- ♦ *Implement a cooperative research program with independent research agencies and other interested parties to get a better understanding of natural disturbance patterns, forest dynamics and stand structure.*

This Detailed Forest Management Plan will also:

- ♦ *Describe the current use and condition of the forest management area;*
- ♦ *Describe how the public will be included in forest management planning and operations;*
- ♦ *Describe sound forest management philosophies and objectives that include forest values such as timber supply, wildlife habitat, water resources, other commercial and public uses;*
- ♦ *Describe the implementation, monitoring and feedback mechanism strategies for ensuring that the plan is meeting its objectives;*
- ♦ *Include the yield projections and assumptions used to determine the net land base for the determination of the annual allowable cut;*
- ♦ *Describe the harvesting schedule for the first rotation;*
- ♦ *Include a spatial harvest sequence for the first 20 years;*
- ♦ *Include provision for a 20 year road development plan;*
- ♦ *Include a long-term forest protection strategy in which a 'cooling of the forest' initiative will be considered.*

1.2 Current Status of the Company

1.2.1 Corporate History – West Fraser Timber

West Fraser Timber was formed in 1955 when 3 brothers, Henry H. Ketchum Jr., William P. Ketchum and Samuel K. Ketchum acquired a small planer mill located in Quesnel, British Columbia.

West Fraser Timber is an integrated canadian forest products company which produces high quality products of dimension lumber, stud lumber, medium density fibreboard (MDF), moldings, plywood, , specialty wood products, wood chips, bleached-chemi-thermal-mechanical pulp (BCTMP), linerboard, Kraft paper and newsprint. West Fraser Timber currently owns and operates ten sawmills and is involved in joint ventures with three additional sawmills in the

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provinces of British Columbia and Alberta; two medium density fibreboard plants; two pulp mills; a veneer plant and plywood plant; and, joint ventures in a pulp mill and a newsprint company. The company also owns two sawmills in the Southeastern United States in Louisiana and Arkansas. The Company recently sold the franchise rights to Revy stores located through Canada but still retains the real estate for most of those 54 stores.

In recent years West Fraser Timber has significantly increased its forestry assets in Alberta. In 1989 West Fraser Timber acquired 50% of the assets of Alberta Newsprint Company in Whitecourt, Alberta. On August 25, 1995, West Fraser Timber purchased Alberta Energy Corporation's assets, which included a sawmill and medium density plant in Blue Ridge and a pulp mill facility in Slave Lake. On November 3rd, 1999 West Fraser Timber acquired the assets of Zeidler Forest Industries Ltd., which included a veneer plant in Slave Lake and a plywood plant in Edmonton, Alberta. Since both the pulp mill and the veneer plant are owned by West Fraser Timber, it made sense to amalgamate both woodlands into a single woodlands department, operated under Alberta Plywood Limited. Alberta Plywood Limited now manages both the Forest Management Area and the coniferous timber quotas. On November 24, 2000 West Fraser entered a joint venture with Kee Tas Kee Now Sawmill Ltd. (an Alberta First Nations Group near Red Earth, Alberta), to purchase Brewster Lumber Division (renamed Seehta Forest Products). This division also falls under the management of the Alberta Plywood Ltd. woodlands management team.

1.2.2 The Forest Management Agreement

On November 15, 1990, Slave Lake Pulp entered into a twenty year Forest Management Agreement with the Province of Alberta for 450,000 ha public land of the Slave Lake region. Under the Forest Management Agreement, the primary use of the Forest Management Area is for the purpose of growing and harvesting timber on a sustained yield basis:

7. (1) Subject to the terms and conditions of this agreement the minister grants the company the rights, during the term of this Agreement, to establish, grow and harvest timber on the FMA on a perpetual sustained yield basis,

9. On the forest management area the company shall:
(a) follow sound forest management practices with the purpose of achieving and maintaining a perpetual sustained yield of timber from the productive forest land, while not diminishing the productivity of the land...

"WHEREAS the Minister desires to provide for sustainable development of all resources and to provide for the fullest possible economic utilization of timber from the forest management area and stable employment in local communities by maximizing the value of the timber resource base while maintaining a forest environment of high quality"...⁴

While the primary purpose of the Forest Management Area is for perpetual sustained yield fibre supply, the company recognizes and incorporates the rights of others to use the forest for multiple use. The company will make provisions for others to travel, hunt, fish, recreate, trap, and undertake geophysical activities and other industrial developments.

As part of the agreement Slave Lake Pulp was required to produce a preliminary Forest Management Plan at the end of the first year, a detailed forest management plan at the end of three years and a revised forest management plan on November 15, 2000. The original

⁴ Forest Management Agreement amendment O.C. 219/2001

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agreement allowed for an expansion of the processing facility and an increase in the FMA area. The original capacity was set as 110,000 air dry tons of Bleached ChemiThermoMechanical pulp. In recognition of the company's investment in the facility and expansion to 190,000 metric tonnes, the Forest Management Agreement was amended by Order in Council on July 28, 1999. The OC was approved by the Lieutenant Governor on February 7, 2001. The amendment document includes significant changes in:

- ◆ *Inclusion of S1S Forest Management Unit*
- ◆ *FMA renewal every 20 years*
- ◆ *Timber types will be designated using AVI instead of Phase 3*
- ◆ *All C, CD and DC stands will be managed primarily for coniferous production and the Detailed Forest Management Plan will make provisions for the sustainability of deciduous timber;*
- ◆ *All D stands will be managed primarily for deciduous production and the Detailed Forest Management Plan will make provisions for the sustainability of coniferous timber. Clauses relating to rights to harvest deciduous timber from deciduous stands containing a conifer understorey are removed;*
- ◆ *The Detailed Forest Management Plan will provide for the maintenance of mixedwood stand structures;*

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1.2.3 TIMBER OPERATORS IN THE FOREST MANAGEMENT AREA

Slave Lake Pulp manages a deciduous FMA that contains many overlapping conifer timber allocations. The company recognizes the rights and responsibilities of the conifer quota holders and will make all reasonable efforts to involve them in all stages of integrated planning and operations.

Table 1-1: Conifer Allocations within FMU's Impacted by the FMA⁵

FMU	Organization	Quota Certificate No.	% of Conifer AAC	Conifer AAC (m3/yr)	Utilization Standard
S6	Vanderwell Contractors Ltd.	CTQS060011	59.36	44,465	15/11
	Alberta Plywood Ltd.	CTQS060009	35.16	26,337	15/11
	Local Misc. Timber Users		5.48	4,105	15/11
	Total		100.00	74,907	
S2	Millar Western Forest Products	CTQS020034	71.55	170,809	15/11
	Alberta Plywood Ltd.	CTQS020035	22.95	54,789	15/11
	Local Misc. Timber Users		5.50	13,130	15/11
	Total		100.00	238,728	
S1	Millar Western Forest Products	CTQS010036	12.99	38,648	15/11
	Buchanan Lumber Ltd.	CTQS010038	48.95	145,609	15/11
	Alberta Plywood Ltd.	CTQS010037	38.06	113,216	15/11
	Total		100.00	297,473	

Table 1-2: Deciduous Allocations within the FMA

FMU	Organization	% of Deciduous AAC ⁶	Deciduous AAC (m3/yr)	Utilization Standard
S1S ⁷ , S2S, S6S	Slave Lake Pulp	100.00	235,385	15/10
S1S - amended	Slave Lake Pulp	100.00	135,052	15/10
	Total	100.00	370,437	

⁵ Effective date of the AAC's presented is May 2001.

⁶ 2% of the deciduous AAC is allocated to local timber users.

⁷ The original FMA area included two townships of FMU S1S (TWP 72-11-5 and 72-12-5).

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2.0 Background

2.1 History and Rationale

In the past, Forest Management Plans were developed with a singular clear focus on timber supply. The other values of the forest were recognized but carried much less weight than the value of the timber resource.

Prior to the issuance of the Slave Lake Pulp Forest Management Agreement, conifer operators were the sole operators within the boundaries of the FMA area. For the most part, timber harvesting within the Forest Management Agreement area used a two pass, 50% removal harvesting system. This two-pass system resulted in a delay of 20 years before the second pass was entered. The historical system typically resulted in square or rectangular cutovers averaging about 20 hectares in size. The intent was to promote natural white spruce ingress while providing for wildlife habitat and wildlife cover. These cutovers were either left-for-natural or scarified and either planted or seeded. Forest harvesting in this manner produced an even-aged forest consisting of small sized blocks.

During the last decade the management paradigm has changed significantly as a result of increasing public concern about forest management in North America. This is evident in recent developments in the Pacific Northwest and in the province of British Columbia where public concern increased as a result of the perception of clearcutting as an unacceptable forest management practice. Subsequently, most forest managers are taking a more ecological approach towards forest management. It is apparent that global, national and provincial initiatives are progressing to an ecological approach to forest management that incorporates forest harvesting with the other values of the forest in a dynamic and adaptive manner. To this end this Detailed Forest Management Plan strives to balance the social, environmental and economic values of the forest.

2.2 Slave Lake Pulp's 2000 Detailed Forest Management Plan

Although Slave Lake Pulp is committed to following the principles of Sustainable Forest Management; the Company recognizes that the transition from *sustained timber forest management* to *sustainable forest management* is a complicated process requiring cooperation, commitment and trust between stakeholders. Slave Lake Pulp recognizes that this transition will not happen immediately but should take place in a coordinated manner over a period of five to ten years.

2.2.1 Global and National Direction

The international community is demanding a more sustainable approach to forest management. In 1987, the Bruntland Commission¹ introduced the concept of sustainable development which is defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" This more encompassing approach incorporates integrated resource management, multiple use and sustained fibre management.

¹ 1987 the United Nations Commission on Environment and Development (the Bruntland Commission)

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In 1992, the Prime Minister of Canada signed the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil. This further emphasized the need to adopt the concept of a more environmental approach to forest management. Also in 1992, Alberta was a partner in the development of the National Forest Strategy and signed the Canada Forest Accord. This resulted in Canada being the first major forest nation in the world to sign a national forest accord that commits communities, the Government and industry to sustainable forest practices. The goal of the Canada Forest Accord is as follows:

“Our goal is to maintain and enhance the long term health of our forest ecosystems, for the benefit of all living things both nationally and globally, while providing environmental, economic, social and cultural opportunities for the benefit of present and future generations”²

Canada's National Forest Strategy required the development of a set of criteria and indicators for the conservation and sustainable development of Canada's forest resources. In 1993 the process was initiated by the Canadian Council of Forest Ministers (CCFM). In 1995, after two years of nation wide consultations, the Canadian Council of Forest Ministers issues a framework of Criteria and Indicators of Sustainable Forest Management in Canada. Also in 1995, the Canadian Biodiversity Strategy was published. In 1997, Criteria and Indicators of Sustainable Forest Management in Canada – CCFM Technical Report 1997 were published. This document is a National framework of criteria and indicators developed to assist in the goal of sustainable forest management. The six sustainable forest management criteria are:

- ◆ *Conservation of biological diversity*
- ◆ *Maintenance and enhancement of forest ecosystem condition and productivity*
- ◆ *Conservation of soil and water resources*
- ◆ *Forest ecosystem contributions to global ecological cycles*
- ◆ *Multiple benefits of forests to society*
- ◆ *Accepting society's responsibility for sustainable development³*

2.2.2 Provincial Direction

The boreal forest is the largest forest in the world and comprises the majority of Canada and Alberta's forested landscape. The provincial forests are under the jurisdiction of the provincial government and are designated as 'green area' and are being maintained primarily for industrial activity such as forestry, trapping, recreation and geophysical activities. The Provincial government, recognizing the need for transition from sustainable fibre management to sustainable forest management, initiated several provincial initiatives.

In response to the global and national initiatives, Alberta initiated a Special Places 2000 program in March 1995 to complete a network of protected areas representing the six natural regions in

² Canada Forest Accord, May 1, 1998 Ottawa, Ontario

³ Criteria and Indicators of Sustainable Forest Management in Canada – Canadian Council of Forest Ministers Technical Report 1997.

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the province by 2000. In 1995, Alberta initiated the Alberta Forest Conservation Strategy from which the Alberta government produced Alberta Forest Legacy document. In 1998, the province produced the Interim Forest Management Planning Manual – Guideline to Plan Development. The intent of this document is to guide forest management plans in the province. In addition to the provincial Government's initiatives, the Alberta Forest Products Association introduced the Forest Care program to improve the forest industry's performance, and to communicate the performance locally and provincially.

2.2.2.1 Interim Planning Manual

This Detailed Forest Management Plan is prepared according to the Interim Planning Manual Guidelines to Plan Development – Version: April, 1998. This has resulted in the inclusion of guiding principles such as:

- ♦ *Ecological sustainability – Ensure that the ecological integrity of the forested landscape be maintained to protect the health of the environment and to provide suitable wildlife habitat, clean water and air to present and future generations.*
- ♦ *Sustainable development – Ensure that the forest is managed to sustain the benefits to present and future generations*
- ♦ *Public integration – Recognize and incorporate the public in forest management decision making.*
- ♦ *Adaptive Management – Recognize the need to monitor, evaluate and provide feedback regarding the success of forest management decisions and make adjustments as required to improve future decisions.⁴*

2.2.2.2 Integrated Planning

An integrated approach to planning and operations is necessary for the success of this plan. The ideal integrated resource plan must integrate the different resource management systems such as sustainable timber management, wildlife management, aquatic resource management, protected areas, geophysical activities and general land use. Each of these different management systems has different, and sometimes conflicting, management objectives, often with a fairly narrow focus. An approach to integrating these systems is necessary in order for *sustainable forest management* to be successful. Slave Lake Pulp is committed to striving for the integration of the social, environmental and economics into this detailed forest management plan and its operations.

This Detailed Forest Management Plan is being developed with the input from other stakeholders representing other timber operators, trappers, the public and Alberta Sustainable Resources Development.

2.2.2.3 Planning Principles

In order to ensure a sustainable timber supply while maintaining the other values of the forest Slave Lake Pulp believes the principles outlined in the Criteria and Indicators document should be

⁴ Interim Forest Management Planning Manual, Guidelines to Plan Development Version: April, 1998

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followed and supplemented with Forest Management Area specific principles. The purpose of the indicators is to provide a practical, cost-effective and scientifically sound basis for forest managers and auditors to assess on the ground performance. These attempt to ensure that the different interests of society are taken into account. The Criteria and Indicators are meshed within the goals and objectives of this plan as indicated in Appendix C.

2.2.3 Company and Corporate Direction

2.2.3.1 West Fraser Timber Environmental Policy

West Fraser Timber Co. Ltd. is committed to responsible stewardship of the environment. A philosophy of continual improvement of our forest practices and manufacturing procedures has been adopted to optimize the use of resources and minimize or eliminate the impact of our operations on the environment. West Fraser recognizes that environmental excellence is an integral aspect of long-term business success. Our Company and its employees are committed to the following:

- ♦ *Complying with all applicable environmental laws and regulations, and with other requirements to which the organization subscribes.*
- ♦ *Preventing pollution and continuing to improve our environmental performance by setting and reviewing environmental objectives and targets.*
- ♦ *Conducting periodic environmental audits.*
- ♦ *Providing training for employees and contractors to ensure environmentally responsible work practices.*
- ♦ *Communicating our environmental performance to employees, customers, shareholders, local communities and other stakeholders.*
- ♦ *Reviewing, on a regular basis, this policy to ensure that it reflects the Company's ongoing commitment to environmental stewardship.*

2.2.3.2 Slave Lake Pulp

Slave Lake Pulp is also committed to the West Fraser Timber environmental policy and is committed to the operation of its' facilities in a manner that ensures that the environment is protected. In order to achieve that goal, Slave Lake Pulp is committed to practicing sustainable forest management in accordance with all applicable provincial and federal environmental laws and regulations; and, will strive for continuous improvement. All activities will be treated as an opportunity to minimize waste, and to achieve an efficient use of raw materials and energy.

Slave Lake Pulp demands excellence and continuous improvement in all its' key activities which includes:

- ♦ *Operating and maintenance procedures and training.*
- ♦ *Integration with new environmental protection technology with respect to significant process changes.*

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- ◆ *Effective identification of potential environmental impacts from operations.*
- ◆ *Individual and collective employee commitment and understanding to minimize environmental effects of activities necessary to their jobs.*
- ◆ *To provide timely and accurate information on our environmental performance to our Board of Directors, shareholders, employees, customers and other interested parties.*
- ◆ *Setting and reviewing environmental objectives and targets.*

2.3 THE PROCESSING FACILITY

2.3.1 THE PULP MILL FACILITY

2.3.1.1 General Overview

The Slave Lake Pulp mill facility is located 20 km east of the town of Slave Lake, approximately 250-km northwest of the city of Edmonton. Alberta Energy Company Ltd. and MoDo Canada Inc. formed the Slave Lake Pulp Partnership on December 12th, 1989 to construct and operate a Bleached Chemi Thermo Mechanical pulp mill designed to produce 110,000 Air Dried Metric Tonnes (ADMT) of high quality pulp per year. Since that time, significant developments, including the acquisition of the company by West Fraser Timber in 1995 and the subsequent acquisition of Zeidler Forest Industries in 1999, have taken place. A mill debottlenecking project was undertaken in 1995 to increase pulp production to 165,000 ADMT per year with additional continuous improvements resulting in an annual capacity of 190,000 ADMT being reached in 2000. Further mill improvements within the process will result in an annual production rate of 210,000 ADMT by 2002.

The main market for BCTMP is in high quality printing and writing papers with additional growth opportunities emerging in paperboard packaging grades. BCTMP produced at Slave Lake Pulp is shipped around the world to paper mills with approximately 35% going to Europe, 50% to Asia, and the remaining 15% to mills within North America. The Aspen BCTMP produced by Slave Lake Pulp provides improved properties in the finished paper product resulting in BCTMP now replacing part of the Kraft pulp furnish in many applications.

The Slave Lake Pulp mill uses a combination of single line and double line process stages and incorporates state of the art technology in the BCTMP pulping process. BCTMP technology was developed in Sweden with the first mill using this process being started up in 1979. The first Canadian BCTMP mill, Quesnel River Pulp, was built and started up in 1981 by West Fraser Timber and Daishowa Canada in Quesnel, B.C. Currently there are a total of 9 BCTMP mills in operation in Canada. Continuous investments made at Slave Lake Pulp to increase production capacity, improve pulp quality, and reduce environmental impacts have kept the mill at the leading edge of BCTMP technology.

Slave Lake Pulp currently has about 100 full time employees working at the mill site. Additional contractors are regularly used for maintenance and project construction activities. The woodlands group is incorporated into the Alberta Plywood Ltd. operation and now consists of a total of 20 full time employees.

Slave Lake Pulp's fibre supply is primarily in the form of deciduous roundwood logs with coniferous residual sawmill chips making up the remainder. Deciduous logs are delivered in tree length form to the mill yard where they are offloaded using either the crane or, to a lesser extent,

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a butt-n-top loader and stacked for subsequent debarking and chipping. Logs are debarked by using a Nicholson ring debarker followed by chipping with a Nicholson chipper. The chips are stored on a 5 to 10 day storage pile prior to being used in the mill process; the storage time is kept to a minimum to preserve the brightness of the fibres and improve final pulp quality. The chip feed to the mill is screened to remove oversize chips and passes under a magnet to remove metal contaminants.

Coniferous chips, accounting for about 40,000-m3 equivalent, are purchased from Vanderwell Contractors Ltd. and from Alberta Plywood Ltd. The chips are delivered by self-dumping trucks and stored in outdoor chip piles. Coniferous and deciduous chips are mixed together as required when needed to attain specific pulp properties for the production of LightWeight Coated (LWC) papers.

2.3.1.2 The Pulping Process

The chip feed to the mill is first lightly steamed to prepare the chips for processing. The chips pass through a chip washer to remove sand, dirt, and other contaminants, which affect the process equipment and / or pulp quality. The BCTMP process utilizes low dosage chemical impregnation and steam addition to the wood chips to soften the fibres prior to separation. The chemicals and heat soften the bond of lignin between the fibres and allow separation without excessive damage. Unlike Kraft pulping, in which the lignin and much of the hemi-cellulose is dissolved and removed, the BCTMP process retains most of the wood constituents and results in a high yield of final pulp (85-92 %) from the initial chip feed.

The fibres are then mechanically separated in high-pressure refiners, each unit driven by an 18 MW electric motor. The refining stage creates large amounts of steam which is separated from the pulp fibres and used to heat mill process water, to steam the incoming chips, and to heat the building areas. The refined pulp fibres are washed to remove extractives and impurities prior to the first stage of bleaching. After this first stage of bleaching, the pulp fibres are refined once more to achieve the desired final properties followed by screening and cleaning to remove unseparated fibre bundles. A second stage of peroxide bleaching is used to achieve a very bright and white final product. Two stages of peroxide bleaching are utilized by Slave Lake Pulp to produce high brightness, high purity BCTMP grades. No chlorine or chlorine containing chemical is used in the production of BCTMP pulps; therefore no chlorinated compounds are created or released into the environment.

The fully refined and bleached pulp is then thoroughly washed to remove all pulping and bleaching residuals. A two stage low temperature, high air volume Flash Drying process is used to dry the pulp. The pulp is pressed into large bales, wrapped with bleached Kraft pulp, and prepared for shipment. Virtually all of Slave Lake Pulp's entire final product is shipped from the mill by rail.

2.3.1.3 Energy Use

Energy is supplied to the mill in the form of both electricity and natural gas.

Electricity supply is primarily from coal fired power plants in the Lake Wabamun area. The mill consumes about 50 MWh of electricity on average; about 75% of this demand is for the refining process. The current electricity consumption per tonne of pulp produced is 2.22 MWh / ADMT; this rate of consumption is down 6.3% from an average of 2.37 MWh / ADMT in the first eight years of operation. Slave Lake Pulp is continuously working on projects, which reduce the amount of electricity required to produce each tonne of pulp. These projects included things such as development of low energy refiner segments, optimization of chemicals and heat in

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impregnation versus energy consumption and pulp quality requirements, utilization of high efficiency motors and variable frequency drives, and many similar initiatives.

Natural gas is supplied from the provincial distribution system. Gas is used to dry pulp, create fresh steam for various requirements, and to heat the building areas. The mill currently uses about 3 GJ of natural gas / ADMT of pulp. This consumption level is down 29% from an average of 4.2 GJ / ADMT in the first eight years of operation. Further mill improvement projects are being undertaken to better utilize waste steam, to remove additional heat from process streams via heat exchangers, and to optimize the mill heat balance to further reduce the amount of natural gas consumption.

Slave Lake Pulp used to dry the effluent system sludge material prior to incineration, which required a large amount of natural gas. The sludge, which is a mixture of rejected fibres and biological solids from the effluent treatment system, has been found to be an excellent source of nitrogen and phosphorus and a benefit to yields in agricultural and forestland areas. Carefully controlled experiments have shown two to three times the growth of crops and trees with application of the sludge material. Slave Lake Pulp is no longer drying the sludge stream and is instead working towards continuously spreading the sludge in agricultural and forest areas to provide growth benefits.

2.3.2 ENVIRONMENTAL PROTECTION

2.3.2.1 General Overview

Slave Lake Pulp is committed to the operation of the pulp mill in a manner that protects the environment to meet or exceed government standards at all times and to the principle of continuous improvement.

In 1988 Alberta Energy Company (AEC) Ltd. submitted a proposal to the Province of Alberta to construct a pulp mill facility. As part of the process, AEC was required to perform an Environmental Impact Assessment in which environmental, social, and economic consequences associated with the construction of the mill were to be examined. In February 1989 the Environmental Impact Assessment was completed and approved by the Province. The conclusions from the EIA were summarized as the following:

- ◆ *Construction and operation of the mill would be environmentally acceptable with minor local impacts on the biophysical resources.*
- ◆ *The project would have a significant positive impact on the local and regional economies without placing any difficulty on the community to accommodate the increased housing and social services needs.*
- ◆ *Many issues were raised, discussed, and fully explained during the public consultation program with the general response to the project being very positive as the project is one that employs environmentally acceptable technology and is of a scope compatible with the needs of the Slave Lake region.*
- ◆ *Extensive modeling of the river systems concluded that the mill operation would have minimal impact on the downstream rivers, would be well within acceptable standards for water quality, and would have no impact on fish populations or fisheries.*
- ◆ *Air emissions were concluded to have no impact.*

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In June 1990 Slave Lake Pulp met all the requirements and was given approval to commence operations.

Slave Lake Pulp has continuously improved the environmental operations at the mill. A continuous commitment has been made towards capital spending for improvements, which reduce the impact of the mill operation. The following table highlights the Total Suspended Solids (T.S.S.), Biochemical Oxygen Demand (B.O.D.), and Color discharge values for each year of operation up to 2000:

Table 2-1: Effluent Indicator Levels

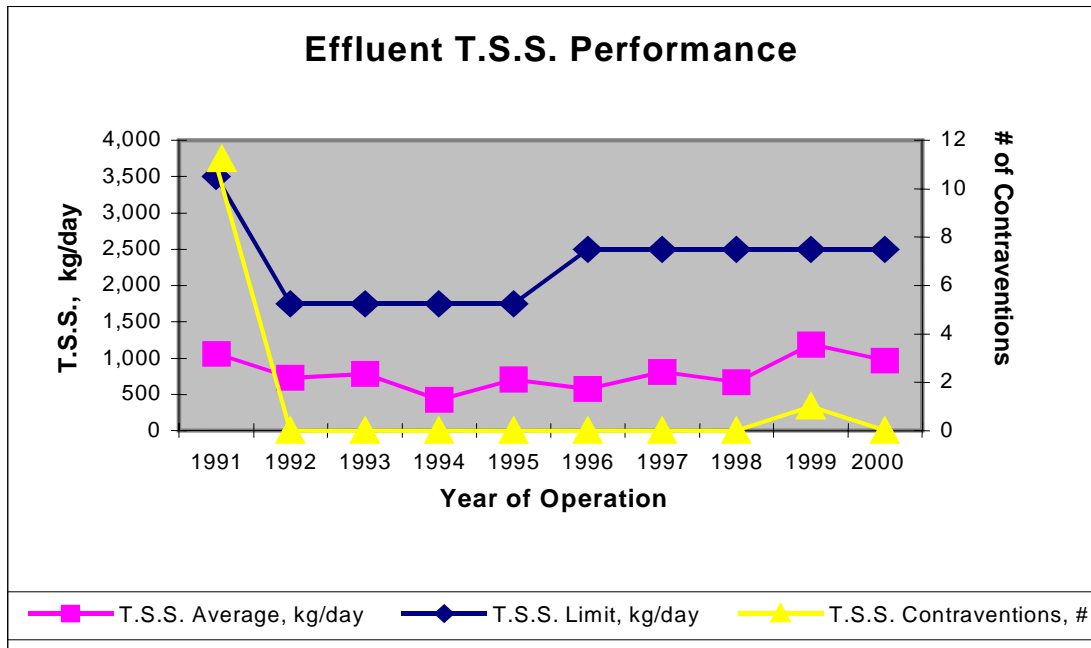
YEAR	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Pulp Production, ADMT	69,348	113,441	116,345	130,185	121,011	110,330	143,127	135,829	170,807	195,754
Effluent Flow, Average m3/day	3,882	4,757	5,598	7,692	6,826	6,436	7,737	8,714	9,293	9,509
Effluent Flow, Avg. m3/ADMT	20.4	15.3	17.6	21.6	20.6	21.4	19.7	23.4	19.9	17.7
T.S.S. Average kg/day	1,062	731	780	426	707	580	810	672	1,186	913
T.S.S. Average kg/ADMT	5.6	2.4	2.4	1.2	2.1	1.9	2.1	1.8	2.5	1.7
B.O.D. Average kg/day	887	628	457	235	294	288	388	344	549	575
B.O.D. Average kg/ADMT	4.7	2.0	1.4	0.7	0.9	1.0	1.0	0.9	1.2	1.1
Color Average kg/day	8,916	11,167	9,262	9,580	10,149	9,046	12,153	10,237	14,653	16,336
Color Average kg/ADMT	46.9	36.0	29.1	26.9	30.6	30.0	31.0	27.5	31.3	30.5

The above values show that Slave Lake Pulp significantly improved performance of its effluent treatment operation in the first few years of operation. Since that time, increasing pulp production has resulted in higher discharges in terms of kg/day values, yet steady in terms of discharge per tonne of pulp produced.

The following graph shows the T.S.S. discharge to the Lesser Slave River since the mill started operation in 1991 versus the license limits; also included is the number of contraventions of the license limit during this period, which is only one occurrence since 1991. Slave Lake Pulp is working hard towards further reducing the T.S.S. discharges to the river.

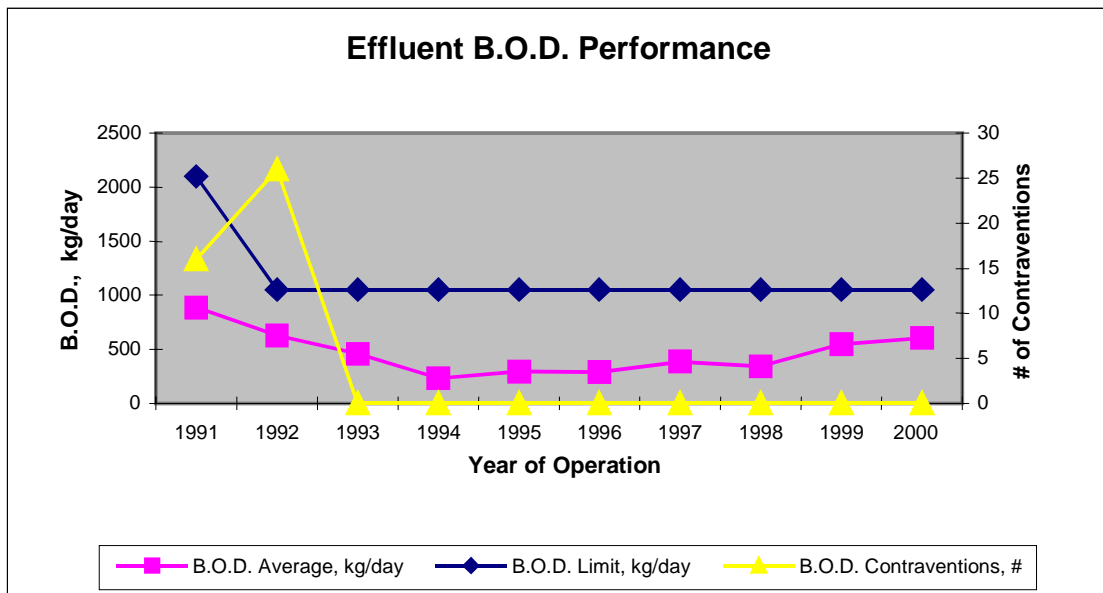
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Figure 2-1: Effluent T.S.S. Performance



The following graph shows the B.O.D. discharge to the Lesser Slave River since the mill started operation in 1991 versus the license limits; also included is the number of contraventions of the license limit during this period, which is zero occurrences since 1992. Slave Lake Pulp is working hard towards further reducing the B.O.D. discharges to the river.

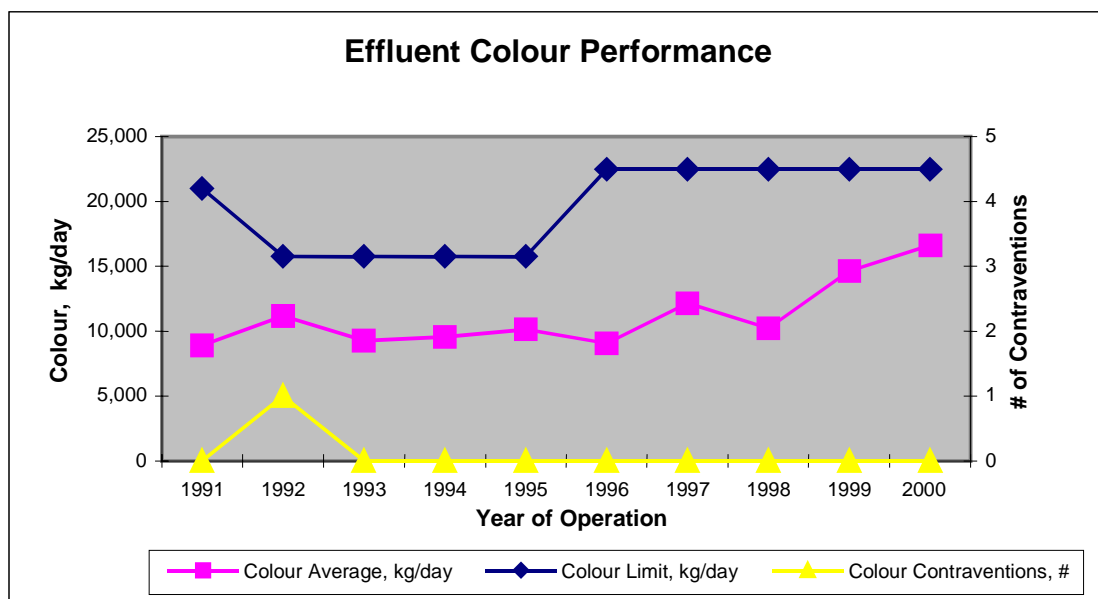
Figure 2-2: Effluent B.O.D. Performance



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The following graph shows the Color discharge to the Lesser Slave River since the mill started operation in 1991 versus the license limits; also included is the number of contraventions of the license limit during this period, which is zero occurrences since 1992. Slave Lake Pulp is working hard towards further reducing the Color discharges to the river.

Figure 2-3: Effluent Colour Performance



Slave Lake Pulp will be increasing pulp production to approximately 210,000 ADMT per year by 2002. To facilitate this, the mill will be spending approximately \$3 MM to upgrade the effluent treatment system and reduce the discharge of T.S.S. and B.O.D. to the Lesser Slave River. With the improvements, the kg/day values for these parameters will be reduced from current levels and the kg/ADMT values will be reduced significantly.

2.3.2.2 Water Quality in the Lesser Slave River

Slave Lake Pulp recognizes that environmental awareness is increasing in the global, national, provincial and local communities. The local community, which depends on Lesser Slave Lake for its water supply, is concerned about water quality and the impact of Slave Lake Pulp on the environment. The Slave Lake Pulp water intake and effluent discharge is located on the Lesser Slave River approximately 20 km downstream of Lesser Slave Lake. As such, the water intake and effluent discharge is downstream of the Town of Slave Lake's water intake and the mill operation has no direct effect upon local water supplies. Still Slave Lake Pulp strives to maintain a minimal impact upon the Lesser Slave River and the aquatic species that it supports.

As part of Slave lake Pulp's commitment to the Province, the company agreed to initiate programs to help determine the environmental impacts of the mill operation upon the Lesser Slave River. Slave Lake Pulp has conducted extensive studies of the river environment both prior to mill start-up and in many of the years since operation began in 1991. Slave Lake Pulp is one of the only pulp mills in Canada to have a comprehensive analysis of the river completed prior to operation; this information is extremely useful in determining if the mill operation has in any way altered the aquatic environment.

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Lesser Slave River studies were conducted every year from 1989 to 1995 prior to the start of the Environmental Effects Monitoring (EEM) Program regulated by Environment Canada. Every pulp and paper mill operation in Canada (with liquid effluent discharges) must conduct the EEM monitoring program every three years. Slave Lake Pulp's first opportunity to initiate the EEM on the Lesser Slave River was in 1999.

The Baseline Study of the Lesser Slave River conducted in 1989 and 1990 served to determine the physical, chemical, and biological properties both upstream and downstream of the proposed mill intake / outfall location. The main highlights of this study were as follows:

- ◆ *The river features two distinct habitats with the transition occurring near the proposed mill outfall. Upstream areas are primarily deep and slow moving while downstream reaches are shallow fast moving rapid areas. This presented a unique challenge in determining whether the effluent discharge has any impact upon the river as different habitats have different quantities and types of aquatic life.*
- ◆ *The river water quality was found to be good and mostly with the Canadian water quality guidelines. It was predicted that the impact of the mill operation on dissolved oxygen levels would be insignificant. No dioxins, furans, or other chlorinated organics were present in the water, sediments, or fish.*
- ◆ *The most abundant fish species were mountain whitefish and longnose suckers. Fish sampling was performed to collect information critical to determine if the mill operation was having future impact on these populations.*

The Lesser Slave River monitoring studies conducted in 1991, 1992, 1993, 1994, & 1995 were equally comprehensive to the baseline study and each measured the same physical, chemical, and biological properties both upstream and downstream of the now operational mill intake / outfall location. The main conclusions from these studies were as follows:

- ◆ *As with the baseline studies, the chemical constituents in the river were low and mostly within the Canadian water quality guidelines. There was, as predicted in the mill proposals, a slight increase in sodium and zinc levels in the river from upstream to downstream, but these remained within the guidelines. No other water parameters were found to increase downstream of the mill operation.*
- ◆ *The dissolved oxygen levels were well above acceptable levels during every sampling period during these years with the effect of the mill effluent discharge not being detectable.*
- ◆ *The periphyton abundance was similar upstream vs. downstream of the mill outfall. It was also documented that Lesser Slave Lake likely has a great influence on the quantity and health of the periphyton community in the entire Lesser Slave River ecosystem.*
- ◆ *There was a moderate increase in the richness of the benthos community in near field areas downstream of the mill attributable to nutrient enrichment from the effluent stream. The same effect on this community from the influence of Lesser Slave Lake was observed.*
- ◆ *The population and health of the mountain whitefish and longnose suckers have not changed with the operation of Slave Lake Pulp.*

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In summary, the first five years of operational monitoring of the Lesser Slave River found that the Slave Lake Pulp operation and effluent discharge was having no significant changes to the physical, chemical, or biological properties of the ecosystem.

With the inception of the EEM program, Slave Lake Pulp had the 1995 Lesser Slave River monitoring study successfully accepted for Cycle 1 requirements. Slave Lake Pulp then joined with Weldwood of Canada, Alberta Newsprint Company, Millar Western Pulp, and Alberta Pacific to conduct the Cycle 2 program. For this study, the Athabasca and Lesser Slave River systems were monitored in a joint study of the five pulp mills operating on the Athabasca River System. This comprehensive program examined the ecosystem upstream and downstream of each of the five mills and provided an excellent overview of the entire river system. The main conclusions from this study were as follows:

- ◆ *The effects upon the receiving stream found upstream and downstream of all five of the mills were very similar.*
- ◆ *The fish populations response to exposure to mill effluents was generally neutral with some increase in growth, reproductive capacity, and energy stores observed in some local populations near effluent outfalls.*
- ◆ *The growth of algae in the riverbeds increased slightly downstream of each mill as a result of nutrient enrichment from the effluent streams. The increased algae growth corresponded to an increase in the magnitude of benthic invertebrates in each downstream location. No reduction in any species or type of organisms was detected.*
- ◆ *The increase in algae and organisms was the likely factor for the increased growth of the fish species.*

2.3.2.3 Air Quality

The BCTMP process is very environmentally acceptable to air quality versus other pulping technologies in that no significant air emissions are generated. The air emissions from the mill process are mainly air and water vapor from the various process areas with the largest discharge being the exhaust from the pulp dryers. The mill produces no foul smelling sulfur compounds, which are associated with Kraft pulping processes.

Air quality is monitored by Slave Lake Pulp on an ongoing basis for ambient particulate levels and for maintaining adequate combustion temperatures in the wood waste burner.

The ambient particulate level at the mill site is measured at a frequency determined by Alberta Sustainable Resource Development, every sixth day, and is a measure of dirt, pulp, or other matter that is being carried in the air. The measured values for particulate matter are within the acceptable guidelines greater than 97% of the time; exceptions to this is when high amounts of traffic in the mill yard during dry conditions have created large amounts of dust.

Wood waste amounts consisting of bark, fines, and reject chips is burned in an Olivine cyclone burner. The burner operates at an exhaust gas temperature of 650 °C, which ensures complete combustion and produces virtually no smoke emissions. The exhaust temperature is continuously monitored and reported each month with the SLP limit being a minimum temperature of 425 °C with operation below this value only being permitted for 10% of the time. SLP has never been out of compliance with this limit.

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2.4 FIBRE REQUIREMENT AND SUPPLY

Slave Lake Pulp has had considerable increases in log consumption since inception in 1990. Mill upgrades, high quality logs and, more recently, a rigorous log quality program contributed to the significant improvements in fibre recovery.

In 1991 Slave Lake Pulp operated a single line mill that consumed 207,697 m³ and produced 69,348 ADMT of pulp. Upgrades to the facility resulted in an increase in production to 190,000 ADMT. Current annual fibre consumption is 630,000 m³ of timber equivalent with a resulting pulp production of 210,000 ADMT.

Current annual fibre supply requirements and source is summarized in the following table:

Table 2-2: Current Annual Fibre Requirement

Source	Annual Fibre Requirement (m3)
SLP FMA	525,000
BRL FMA	65,000
Wood Purchases	65,000
Coniferous chips	25,000
Total Fibre	680,000

In addition to the mill requirements identified above, Slave Lake Pulp has committed to supplying 50,000 m3 annually to a West Fraser solid wood facility.

2.5 WOODLANDS ORGANIZATION

Slave Lake Pulp's Forest Management Area is managed by Alberta Plywood Limited. Subsequent to the acquisition of Zeidler Forest Industries Limited on November 3rd, 1999, West Fraser Timber made the decision to amalgamate the woodlands divisions of Slave Lake Pulp and Zeidler Forest Industries Limited into a single woodlands division under Alberta Plywood Limited. The woodlands division manages both Alberta Plywood's quota interests and Slave Lake Pulp's Forest Management Area. Refer to Appendix D for the woodlands organizational chart.

2.6 FUTURE DEVELOPMENTS

Slave Lake Pulp is committed to continuously improving the operation to provide a safe work environment, reduced environmental impacts, improved pulp quality of our customers, and as a result generating sustainable economic returns. The BCTMP process is still relatively new and new markets and uses for the product are developing each year. Future mill improvements are expected to further improve production capability and subsequently increase fibre requirements.

Safety is of prime importance to Slave Lake Pulp and extensive programs and new initiatives are undertaken each year to improve in this area. Programs such as Partnerships in Injury Reduction (PIR) which include yearly audits of the safety program enable the mill to measure success in this area while pointing out weaknesses that need to be improved upon.

Slave Lake Pulp has a comprehensive Emergency Response Plan that is updated once a year. This plan outlines all of the procedures, contacts, and information required responding to any possible chemical spills, forest fires, floods, or similar incidents. The plan is shared with local governments and industries to help coordinate a combined response to incidents in the Slave Lake area. The Slave Lake Pulp mill is specially designed to prevent chemical spills from

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occurring. In the event that a spill occurs full spill containment berms and / or chests would fully prevent release of the chemical into the environment.

Slave Lake Pulp's success is a function of its' strong workforce and the commitment by each employee to the goals of the mill operation. Slave Lake Pulp endeavors at all times to encourage training and hiring of new employees from the local communities.

Slave Lake Pulp will continue to work to reduce the environmental impacts the operation may have upon the surrounding area. The mill is working towards obtaining certification under ISO 14000, which is an internationally recognized Environmental Management Standard that rigorously audits the mill operation every year. Continued accreditation under this program requires continuous improvement in the environmental area.

As the parent company of Slave Lake Pulp, West Fraser Timber is strongly committed to the success of the mill operation in all areas. Continuous investments are made to the mill each and every year to ensure that the mill operation will maintain its' standing and presence in both the pulp industry and the community of Slave Lake. West Fraser Timber also conducts regular environmental audits of all of their operations to ensure that full compliance with all permits is maintained and that each operation is working towards reducing any impacts in the environment or our communities.

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3.0 Plan Development

3.1 The Planning Team

3.1.1 Submission Deadline

The Slave Lake Pulp Detailed Forest Management Planning Team has been in place since January of 2000. Early in the process, it was recognized that the timelines for completion of the DFMP by November 15, 2000 would be difficult to accomplish due to the revision of the FMA and the major impacts of the 1998 fire season. Consequently, an extension was requested and granted to November 15, 2001. Subsequently, the 2001 Chisholm Fire further created a significant delay in the DFMP process. This delay was quickly acknowledged and the final submission date was amended to May 15, 2002 (see extension approval letters in Appendix A).

3.1.2 The Planning Team

The DFMP Planning Team is composed of representatives of the major stakeholders within the expanded FMA area including all other timber users, government regulatory agencies and a cross-section of representation from other forest users and the general public. Silvacom was contracted to provide technical support throughout the process with particular emphasis on inventory assimilation, yield curve development and timber supply analysis.

The company representatives include the Woodlands Manager, Planning Forester and Management Forester. Table 3.1 lists the participants in the DFMP Planning team. The team has representatives from the local trappers, the local Public Advisory Committee and the local MTU all represented by one person. Both a fisheries expert and a wildlife expert represent Fish and Wildlife Division in the team. Land and Forest Division have several representatives from the two Forest Areas as well as representatives from the Forest Management Branch assigned to approval of various aspects of the plan.

Several members of the team have changed over the two years as jobs and affiliations have altered. The Company has been able to maintain the intent of the group, which has been to adequately represent the various interests within the FMA area.

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Table 3-1: Detailed Forest Management Planning Team

Name	Organization	Duties
Patti Campsall	Alberta Sustainable Resource Development – Northern Waters Forest Area.	Area Forester
Jason Cottingham	Alberta Sustainable Resource Development – Northern Waters Forest Area	Area Forester
Nadine Pedersen	Alberta Sustainable Resource Development - Forest Management Division	Provincial Timber Supply Analyst
Karl Peck	Alberta Sustainable Resource Development - Forest Management Division	Provincial Timber Supply Analyst
Teresa Stokes	Alberta Sustainable Resource Development - Forest Management Division	Provincial Forest Planner
Jonathan Russell	Millar Western Forest Products Ltd.	Chief Forester
Keith Branting	Buchanan Lumber Ltd.	Woodlands Manager
Scott Formaniuk	Vanderwell Contractors (1971) Ltd.	Silviculture Forester
Ken Killeen	Lakeshore Local Timber Permit Association (S2 MTU)	LAC member
David Shupac	S6 MTU/ Slave Lake Trappers Assoc./ SLFPAC	President/member/member
David DeRosa	Fish and Wildlife Service	Fisheries Biologist
Mark Heckbert	Fish and Wildlife Service	Wildlife Biologist
Chris Lang	Silvacom Ltd.	Forestry consultant
Richard Briand	Alberta Plywood Ltd.	Planning Forester
Terry Kristoff	Alberta Plywood Ltd.	Management Forester
Bert Larocque	Alberta Plywood Ltd.	Operations Superintendent
Gordon Sanders	Alberta Plywood Ltd.	Woodlands Manager

3.1.3 Sub Committees - The Fish and Wildlife Integrated Technical Committee

Early in the planning process, a Fish and Wildlife Integrated Technical Committee (FWITC) was established as a sub committee of the DFMP Planning Team. This committee was designed to answer the technical questions, which were posed by the DFMP Team regarding fish and wildlife issues and their incorporation into the overall forest management strategies developed in the plan.

The following stakeholders have representation on the fish and wildlife integrated technical committee:

- ◆ *Slave Lake Pulp*
- ◆ *Millar Western Forest Products Ltd. (representing all quota holders)*
- ◆ *Land and Forest Division (LFD will also represent the MTU program)*
- ◆ *Fish and Wildlife Service (SRD)*

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3.2 The Planning Process

The DFMP Team established an open and consultative approach to all aspects of the plan development. All members had equal opportunity to participate within the planning process. Meetings were scheduled to take place monthly with the opportunity to increase the number of meetings as the plan progressed. Originally, the plan was to be developed in concurrent working parts. This process did not seem to mesh well with the government approval process and soon resulted in the process stalling to accommodate regulatory approval in certain key development areas such as AVI approval and yield curve approval. The end result was a lengthening of the DFMP timeline to accommodate the preparation and approval process.

3.2.1 Development of a Management Philosophy and Approach to Planning

The DFMP Team worked diligently through a process aimed at developing a management philosophy within the FMA. The initial steps included development of the Terms of Reference (Appendix C). It was Slave Lake Pulp's goal was to arrive at a management philosophy on the FMA, which was acceptable to all parties on the DFMP Team yet still, reflected the overall corporate philosophy of management, including environmental, societal and economic philosophies. The following represent a summary of the management philosophy developed in the team process:

The DFMP Team's primary goal, consistent with the Forest Management Agreement, is to optimize timber production from the Forest Management Area while mitigating the impacts of its forestry operations on the other values of the forest. Spatial sequencing will be implemented, the merits of a single landbase will be evaluated for possible inclusion and a variety of timber supply runs will be evaluated in this Detailed Forest Management Plan. Principles of Sustainable Forest Management, open and consultative processes, sound forest management, adaptive management, and multiple use, will be incorporated in the plan. Coarse and fine filter approaches and a range of management intensities will be considered in this plan. The DFMP Team anticipates that this evolution in forest management will promote the long term goal of managing the timber resource in a manner that supports multiple use of the forest, while sustaining forest health and providing the opportunity for integrating other environmental, economic and societal objectives. The Team believes that a balanced approach with the flexibility to accommodate change is necessary for a successful plan. The forest will be managed to produce a sustainable supply of both coniferous and deciduous timber.

3.2.1.1 Sustainable Forest Management

The principles of Sustainable Forest Management as outlined in *Criteria and Indicators of Sustainable Forest Management in Canada – Technical Report 1997*¹ will be mirrored in this Detailed Forest Management Plan. The Team recognizes that it is a national document that is currently under revision and may change over time; however, it believes that the basic principles are sound and intends to incorporate them into the goals and objectives of this DFMP.

¹ *Criteria and Indicators of Sustainable Forest Management in Canada – Technical Report 1997- Canadian Council of Forest Ministers*

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3.2.1.2 Open and consultative process in the development of the Detailed Forest Management Plan.

Consistent with the Interim Forest Management Planning Manual – Version 1998, Slave Lake Pulp and the DFMP Team is committed to development of this plan in an open and consultative manner, and will make a reasonable effort to involve all stakeholders, including Government agencies, other resource users and the general public. An open and extensive ongoing public input process will be used to get meaningful public input. Slave Lake Pulp has established a process whereby the public, in the vicinity of the Forest Management Area, are provided, on an ongoing basis, with the opportunity to have input to the DFMP process.

3.2.1.3 Sound Forest Management Principles

The DFMP Team is committed to following sound forest management principles that are biologically, socially, economically and operationally feasible. To ensure that the desired objectives are satisfied, the Team intends to rely on the most up to date information for decision-making purposes. The Team intends to use management practices that are biologically appropriate to the silviculture of the species being considered.

3.2.1.4 Adaptive management principle.

The DFMP Team recognizes that the forest is a dynamic system that is in a constant state of change; that public values change; that research provides new knowledge and that the DFMP needs to be a dynamic process that recognizes, quantifies, analyses and addresses change. As a consequence:

- ◆ *Slave Lake Pulp is committed to the support of ongoing research and operational trials, with the intent to apply the knowledge gained.*
- ◆ *Slave Lake Pulp is committed to monitoring timber harvesting activities on the Forest Management Area, analysis of the results and feedback into planning and operations. Appropriate changes will be implemented as part of the adaptive management process.*
- ◆ *Slave lake Pulp is committed to implementing the DFMP through General Development Plans (GDP) and Annual Operating Plans (AOP) to ensure that activities are consistent with the DFMP.*

3.2.1.5 Multiple use principle

The Team recognizes that the forest has many other uses other than for timber. The use of the forest by other commercial forest resource users including other forest companies, oil and gas operators, recreation users, trappers and grazing disposition holders, are accommodated in this plan. Other values of the forest, including water quality and quantity, are also recognized.

Slave Lake Pulp will use a combination of approaches including:

- ◆ *Solicit input from other stakeholders in the development and implementation of this plan.*
- ◆ *Use a single DFMP that is developed for all forest industry stakeholders in the FMA.*
- ◆ *Make a reasonable attempt to balance biological, social and economic factors.*

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3.2.1.6 Coarse Filter

The DFMP Team intends to use a coarse filter approach in the development of this plan. This approach involves maintaining a range of representative forest ecosystems on a landscape basis. It is their intent to maintain an acceptable range of forest conditions such as, stand sizes, species composition, stand structure and age class distribution on a landscape basis. Slave Lake Pulp will complete a landscape assessment that will help determine the acceptable range of future forest conditions. Slave Lake pulp is committed to working with Alberta Sustainable Resource Development towards refining the coarse filter approach during the term of this plan.

3.2.1.7 Range of management intensities

A management approach that adopts the concept of using a range of management intensities will be used in this plan. Management options to be considered include, multiple use forest management, enhanced forest management, special management areas and protected areas.

1) Multiple use forest management

Most of the Forest Management Area will be designated as areas for multiple use forest management, and will serve multiple use purposes, including wildlife, biodiversity, water, timber supply and recreation

2) Stand density management (SDM)

Some areas within the FMA will be managed intensively for timber production but are not intended to preclude the opportunity for other uses within the SDM area. Timber supply analysis will allow for the evaluation of stand density management, using crop planning.

3) Special management areas

Areas such as, inoperable slopes, mineral licks, riparian areas, and other sensitive areas will be considered for special management. The Team intends to work closely with the government and the other stakeholders, through the FWTIC, to ensure that sensitive areas are managed appropriately.

4) Protected areas

There are several protected areas within, and adjacent to, Slave Lake Pulp's FMA boundary, including the Grizzly Ridge Wildland Provincial Park, Otauwau Natural Area and Goose Mountain Ecological Reserve. Slave Lake Pulp and members of the DFMP Team worked closely with the local communities and the government in ensuring that the Grizzly Ridge Wildland Provincial Park was protected because of its ecological significance. These protected areas are intended to serve as benchmark areas.

3.2.2 Identification of Biological, Social and Economic Issues

For successful forest management plan development and implementation, forest resource management issues must be identified, evaluated, and where necessary, incorporated into the detailed forest management plan. The following issues were identified and will be addressed as part of the DFMP process:

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3.2.2.1 Slave Lake Pulp issues:

- ⇒ *Roles, rights and responsibilities of stakeholders*
- ⇒ *Loss of productive forest landbase*

3.2.2.2 Vanderwell Contractors Ltd. issues:

- ⇒ *Pre-1991 cutblocks)*
 - 1 *Updates show more deciduous due to suckering*
 - 2 *Historically these were conifer landbase*
 - 3 *Must go back to the 1986 phase III cover type*
- ⇒ *Incidental conifer*
 - 1 *What is Slave Lake Pulp's incidental conifer replacement strategy?*
 - 2 *Strategy to be developed for this plan.*
 - 3 *Need annual monitoring and reporting strategy*
- ⇒ *Conifer understorey*
 - 1 *Require identification, protection and monitoring strategies*
 - 2 *Require conifer understorey inventory to be completed by 2002*
 - 3 *Assign to yield curves and incorporate into the TSA.*
- ⇒ *Merchantability deletions - Want opportunity to harvest – if feasible*
- ⇒ *Single landbase - Do not agree with single landbase concept and deciduous normalization*
- ⇒ *Shadow analysis - Wants opportunity to review yield curves and TSA for S6 FMU*
- ⇒ *AVI re-inventory - The inventory is 10 years old and has not been updated. It should be done on a systematic basis, beginning immediately, with involvement with the quota holders.*

3.2.2.3 Buchanan Lumber's issues:

- ⇒ *Primarily interested in coniferous AAC. Not necessarily interested in all aspects of the forest management plan;*
- ⇒ *An AAC calculation on the entire S1 FMU or just the East Side that is within Slave Lake Pulp's FMA? Would prefer to see the calculations done on the entire FMU for conifer;*

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- ⇒ *Spatial analysis - Should also be done on the entire S1;*
- ⇒ *FMU Coniferous plots - Are there enough? Where?*
- ⇒ *Landbase netdown – Wants to have opportunity in low density or other marginal coniferous stands on an as encountered basis*
- ⇒ *Coniferous understories – Location, amount and condition;*
- ⇒ *Post 1991 cutblocks – all blocks occurring in the mixedwood forest should be put back on regenerated mixedwood curves;*
- ⇒ *Pre 1991 cutblocks – go with the AVI call unless we have data to support otherwise. Suggests aerial surveys to designate blocks.*
- ⇒ *Incidental conifer should be managed on a sustainable basis*
- ⇒ *Forest dynamics – the forests have grown and how do we deal with increase in coniferous AAC?*
- ⇒ *Agree in principle with the single landbase concept.*

3.2.2.4 Millar Western Forest Products Ltd. issues:

- ⇒ *Enhanced Forest Management, including crop planning, is a priority for MWFP; -*
- ⇒ *Coniferous understories – Issues defining coniferous understories*
- ⇒ *Inoperable areas – Opportunity to harvest where encountered where operationally feasible.*
- ⇒ *Fish and Wildlife buffers – Strategy for management should be developed within the development of this DFMP*
- ⇒ *Merchantability test deletions – wants the opportunity to operate in stands deemed as unmerchantable on an as encountered basis*
- ⇒ *Volume sampling – MWFP requests access to all data collected as well as inclusion in decision making regarding the design and implementation strategy for any new volume sampling program; -*
- ⇒ *Yield curve development – MWFP requests involvement in yield curve development;*
- ⇒ *Recognition that the 1998 DFMP was signed subject to the understanding that some assumptions were contentious in nature and will be addressed in the 2000 DFMP*
- ⇒ *Implementation of single landbase management, including mixedwood management strategies, must be included in the plan.*
- ⇒ *Requests that MWFP be involved in the development in FMA ground rules*
- ⇒ *Wants to investigate the opportunity for surge cuts in the S2 FMU.*

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- ⇒ *Incidental coniferous will be a part of the coniferous AAC and will allocated to coniferous disposition holders according to quota percentages. .*
- ⇒ *Cutovers within companies Silviculture Information Systems will include planned activities and be included in the updated inventory for TSA. .*

3.2.2.5 F&WS – Fisheries issues:

- ⇒ *Plan must show how harvesting operations will be conducted in a manner that minimizes the impacts on the watershed. Suggest to incorporate some of the ideas from the Oregon Plan⁷;*
- ⇒ *Performance audit for roads and crossings;*
- ⇒ *Minimize the number of roads and crossings;*
- ⇒ *Quantify crossings on a watershed basis;*
- ⇒ *Detailed watershed plans that maintain biodiversity over time;*
- ⇒ *Maintain water yields over time;*
- ⇒ *Riparian and water source buffers – variable buffer widths with a minimum, use management guidelines similar to the 1999 Oregon Plan;*
- ⇒ *Cumulative effects – set limits for linear disturbance, number of crossings and percent vegetation removal on a watershed basis;*
- ⇒ *Water quality and water quantity;*
- ⇒ *Inoperable areas;*
- ⇒ *Sensitive soils;*
- ⇒ *Soil erosion*

3.2.2.6 F&WS - Wildlife issues:

- ⇒ *Wildlife habitat – Wildlife patches within the single pass logging scheme are critical to maintenance of habitat and other key wildlife values such as thermal cover and line of sight.*
- ⇒ *Seral stages – the amount and distribution of seral stages across the landscape are important considerations. The target range to be met in each seral stage may define the success of the management system in protecting the coarse filter species.*
- ⇒ *Buffer management – Buffers are significant contributors to the area retained on the landscape for wildlife protection;*
- ⇒ *Access- Access management and control are prime considerations in the harvest design. Increased access to the FMA is detrimental to wildlife management efforts.*

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The DFMP should address key access routes and a system to manage those routes. F&WS should be involved in the Road Corridor Development Plan.

- ⇒ *Wildlife species management – species monitoring programs would help address the success of the preferred management system. Representative species of major species groups are suggested;*
- ⇒ *Mineral licks and other special sites should be protected within the plan.*
- ⇒ *Trappers – there is a need to create an effective trapper management program and implement it through the DFMP. ;*
- ⇒ *Riparian areas – wetlands, riparian areas and natural ponds such as beaver ponds should be retained on the landscape and should be addressed within the DFMP.*
- ⇒ *Stand Density Management – The impacts of intensive management on wildlife and wildlife habitat are not clearly understood. This should be taken into consideration in the SDM proposal within the plan.*
- ⇒ *Key Habitat –Key guidelines for caribou management must be included in the plan.*
- ⇒ *Connectivity – the key wildlife areas need connectivity to the rest of the landscape. Efforts should be made to ensure the wildlife corridors exist from upland to riparian areas, etc.*
- ⇒ *Coarse Woody Debris – CWD and downed woody material are important for a number of species.*
- ⇒ *Fire Salvage Guidelines – The salvage of major fire areas needs to address all other forest values, not just timber.*
- ⇒ *Cumulative effects - The cumulative effects of forestry and other activity creates many undesirable situations. The plan should attempt to address these cumulative effects. This could include coordinated access and other integrated operations between forest companies and other users.*

3.2.2.7 Public issues:

- ⇒ *Sustainable forest development*
- ⇒ *Allocation of the forest resource*
- ⇒ *Special Places 2000*
- ⇒ *Multiple use of the forest*
- ⇒ *Ecological diversity*
- ⇒ *Reforestation*
- ⇒ *Logging trucks on the road*

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- ⇒ *Herbicides*
- ⇒ *Harvesting methods*
- ⇒ *Public input into forest planning*
- ⇒ *Relationship between forestry and oil and gas*

3.2.2.8 Transboundary issues:

- ⇒ *Transboundary issues such as integrated management opportunities with other FMA holders will be addressed in the Detailed Forest Management Plan. Trapper issues:*
- ⇒ *Notification and involvement in harvest planning.*
- ⇒ *Trapper compensation*
- ⇒ *Maintenance of traditional access*

3.2.2.9 S6 MTU issues:

- ⇒ *Wood supply shortfall due to the 1998 fires*

3.2.2.10 S2 MTU issues

- ⇒ *Maintenance of existing MTU boundary*
- ⇒ *Open to the evaluation of a single landbase concept for possible inclusion into this DFMP*

3.2.2.11 Other issues:

- ⇒ *Identification and protection of heritage sites;*
- ⇒ *Klondike Trail*

3.2.3 Development of Goals, Objectives and Strategies

The Detailed Forest Management Planning Team worked through the development of the goals and objectives of the DFMP in the open and consultative process made available through the monthly meetings. The Goals and Objectives were jointly agreed upon and given sign off prior to submission on November 15, 2000. The Goals and Objectives document as shown in Appendix C is meshed within the Criteria and Indicators developed by the Canadian Council of Forest Ministers. These goals and objectives are viewed as active benchmarks, which will be addressed through the plan development process. They are not viewed as all-inclusive or definitive. The goals and objectives within Section 6: Resource Management Objectives and Strategies comprise the agreed upon final set of terms.

The strategies designed to meet the goals and objectives have been developed within the DFMP planning Team and reflect the intent of the members of the team. It is recognized that Slave Lake Pulp accepts all strategies as a component of this Detailed Forest Management Plan but

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recognizes that the other timber operators have varying degrees of responsibility within the plan. This plan will detail any commitment or strategy, which is the sole responsibility of the Company. All other commitments are seen as joint responsibilities. To this end, the plan goals, objectives and strategies are intended to be a plan for the direction of operations and forest management upon the entire FMA area. In addition, all of the non-FMA areas in FMU's S6 and S2 will be managed under the umbrella of this plan.

3.2.4 Incorporation of Public Input

Meaningful public involvement is a requirement of this Detailed Forest Management Plan. Slave Lake Pulp is committed to actively soliciting and incorporating public input into the Detailed Forest Management Plan and operations on a continuous basis.

Slave Lake Pulp is committed to external participation and review that is open, transparent and consultative. The intent of this process is to provide a forum for education, two-way communication and shared decision-making. This process is in alignment with the Interim Planning Manual. To facilitate this process, Slave Lake Pulp has created a Detailed Forest Management Planning Team. Representation on this team consists of representatives from all quota holders within the FMA; Alberta Sustainable Resource Development at the forest area, regional and provincial levels; NRS representation from the regional wildlife and regional fisheries biologist; local timber use representation; trapper representation; and the chairperson from the Slave Lake Forest Public Advisory Committee (SLFPAC).

In addition to the Detailed Forest Management Planning team, input into the plan is obtained through the Fish and Wildlife Integrated Technical Committee (FWITC). The intent of this committee is to provide input into and review of the detailed forest management plan. This committee comprises of representatives from Alberta Sustainable Resource Development, a quota holder representative and representatives from SLP.

Opportunity for public participation is primarily through the Slave Lake Forest Public Advisory Committee (SLFPAC). This committee was formed in January 1997 and consists of a cross section of interests including local community public members, small loggers, local trappers, Alberta Sustainable Resource Development, native bands and local forest industry representatives. Native bands have not been actively participating on the SLFPAC, as a result, we have conducted open houses and meetings with the First Nations groups.

Slave Lake Pulp's strategy for external public involvement into this plan is primarily through the following:

- 1) *The Slave Lake Forest Public Advisory Committee (SLFPAC)*
- 2) *Open houses*
- 3) *Meetings and presentations to community leaders and the general community*
- 4) *School presentations and tours*

Through open houses, Slave Lake Pulp intends to present all of it's plans, including the DFMP, the General Development Plan (GDP), Annual Operating Plans (AOPs), Silviculture Plans, Forest Protection Plans, and general information on the company. Open houses will be held in local communities. Slave Lake Pulp also intends to visit local first nation communities.

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Public issues that arise out of our public input process will be addressed primarily by discussion of the issue(s) with the person(s) or organization that raises the issue(s), in the relevant forum, in an attempt to come to resolution at that stage. In the event that this resolution process is unsuccessful, Alberta Sustainable Resource Development may be consulted for assistance, direction or arbitration.

Slave Lake Pulp's Public Involvement Plan is appended to this document within Appendix E.

3.2.5 Performance Monitoring Strategy

Slave Lake Pulp and the Detailed Forest Management Planning Team have accepted adaptive management as an integral component of forest management on the FMA. Key aspects of the forest management processes require monitoring to ensure that the long and short-term objectives of the plan are being met. The DFMP has built into its framework a number of performance and monitoring criteria, which require reporting on either a periodic or annual basis.

Objectives and strategies to achieve the objectives must all be measured to determine the sustainability of the forest and the appropriateness of the strategies developed within the DFMP. These monitoring criteria will be identified in a performance matrix and will be jointly developed with the other timber operators and the government. It is recognized that tolerance limits on all criteria must be identified as well as critical points for initiation of corrective action. Government audits to ensure compliance to legislation, agreements and ground rules will be a part of the performance monitoring process in addition to separate internal compliance reviews. The main objective of the performance and monitoring of the strategies is to evaluate their appropriateness and ultimately adapt them to better meet the management objectives. The following list of the performance topics to be included within the monitoring program:

- ◆ *Planning*
- ◆ *Achievement of Plan Objectives*
- ◆ *Performance Indicators and Objectives*
- ◆ *Assumptions*
- ◆ *Inventory*
- ◆ *Research*
- ◆ *Public Involvement*
- ◆ *Land Base Summaries*
- ◆ *Harvest Production Summaries*
- ◆ *Silviculture*
- ◆ *Stand Density Management*
- ◆ *Coarse Filter Reporting*

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The Company will submit to the crown annually a Five-Year General Development Plan and Annual Operating Plans. These plans will outline the operational intent for the next year as well as reporting on the completion of work within the past year. These plans will require government approval and are monitoring checkpoints throughout the life of the DFMP. In addition, the Company, in conjunction with the other timber operators, will submit a stewardship report within five years of plan submission. This stewardship report will document the performance problems associated with the DFMP as well as the performance successes experienced by the proponents of the plan.

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4.0 Landscape Assessment

4.1 Purpose and Approach to the Landscape Assessment

The landscape assessment is intended to provide a “snapshot” baseline assessment of the Forest Management Area. This baseline will be used to help determine the DFMP’s goals and objectives and will provide a measuring device to assess the success of the DFMP’s preferred forest management strategy in achieving those objectives and goals. The landscape assessment will identify characteristic vegetation, land use patterns and conditions on the FMA.

Following are some general notes for consideration when reviewing the contents of this section:

- ◆ *Unless otherwise specified, all summaries are of the gross landscape area. Overrides to vegetation cover types have been applied to cutovers to match regeneration assignments.*
- ◆ *The original FMA was inventoried at a scale of 1:20,000 using 1991 aerial photography. The expanded FMA area was inventoried at a scale of 1:15,000 using a combination of 1997 and 1998 aerial photography.*
- ◆ *For the original FMA area, the inventory was updated to reflect both timber harvesting and landuse activities. Landuse updates were completed using digital orthophotos acquired in 1997. Cutblocks were updated to May 1999 using medium scale aerial photography.*
- ◆ *The planning area extends beyond the boundary of the FMA in the northern portions of S2 and S6.*

The landscape area is summarized in the following table and illustrated on the map on page 4-2:

Table 4-1: Landscape Area Summary

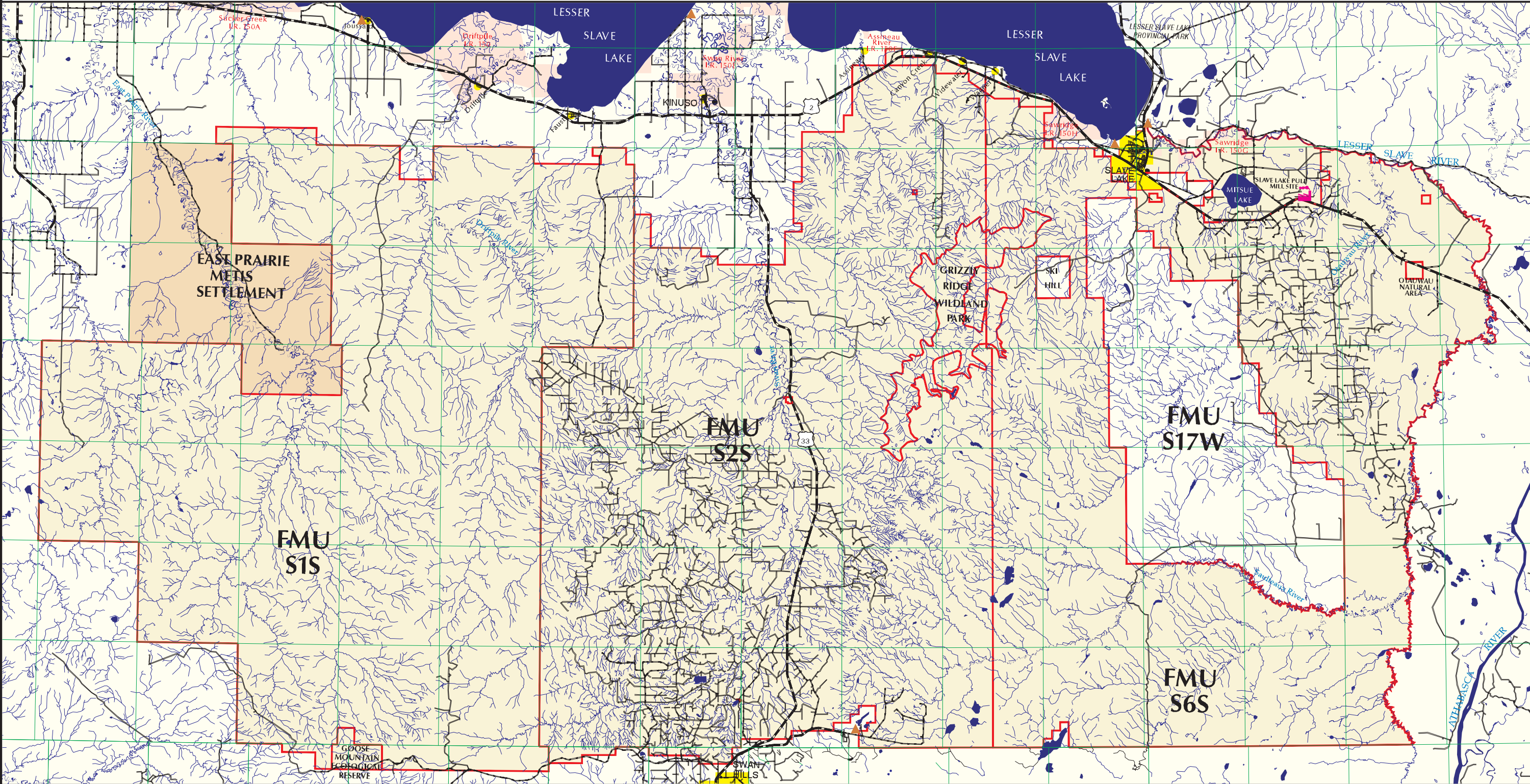
Landscape Unit¹	Area (ha)
Slave Lake Pulp FMA	629,284
Grizzly Ridge Wildland Park	10,691
Goose Mountain Ecological Reserve	1,436
Otauwau Natural Area	333
Non-FMA Quota Areas	13,902
Other Landbase Dispositions	143
Total Planning Area	655,789

¹ The Grizzly Ridge Ski Hill also exists within the landscape area. However, no AVI data is currently available for the area. As a result, the ski hill area is not included within this landscape assessment.

GENERAL OVERVIEW



Scale = 1:375 000



PLANIMETRIC LEGEND

- | | | | | | |
|--|----------------|--|---------------------|--|------------------------|
| | Village/Hamlet | | Perennial Stream | | Towns |
| | Campgrounds | | Intermittent Stream | | Parks |
| | Paved Roads | | Indefinite Stream | | First Nations Reserves |
| | Gravel Roads | | Lakes/Major Rivers | | Metis Settlements |
| | Tertiary Roads | | | | Landscape Area |

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Map Version 1.00
Map Date May 07, 2002
Silvacom Ref #: H-018
Map File:
J:\maps_newbase_map



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4.2 General Description

The SLP FMA in north-central Alberta is approximately 629,284 ha in size and encompasses Forest Management Units S1S in the western portion, S2S in the central portion, and S6S in the eastern portion. The communities of Slave Lake and High Prairie are located near the FMA's northern boundary, while the community of Swan Hills is slightly south of the FMA's southern boundary. The East Prairie Metis Settlement immediately borders the north-west corner of the FMA and forms approximately one half of the western FMA boundary while the eastern boundary is formed by the Saulteaux River. The FMA is bisected by Alberta Provincial Highway 33 running roughly north-south. A large portion (approximately 55,000 ha) of land in the eastern half of the landscape area is within Weyerhaeuser Company's Slave Lake FMA area.

The majority of the FMA drains towards the northeast, into the Athabasca River basin. The southwest corner of FMA lies within the Peace River watershed. All waters ultimately drain north into the Arctic Ocean through the Mackenzie River basin. Larger watercourses contained within the FMA include the East Prairie River, Driftpile River, Swan River, and Saulteaux River. Larger waterbodies within the FMA include Roche Lake, Agnes Lake, Tea Lakes, Jessie Lake, Edith Lake and Chrystina Lake.

4.3 Description of Landscape Pattern and Structure

4.3.1 Physiographic Setting and Geology

The major physiographic units that comprise the SLP FMA are the Swan Hills Uplands in the south and the Lesser Slave Lake Lowlands and Lesser Slave River Lowlands in the north.

The Upper Cretaceous Wapiti Formation (non-marine sandstones and mudstones with scattered coal beds) is the most important bedrock formation within the northern half of the FMA. The Lea Park Formation (marine shales) and Smoky Group (marine shales) are present along the south shore of Lesser Slave Lake and the Lesser Slave River Lowlands. The southern half of the FMA is underlain by both the Tertiary Paskapoo Formation (non-marine sandstones and siltstones with minor conglomerates and coal beds) and the Wapiti Formation. The Tertiary Paskapoo deposits form the upper portions of the Swan Hills (Carlson 1972a, 1972b; Knapik and Lindsay 1983; Vogwill 1978, 1979)².

4.3.2 Glacial History, Surficial Geology and Soils

All landforms, surficial materials, and soils within the FMA reflect the underlying bedrock topography and recent glacial history of the region. Glacial till derived from the underlying bedrock materials is the dominant surficial material present in the area. During the last major glacial period (approximately 100,000 to 10,000 years ago, or the Pleistocene Epoch), the entire FMA was covered by the Laurentide Ice Sheet, a situation similar to most areas of Alberta. As the Laurentide Ice Sheet retreated towards the northeast, ice blocked the pre-glacial northerly drainage forming a sequence of glacial lakes at the ice front. Lesser Slave Lake was formed

² Carlson, V.A. 1972. Bedrock topography of the Whitecourt / Iosegun map areas, NTS 83J, Alberta. Knapik, L.J. and Lindsay, J.D. 1983. Reconnaissance soil survey of the Iosegun Lake Area, Alberta. Alberta Soil Survey Report no. 43. Vogwill, R.I.J. 1978. Hydrogeology of the Lesser Slave Lake Area (83O), Alberta. 1979. Bedrock topography of the Lesser Slave Lake map area, NTS 83O, Alberta.

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during this glacial retreat sequence (St. Onge 1971)³. The south shore reflects this glacial history through its composition of clay and silt rich, glacial lacustrine deposits. Late and post-glacial streams and meltwater channels also formed several significant glaciofluvial deposits (terraces, meltwater channels and deltas). The position of the melting ice front in relation to the Swan Hills Uplands was especially important in creating some of the major glaciofluvial deposits within and on the margins the FMA (St. Onge 1971). Recent fluvial and colluvial deposits have formed along modern Holocene rivers and escarpments and comprise a very small proportion of the land base. Organic materials can occur on any surficial material wherever poorly drained, gently sloping, depressional landforms are present (Knapik and Lindsay 1983; Vogwill 1978).

Soil development is related strongly to the distribution of surficial parent materials and landscape positions within the FMA. To date, detailed (1:127,000) soil mapping has only been completed for a very small portion of the northwest corner of the land base (Knapik and Lindsay 1983). A preliminary predictive soil mapping exercise has recently been completed for the entire FMA (AEM 2000). Predicted soils are mainly Gray Luvisols on upland sites developing on glacial till and glacial lacustrine parent materials. Gleysols and organic soils are mainly found on stagnant to slow draining lowlands. Active fluvial deposits consist of Regosols with variable particle sizes. Well drained, coarse textured, upland glacialofluvial sites may be developed to Brunisols.

Canada Land Inventory (CLI) maps⁴ provide a general description of the soils associated with the forest productivity classes found in the FMA. Forest productivity is moderately to severely limited on about 60% of the FMA, which falls into classes 3 and 4. Limiting factors on growth in these classes are low soil fertility, excess soil moisture and impeded drainage. Forest growth is severely limited in classes 5 and 6, which represent about 20% of the FMA. The major limiting factor for these classes is excessive soil moisture. Soils in class 7, which are characterized by frequent flooding and organic soils, preclude the growth of commercial forests.

Timber productivity ratings (TPR) also provide an indication of site potential for forest growth. The TPR values are calculated on an individual stand basis using combinations of height, age and primary species. A summary of TPR values for the landscape are provided in the following table:

Table 4-2: Timber Productivity Rating Summary

Timber Productivity Rating	Gross Area (ha)	Percent of Area
Good	202,182	30.8%
Medium	298,698	45.5%
Fair	65,365	10.0%
Unproductive	61,615	9.4%
Non-Vegetated Land	27,930	4.3%
Total	655,789	100%

4.3.3 Hydrologic Description

Slave Lake Pulp's forest management area occurs primarily on the south half of the Lesser Slave Lake watershed. Major drainages flowing north into the lake or the Slave River include West and East Prairie River, Driftpile River, Swan River, Otauwau River and the Saulteaux River. Smaller

³St. Onge, D.A.1971. Sequence of glacial lakes in north central Alberta. Geological Survey of Canada Bulletin 213, Ottawa.

⁴ Environment Canada 2001

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basins include Arcadia Creek, Eula Creek, Assineau River, Mooney Creek, and Eating Creek and Florida Creek, which flow into Mitsue Lake.

Five basins flow northward, directly into Lesser Slave Lake (Arcadia Creek, Driftpile River, Swan River, Assineau River and Mooney Creek). Five basins flow north eastward into the Lesser Slave River which drains eastward into the Athabasca River (Sawridge, Eating and Florida Creeks, and the Otauwau and Sauteaux Rivers). East and West Prairie Rivers flow north westward into the Heart River which then drains into Lesser Slave Lake. The FMA also contains small parts of the headwaters of Goose and Freeman Rivers.

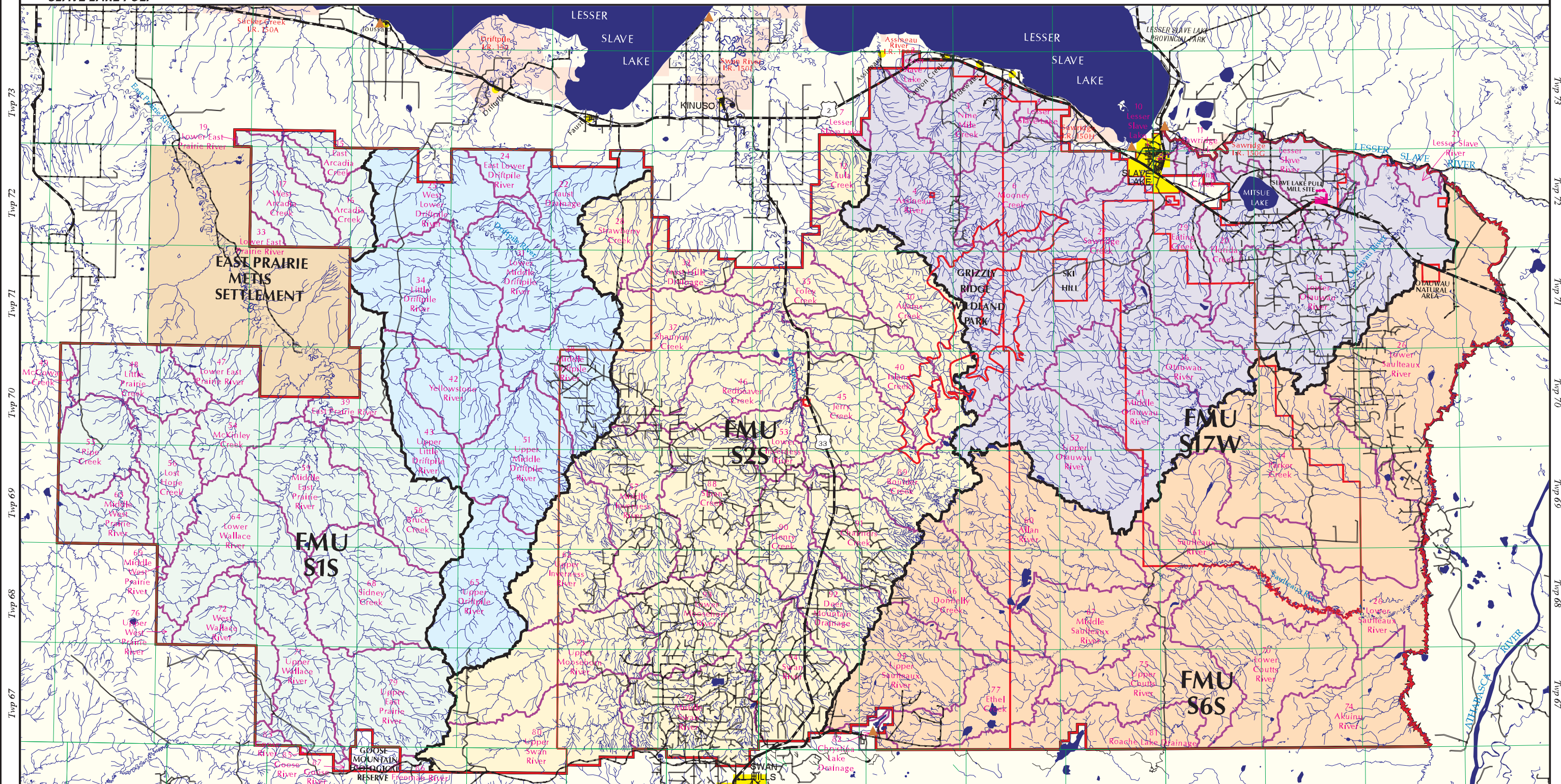
The hydrologic landbase for the FMA was created using a combination of available DEM and hydrology coverages, this resulted in the creation of over 1000 watersheds. These watersheds were consolidated into larger units, to achieve an average size of approximately one township. Some of the larger sub-basins (i.e. Moosehorn, Inverness...) were partitioned into upper, lower and middle reaches to conform to the average size target. Several small basins along the main channels of larger watercourses were also consolidated into larger units.

The consolidation resulted in the identification of ninety-four sub-basins on the FMA, ranging in size from 313 km² in the Lower Sauteaux (basin 25) to a small part of the West Prairie River (basin 68) that occurs in the FMA.(Figure 2). Small fragments of larger basins, less than 1 km², occurred along the boundaries of the FMA. Average sub-basin size on the FMA is ~ 76 km². The Swan and Sauteaux Rivers are the largest basins in the FMA ranging in size from 187 km² to 172 km². The smallest basins are Eating Creek and Florida Creek at 69 km² and 43 km².

For the purposes of forest management planning, five “major basins” were defined on the landscape. These basins are essentially a re-grouping of the smaller watersheds into larger, landscape-level drainages. These regions will be referred to as Landscape Management Units (LMU's):

- ◆ *Swan River LMU*
- ◆ *Driftpile River LMU*
- ◆ *Sauteaux River LMU*
- ◆ *Lesser Slave River LMU (including the Otauwau River)*
- ◆ *East & West Prairie Rivers LMU*

The following map illustrates the location of each watershed in the landscape. A summary of gross area by watershed is provided in Table 4-3.



PLANIMETRIC LEGEND

- | | | | | | |
|--|----------------|--|---------------------|--|------------------------|
| | Village/Hamlet | | Perennial Stream | | Towns |
| | Campgrounds | | Intermittent Stream | | Parks |
| | Paved Roads | | Indefinite Stream | | First Nations Reserves |
| | Gravel Roads | | Lakes/Major Rivers | | Metis Settlements |
| | Tertiary Roads | | | | |

WATERSHEDS

- | | | | |
|--|--------------------|--|----------------|
| | Watershed Boundary | | Basin Boundary |
|--|--------------------|--|----------------|

BASINS (Landscape Management Units)

- | | | | |
|--|-------------------|--|-----------|
| | Driftpile | | Saulteaux |
| | East/West Prairie | | Swan |
| | Lesser Slave | | |

EXAMPLE LABEL

- | | | | |
|--|---------------------|---|------------------|
| | 52 | → | Watershed Number |
| | Upper Otauwau River | → | Watershed Name |

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Table 4-3: FMA Watershed Area Summary (ha)

Major Basin (group)	Watershed Name	Watershed Number	Total
Driftpile	East Lower Driftpile River	24	2,123
	Faust Drainage	22	6,069
	Little Driftpile River	34	12,383
	Lower Middle Driftpile River	31	8,871
	Middle Driftpile River	38	11,422
	Upper Driftpile River	65	10,830
	Upper Little Driftpile River	43	5,771
	Upper Middle Driftpile River	51	10,361
	West Lower Driftpile River	25	8,640
	Yellowstone River	42	6,417
	Driftpile Total		82,888
East/West Prairie	Arcadia Creek	16	4,625
		18	1
	Bruce Creek	58	10,496
	East Arcadia Creek	15	2,056
	East Prairie River	39	4,432
		50	35
	Freeman River	86	490
	Goose River	83	539
		85	41
		87	242
	Little Prairie Creek	48	6,772
	Lost Hope Creek	56	6,807
	Lower East Prairie River	19	29
		33	766
		47	3,643
	Lower Wallace River	64	11,017
	McGowan Creek	49	917
	McKinley Creek	54	5,596
	Middle East Prairie River	59	9,701
	Middle West Prairie River	63	4,888
		69	166
	Pipe Creek	55	6,357
	Sidney Creek	68	12,575
	Upper East Prairie River	79	12,188
	Upper Wallace River	71	9,137
	Upper West Prairie River	76	571
	West Arcadia Creek	17	5,827
	West Wallace River	72	5,601
	East/West Prairie Total		125,516
Lesser Slave	Assineau River	4	14,026

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Major Basin (group)	Watershed Name	Watershed Number	Total
	Eating Creek	13	982
		29	2,559
	Florida Creek	20	7,144
	Lesser Slave Lake	2	2,500
		5	1,351
		7	278
		10	61
	Lesser Slave River	8	7,633
		9	66
		21	1,008
	Lower Otauwau River	14	22,785
	Lower Saulteaux River	23	31
	Middle Otauwau River	41	5,749
	Mooney Creek	6	12,277
	Nine Mile Creek	3	6,136
	Otauwau River	36	330
	Sawridge Creek	11	1,045
		27	19,006
	Upper Otauwau River	52	12,794
	Lesser Slave Total		117,759
Saulteaux	Akuinu River	74	9,560
	Allan River	60	16,995
	Chrystina Lake Drainage	82	401
		84	4
	Donnelly Creek	66	9,671
	Ethel Creek	77	7,975
	Lower Coutts River	70	14,508
	Lower Saulteaux River	26	29,559
	Middle Saulteaux River	67	9,942
	Parker Creek	44	10,625
	Roche Lake Drainage	81	7,324
	Saulteaux River	61	4,281
	Upper Coutts River	75	10,866
	Upper Saulteaux River	95	10,446
	Saulteaux Total		142,157
Swan	Adams Creek	30	12,980
	Boulder Creek	89	6,821
	Chalmers Creek	91	7,818
	Deer Mountain Drainage	92	5,571
	Eula Creek	12	3,546
	Foley Creek	35	7,738
	Frost Hills Drainage	32	3,857
	Henry Creek	90	6,256

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Major Basin (group)	Watershed Name	Watershed Number	Total
	Island Creek	40	7,964
	Jerry Creek	45	9,140
	Lower Inverness River	53	3,517
	Lower Moosehorn River	93	10,933
	Middle Inverness River	57	10,376
	Middle Swan River	78	10,734
	Redbeaver Creek	46	6,918
	Shannon Creek	37	12,477
	Sloan Creek	88	10,593
	Strawberry Creek	28	5,994
	Swan River	94	9,128
	Upper Inverness River	62	10,568
	Upper Moosehorn River	73	12,295
	Upper Swan River	80	12,246
Swan Total			187,469
Grand Total			655,789

4.3.4 Ecological Land Classification

Ecological classification and mapping provides a synthesis of the climatic, physiographic, and vegetation characteristics of an area. The Natural Regions of Alberta⁵ (Alberta Environmental Protection 1994; Alberta Environment 2000; Beckingham and Archibald 1996) provides an ecologically-based, hierarchical classification system for the description of ecological conditions within the province.

Within the SLP FMA, the most detailed level of ecological mapping that has been completed is to the level of Natural Subregions. This level of classification provides a synthesis of the major ecological characteristics for the different areas of the FMA, and provides a context in which to interpret the SLP land base in relation to adjacent regions of the province.

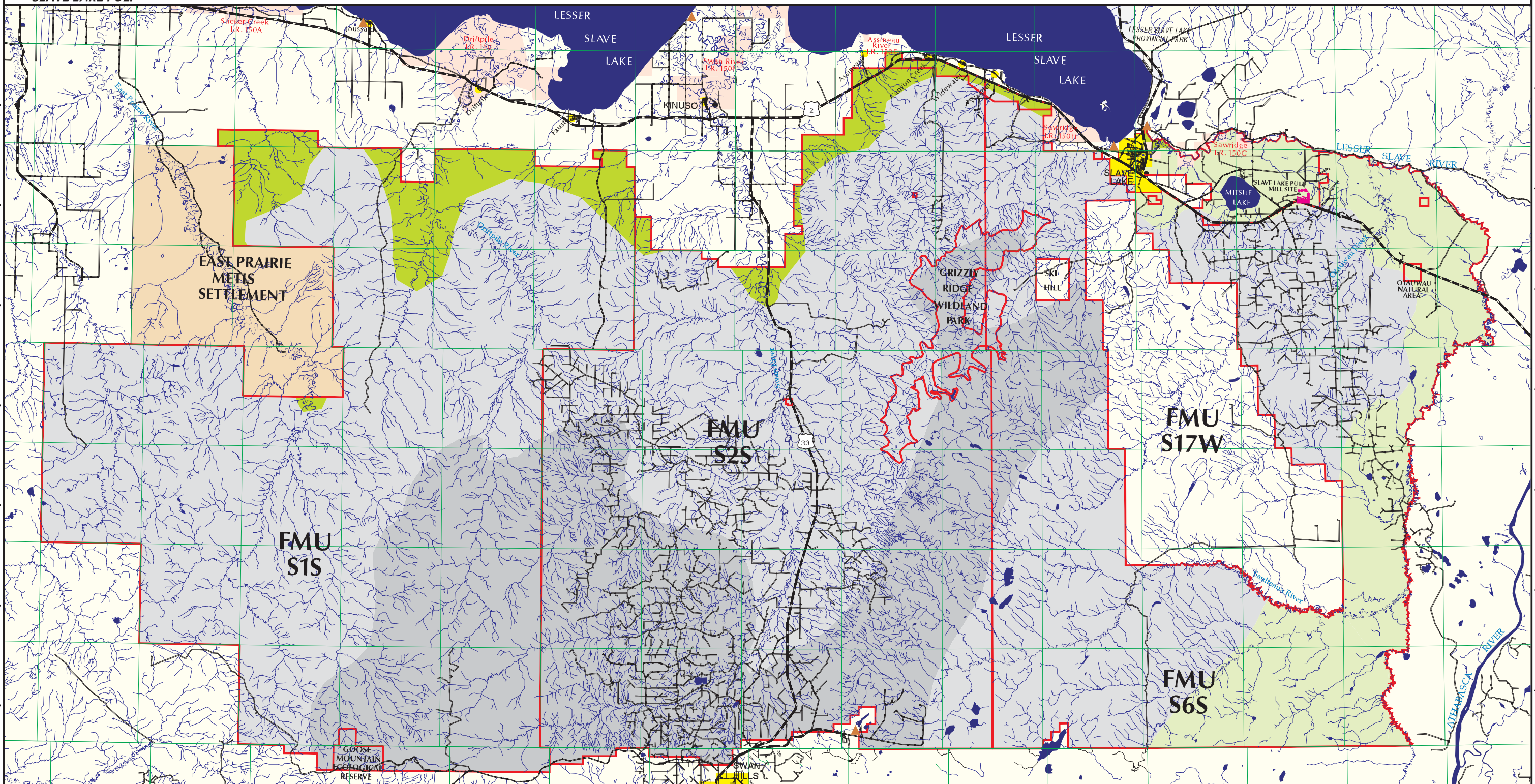
The majority of the SLP FMA (Figure 4-2) consists of the Foothills Natural Region, of which both the Upper Foothills (26%) and the Lower Foothills Natural Subregions (59%) occur within the Swan Hills. The Boreal Forest Natural Region constitutes the remainder of the FMA with the Central Mixedwood Natural Subregion (10%) occurring along the east periphery of the FMA and Dry Mixedwood Natural Subregion (5%) present along the northern edge of the FMA. The following map illustrates the distribution of natural subregions which fall in the FMA area.

⁵ Alberta Environment. 2000. Alberta Natural Region Land Classification System. On Alberta Natural Heritage Information Centre website, www.gov.ab.ca/env/parks/anhic.
 Alberta Environmental Protection. 1994. Ecological land survey site description manual. Alberta Environmental Protection, Resource Information Branch, Edmonton, Alberta.
 Beckingham and Archibald. 1996. Field Guide to the ecosites of west-central Alberta. Special Report 9. Natural Resources Canada, CFS. Edmonton, Alberta.

NATURAL SUBREGIONS



Scale = 1:375 000



PLANIMETRIC LEGEND

- | | | |
|----------------|---------------------|------------------------|
| Village/Hamlet | Perennial Stream | Towns |
| Campgrounds | Intermittent Stream | Parks |
| Paved Roads | Indefinite Stream | First Nations Reserves |
| Gravel Roads | Lakes/Major Rivers | Metis Settlements |
| Tertiary Roads | | |

NATURAL SUBREGIONS

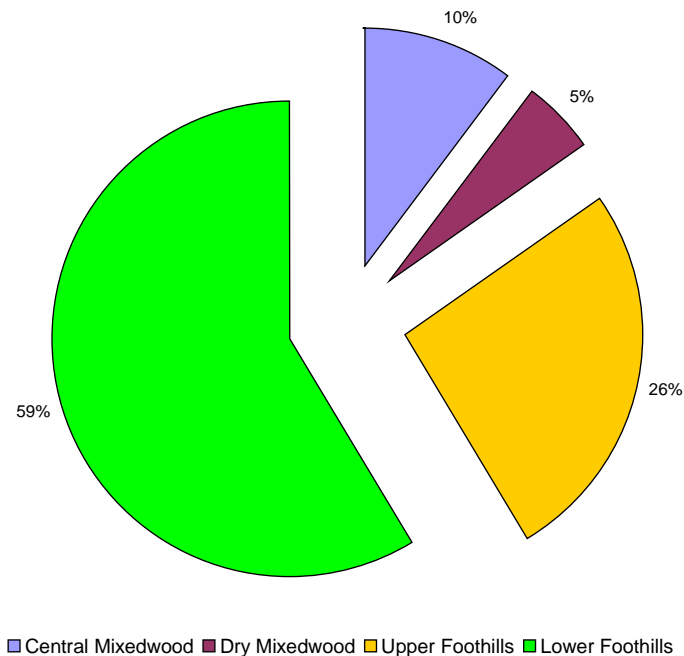
- | | |
|-------------------|-----------------|
| Central Mixedwood | Lower Foothills |
| Dry Mixedwood | Upper Foothills |



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Figure 4-1: FMA Natural Subregion Area Summary



4.3.5 Upper Foothills Natural Subregion

The Upper Foothills Natural Subregion occurs on the upper-most elevations of the Swan Hills Uplands. It has the coolest average summer temperature (11.5°C) and warmest average winter temperature (-6.0°C) of any subregion present within the SLP FMA. Total summer precipitation, however, is the highest of any of the subregions in Alberta at an average of 340mm. The average winter total is 60mm and the annual average total is 540mm. Brunisolic and Luvisolic are the dominant soil developments on till and glaciofluvial materials. Organic soils are constrained to poorly drained, gently-sloping, lowland depressions. The scale and frequency of fire in this subregion appears to be distinct from the lower elevation Mixedwood Subregions; infrequent, large scale fires appear to be the dominant fire patterns in the Upper Foothills. This is probably related to the precipitation conditions of the Swan Hills Uplands.

Lodgepole pine dominates the closed-canopied coniferous forests of this subregion, though white spruce may also present in mixed conifer stands or in pure spruce stands. Black spruce may be found with wetlands or on drier upland sites mixed with lodgepole pine. Aspen is distinctly absent with the exception of on warm southerly slopes with coarse-textured soils. Though it is less diverse than the Lower Foothills Subregion, understory vegetation may include Labrador tea, prickly rose, Canada buffalo-berry, tall bilberry, bog cranberry, green alder, dwarf birch, bracted honeysuckle, bunchberry, twinflower, fireweed, horsetail, five-leaved bramble, false azalea, bishop's cap, heart-leaved arnica, and feathermosses.

4.3.6 Lower Foothills Natural Subregion

The Lower Foothills Natural Subregion occurs on the lower elevations of the Swan Hills Uplands, and is transitional between the Foothills and Mixedwood Natural Regions. The climate of this subregion represents a transition between boreal and cordilleran (montane) climatic conditions and is continental with an average summer temperature of 12.8°C and an average winter

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temperature of -7.8°C . Total annual precipitation is significantly lower than the Upper Foothills. The majority of the annual precipitation (about 465mm) falls during the summer when the average total precipitation is 295mm. Total average winter precipitation is similar to the Upper Foothills Natural Subregion. Brunisolic and Luvisolic soils are the dominant soil developments on till and glaciofluvial materials. Organic soils are contained to poorly drained, gently-sloping, lowland depressions. The scale and frequency of fire in this subregion appears to be transitional between the higher elevation Upper Foothills and the lower elevation Mixedwood Subregions.

Vegetation in the Lower Foothills Natural Subregion is considered transitional between boreal deciduous (e.g. Central Mixedwood Natural Subregion) and montane coniferous (e.g. Upper Foothills Natural Subregion) vegetation. Forests are characteristically mixedwood in nature and are composed of aspen, balsam poplar, lodgepole pine, and white spruce with the species composition of the mixedwood determined by the geographical location and disturbance history. For example, pure coniferous components can be found at the upper boundary with the Upper Foothills Natural Subregion while deciduous components can be found at lower elevations and along dry, south-facing slopes. Black spruce and tamarack are found in poorly drained sites. Typically understory shrubs depend on the drainage of the site and may include prickly rose, dwarf birch, low-bush cranberry, green alder, bearberry, juniper, low bilberry, Canada buffalo-berry, and Labrador tea. Forbs and grasses would include a selection of hairy wild rye, white meadowsweet, twinflower, marsh reed grass, wild sarsaparilla, bunchberry, dewberry, fireweed, wintergreen, sedges, and mosses.

4.3.7 Central Mixedwood Natural Subregion

The Central Mixedwood Natural Subregion occurs along the eastern periphery of the FMA within the Lesser Slave Lake and Lesser Slave River Lowlands. Summers are typically short and cool while winters are long and cold with average temperatures of 13.8°C and -10.5°C , respectively. This subregion is much drier than both the Upper and Lower Foothills with an average annual precipitation of 380mm. June and July are the wettest months with relatively dry winters generally being the normal condition. Luvisolic soil developments on morainal and glacial lacustrine materials are the dominant soil types. Organic soils are contained to poorly drained, gently-sloping, lowland depressions. Some meandering river systems contain large areas of fluvial and colluvial materials. Based on historical fire records (Deslisle and Hall 1987), the fire regime of the Central Mixedwoods appears to be more active than in either the Upper or Lower Foothills. A fire regime of smaller, more frequent fires characterizes this subregion and considerable fire overlap has occurred during the 60-year period of fire records.

The dominant tree species in this subregion is aspen, occurring in both pure and mixed stands. Balsam poplar often occurs with aspen in moister sites and mixedwood stands of aspen, white spruce, and white birch are also common. Typical shrubby vegetation in deciduous upland sites includes low-bush cranberry, Canada buffalo-berry, twinflower, beaked hazelnut, prickly rose, red-osier dogwood, saskatoon, and green alder, while common herbs include bunchberry, wild sarsaparilla, dewberry, cream-coloured peavine, pink wintergreen, palmate-leaved coltsfoot, hairy wild rye, and marsh reed grass. Feathermosses are the dominant understory in areas with greater representation of conifers. Mixedwood forests contain a mosaic of these typical deciduous and coniferous understories. Common peatland vegetation within this subregion includes black spruce, labrador tea, and various peatmosses in bogs or tamarack, dwarf birches, sedges, and brown mosses in fens.

4.3.8 Dry Mixedwood Natural Subregion

The Dry Mixedwood Natural Subregion occurs along the northern periphery of the FMA within the Lesser Slave Lake Lowlands. Most of this subregion within the FMA was covered by late or

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post-glacial Lesser Slave Lake. The climate of this subregion is continental, similar to that of the Central Mixedwood Subregion. The average summer temperature is about 13°C and the majority of the average annual precipitation (350mm) arrives during the summer, while the winters are relatively dry with an average of 60mm of precipitation. Within the FMA, Luvisolic soil developments on glacial lacustrine materials is the dominant soil type, although morainal materials are also present. Organic soils are contained to poorly drained, gently-sloping, lowland depressions. Some meandering river systems contain large areas of fluvial and colluvial materials with limited, or Regosolic, soil developments. The fire regime of the Dry Mixedwood appears to be similar to the Central Mixedwood Subregion.

The dominant tree species in these mixedwood forests tends to be aspen, with the proportion of balsam poplar, white spruce, black spruce, jack pine, and balsam fir determined by the successional stage and moisture regime. Typical understory vegetation is similar to that found in the Central Mixedwood Natural Subregion.

4.4 The Forest Resource

4.4.1 Forested vs. Non-Forested Land

The FMA area is broadly divided into two distinct classes, forested land and non-forested land. The majority of the FMA area is covered with productive, forested land. The forested landbase is comprised predominantly of aspen, pine, black spruce and white spruce forest types. The non-forested portion of the FMA is stratified into two distinct classes:

- ◆ *Natural: Non-vegetated areas such as lakes and rivers, as well as vegetated areas like grasslands and shrub areas fall into this class.*
- ◆ *Anthropogenic: Man-made disturbances like roads, pipelines, well-sites and gravel pits are typical examples of the land types that are grouped into this class.*

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The following table summarizes the forested vs. non-forested areas of the landscape:

Table 4-4: Forested vs. Non-Forested Area Summary (ha)

Landbase Classification	Mixedwood ⁶		Upper Foothills		Lower Foothills		Total	
	Area (ha)	Percent	Area (ha)	Percent	Area (ha)	Percent	Area (ha)	Percent
Forested	76,126.5	76.5	158,927.6	92.4	359,908.2	93.7	594,962.3	90.7
Non-Forested Natural	20,856.2	21.0	8,714.4	5.1	19,062.7	5.0	48,633.4	7.4
Non-Forested Anthropogenic	2,539.3	2.6	4,414.9	2.6	5,238.7	1.4	12,192.9	1.9
Non-Forested Total	23,395.5	23.5	13,129.3	7.6	24,301.5	6.3	60,826.3	9.3
Total	99,521.9	100.00	172,056.9	100.00	384,209.7	100.00	655,788.6	100.00

4.4.2 Cover Group Distribution

The SLP FMA consists of several distinct forest types with significantly varied species and age class groupings. The current composition of the forest has originated as a result of natural disturbances, predominantly fire (see Table 4-5). Oil and gas exploration and development have influenced the contiguity of the forest significantly. The region has also been impacted by forest harvesting activities in localized regions throughout the FMA. The resulting mosaic is further described in the following sections.

Table 4-5: Cover Group Gross Area Summary (ha)

Cover Group (Description)	Natural Subregion			
	Mixedwood	Upper Foothills	Lower Foothills	Total
Non-Forested (Areas that do not currently support forest growth)	23,395.5	13,129.3	24,301.5	60,826.3
C – Pure Conifer (Forested areas with 80%+ of conifer species composition in the overstorey layer)	30,442.0	143,893.4	142,060.3	316,395.8
CD – Mixedwood Conifer Dominant (Forested areas with 50% to 80% of conifer species composition in the overstorey layer)	8,924.2	5,544.6	40,276.5	54,745.3
DC – Mixedwood Deciduous Dominant (Forested areas with 20% to 50% of conifer species composition in the overstorey layer)	4,407.9	3,067.7	28,134.3	35,610.0
D – Pure Deciduous (Forested areas with 20% or less of conifer species composition in the overstorey layer)	32,352.3	6,421.9	149,437.0	188,211.2
Total	99,521.9	172,056.9	384,209.7	655,788.6

⁶ Includes both the central and dry mixedwood natural subregions

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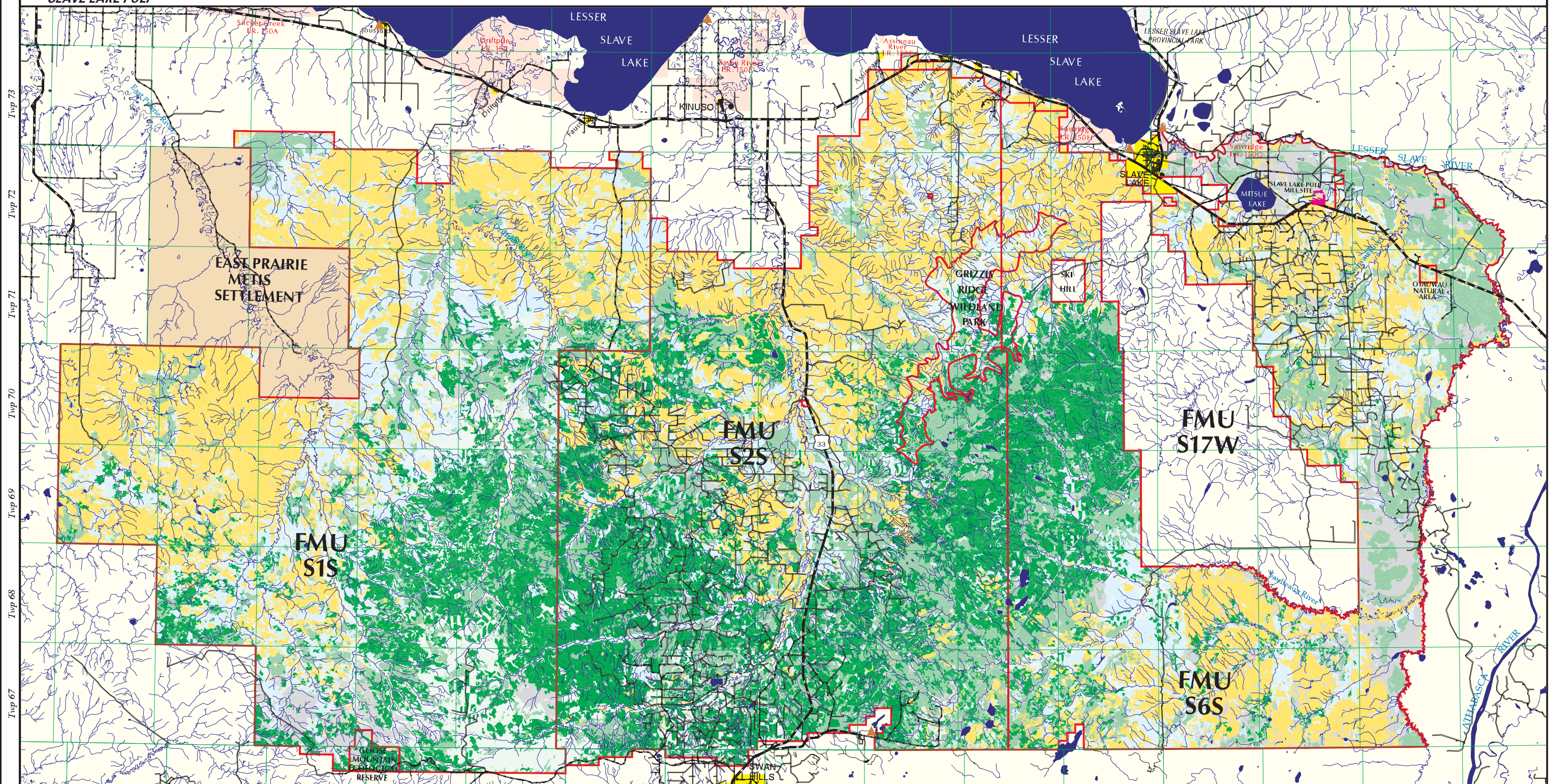
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The cover groups presented above were re-stratified into six distinct cover types. These cover types are more consistent with the seral types and stages that may exist in the FMA area. The seral stages are described in more detail later in this section. Following is a summary of the cover type distribution for the landscape area:

Table 4-6: Cover Type Gross Area Summary (ha)

Cover Type (Description)	Mixedwood	Natural Subregion		Total
		Upper Foothills	Lower Foothills	
Non-Forested (Areas that do not currently support forest growth)	23,395	13,129	24,301	60,826
C-PL (Forested areas with 80%+ of conifer species composition in the overstorey layer with pine as the leading species)	1,684	87,609	49,747	139,039
C-SB (Forested areas with 80%+ of conifer species composition in the overstorey layer with black spruce as the leading species)	23,590	32,102	56,886	112,578
C-SW (Forested areas with 80%+ of conifer species composition in the overstorey layer with white spruce as the leading species)	5,169	24,182	35,428	64,779
MX – Mixedwood (Forested areas with 20% to 80% of conifer species composition in the overstorey layer)	13,332	8,612	68,411	90,355
D – Pure Deciduous (Forested areas with 20% or less of conifer species composition in the overstorey layer)	32,352	6,422	149,437	188,211
Total	99,522	172,057	384,210	655,789

COVER TYPE DISTRIBUTION



PLANIMETRIC LEGEND

- | | | |
|----------------|---------------------|------------------------|
| Village/Hamlet | Perennial Stream | Towns |
| Campgrounds | Intermittent Stream | Parks |
| Paved Roads | Indefinite Stream | First Nations Reserves |
| Gravel Roads | Lakes/Major Rivers | Metis Settlements |
| Tertiary Roads | | |

COVER TYPE

- | | |
|---------------------------------|--------------|
| Conifer - White Spruce Dominant | Mixedwood |
| Conifer - Black Spruce Dominant | Deciduous |
| Conifer - Pine Dominant | Non Forested |

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4.4.3 Forest Age Class Distribution

The cover group and age class distribution of the landscape area is shown in Map 4-3. The FMA was stratified into 40 year age classes and six main species group combinations depicting conifer dominant (lodgepole pine, black spruce, white spruce), mixedwood, deciduous dominant and non-forested regions.

The most noticeable feature of the map is the large contiguous region of conifer dominant older age class forest in the upper foothills. These types are fire origin lodgepole pine and black spruce types which have successfully avoided fire for an extended period. These types have been progressively logged over the last 40 years and display a patch quilt like appearance on the landscape.

The large young age class areas in the eastern and southern portions of the FMA denote the large burned over areas in S6, S2 and S1 in the 1998 and 2001 fire seasons.

The northern regions are dominated by deciduous and mixedwood forest types. The area south of High Prairie along the western edge of the FMA is predominantly pure deciduous forest.

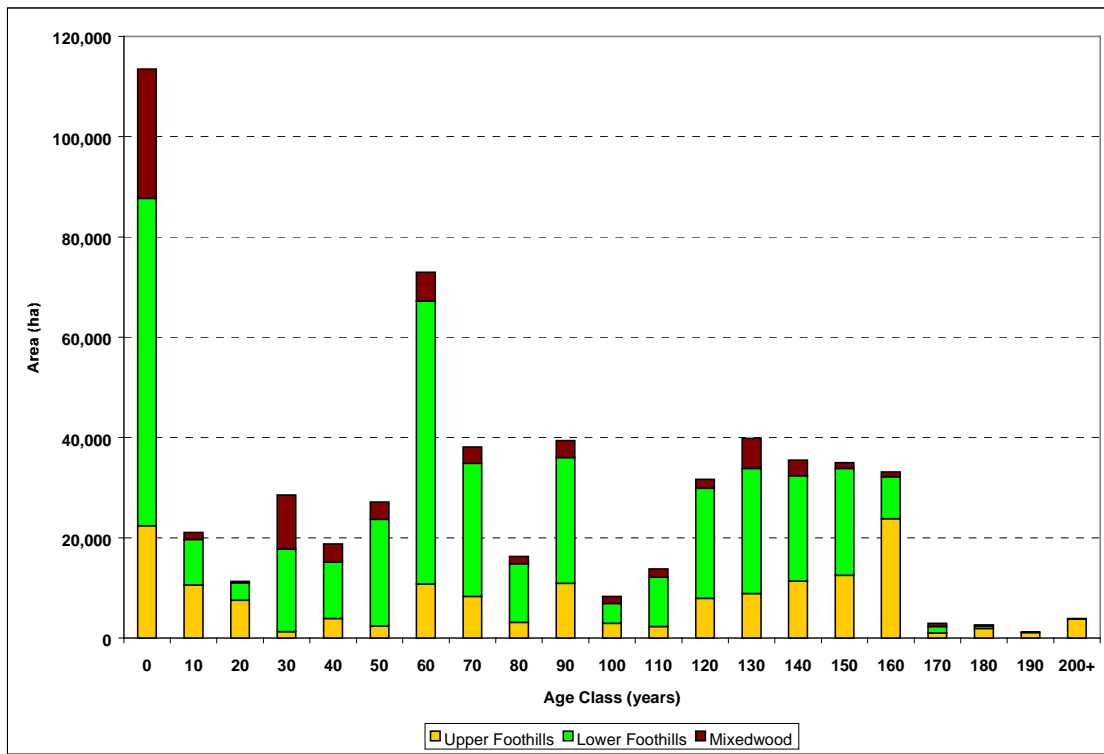
Table 4-7: FMA Age Class Distribution (ha)

Ten Year Age Class	Natural Subregion			Total
	Upper Foothills	Lower Foothills	Mixedwood ⁷	
0	22,406.5	65,309.5	25,769.0	113,485.0
10	10,601.7	9,072.2	1,423.3	21,097.2
20	7,555.9	3,472.9	276.8	11,305.6
30	1,296.3	16,467.0	10,763.1	28,526.4
40	3,892.1	11,279.3	3,566.8	18,738.2
50	2,378.2	21,329.6	3,459.1	27,166.9
60	10,825.9	56,357.6	5,763.8	72,947.3
70	8,275.3	26,585.6	3,218.9	38,079.7
80	3,156.3	11,682.0	1,439.5	16,277.8
90	10,899.3	25,122.5	3,405.8	39,427.6
100	2,985.1	3,904.3	1,420.8	8,310.3
110	2,291.4	9,846.5	1,664.1	13,801.9
120	7,892.6	21,990.8	1,775.4	31,658.8
130	8,906.1	24,904.0	5,999.2	39,809.3
140	11,375.4	20,965.4	3,158.0	35,498.8
150	12,539.9	21,294.3	1,118.3	34,952.4
160	23,841.7	8,303.8	961.2	33,106.7
170	999.7	1,294.1	623.5	2,917.3
180	1,921.8	442.7	241.4	2,605.9
190	1,080.7	186.6	0.0	1,345.8
200	3,805.9	97.5	0.0	3,903.4
Total	158,927.8	359,908.2	76,048	594,962.3

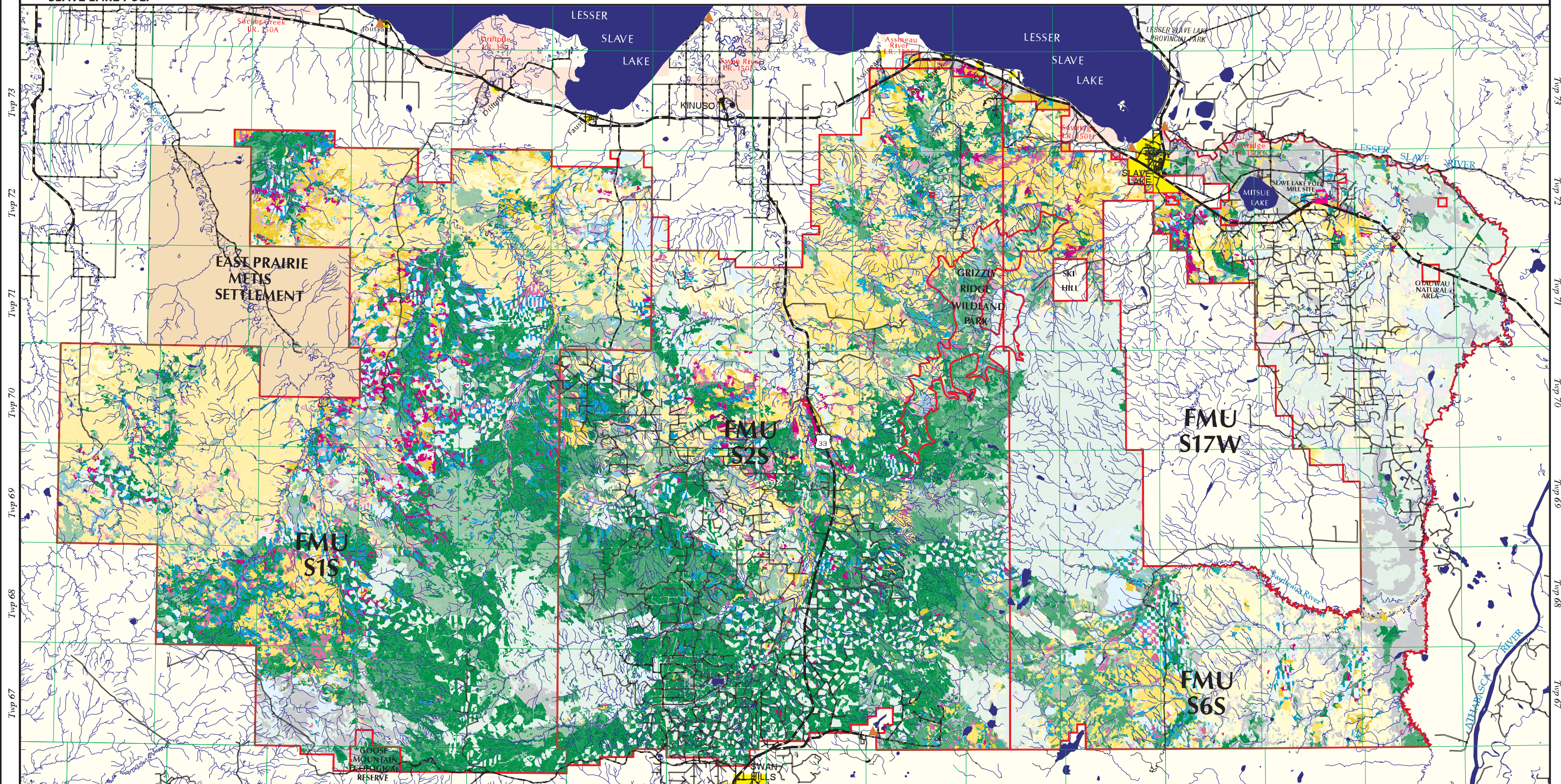
⁷ Includes both the central and dry mixedwood natural subregions

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Figure 4-2: FMA Age Class Distribution by Natural Subregion



SPECIES GROUP AND AGE CLASSIFICATION



PLANIMETRIC LEGEND

- | | | |
|----------------|---------------------|------------------------|
| Village/Hamlet | Perennial Stream | Towns |
| Campgrounds | Intermittent Stream | Parks |
| Paved Roads | Indefinite Stream | First Nations Reserves |
| Gravel Roads | Lakes/Major Rivers | Metis Settlements |
| Tertiary Roads | | |

SPECIES GROUP

AGE (YRS)	CONIFER	MIXEDWOOD CONIFER LEADING	MIXEDWOOD DECIDUOUS LEADING	DECIDUOUS	NON FORESTED
0 - 40					
41 - 80					
81 - 120					
121 +					

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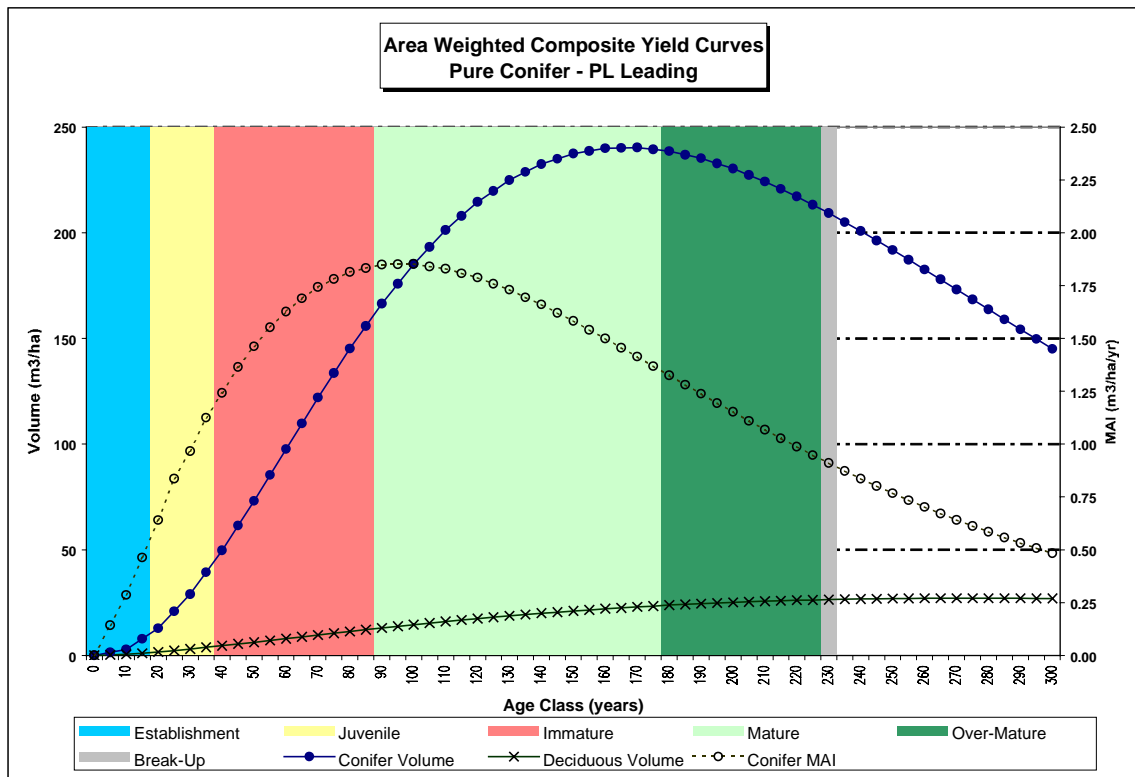
4.4.4 Amount and Distribution of Seral Stages

Seral stages are “life-cycle benchmarks” of forest growth. These stages are different for each forest type (e.g. white spruce stands vs. aspen stands). The characteristics of each forest type at each seral stage will change. The selected age ranges for each particular seral stage are intended to reflect stand function. The forest area within the FMA is quite diverse and contains a broad range of vegetation types, spread across a continuum of seral stages. The following table defines the seral stages for each cover type:

General Description	
Establishment	Time required to establish a new forest stand
Juvenile	Age between establishment and reaching merchantability (approx. 50 m ³ /ha)
Immature	Age between merchantability and ten years prior to peak volume growth (MAI)
Mature	Age from ten years prior to peak MAI to the age that stand volume begins to decline.
Over-Mature	Ages older than mature.

Cover Type Seral Stages

C-PL



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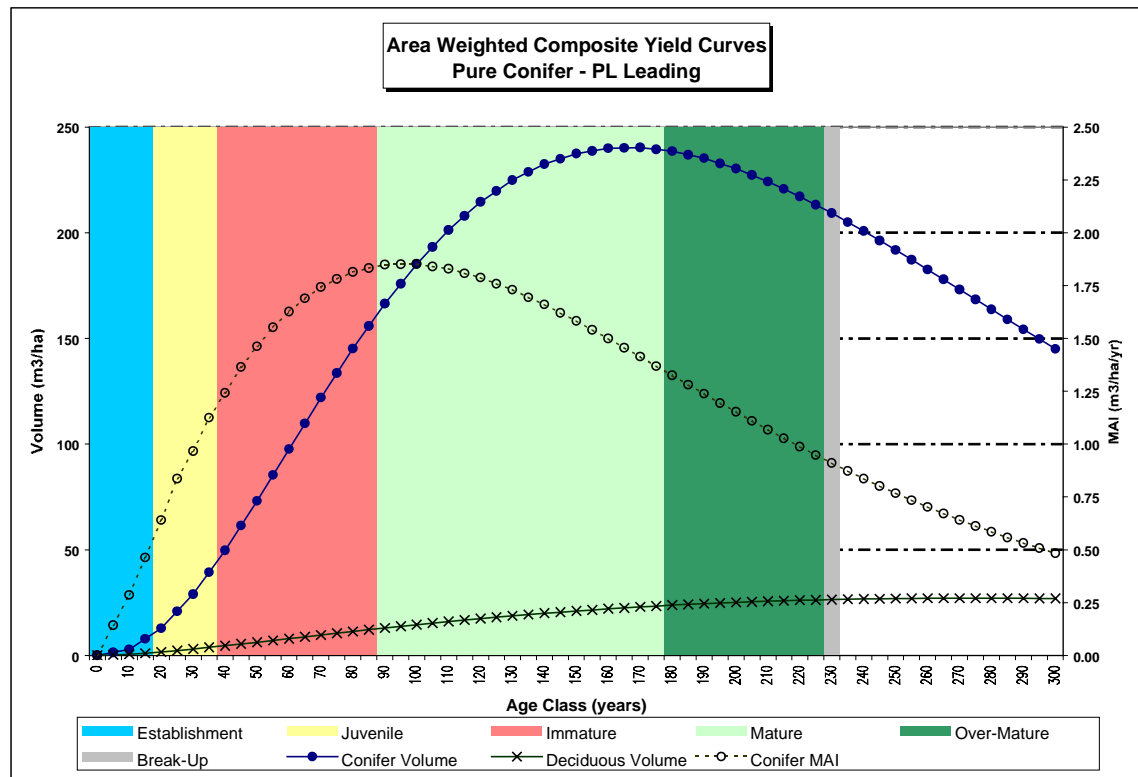
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Mature	Age from ten years prior to peak MAI to the age that stand volume begins to decline.
Over-Mature	Ages older than mature.

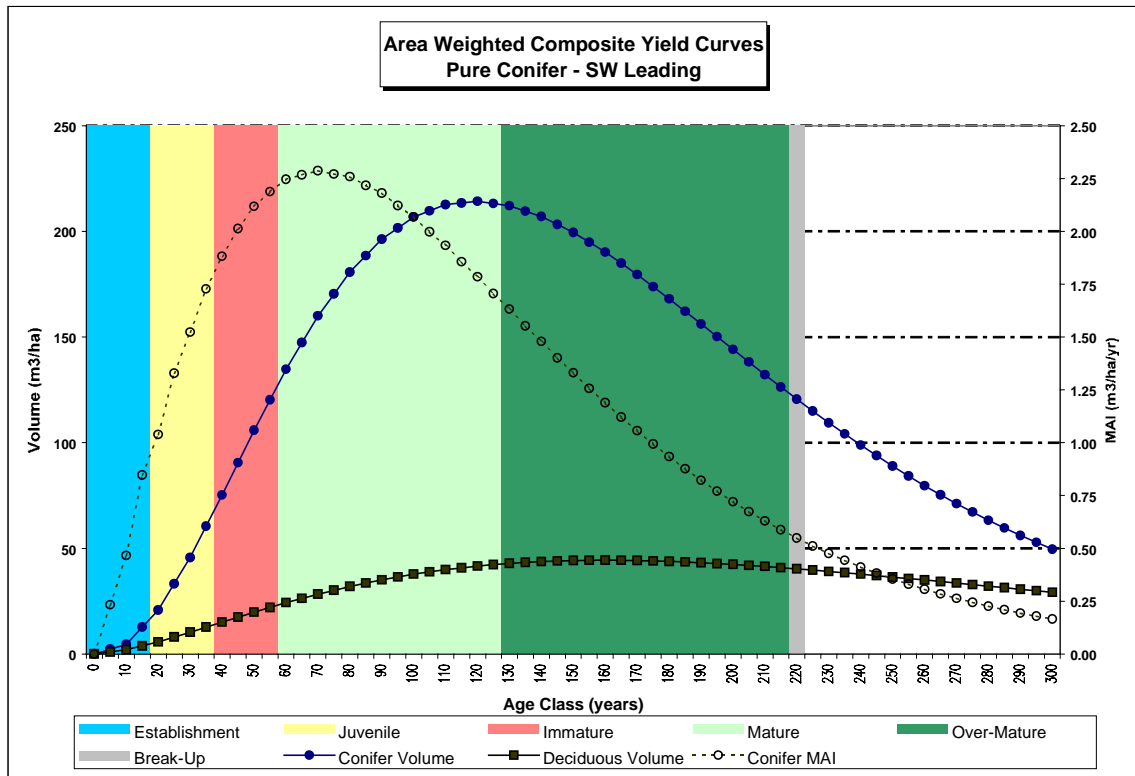
Cover Type Seral Stages

C-PL

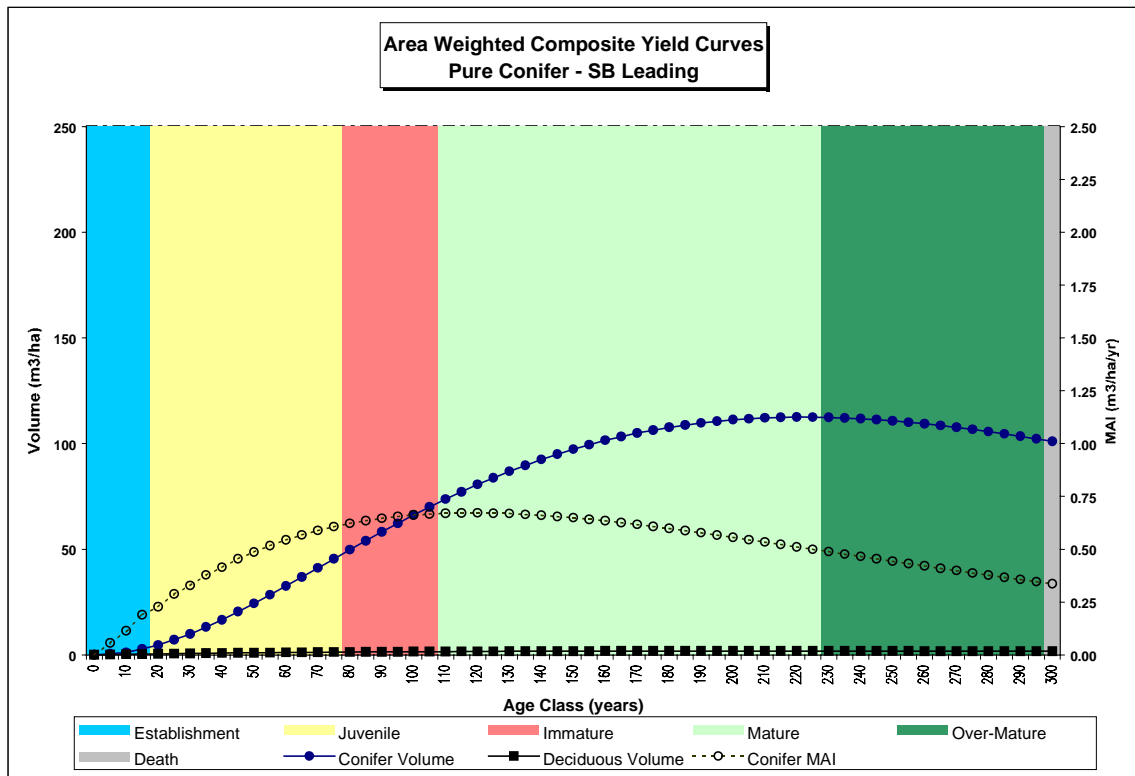


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C-SW

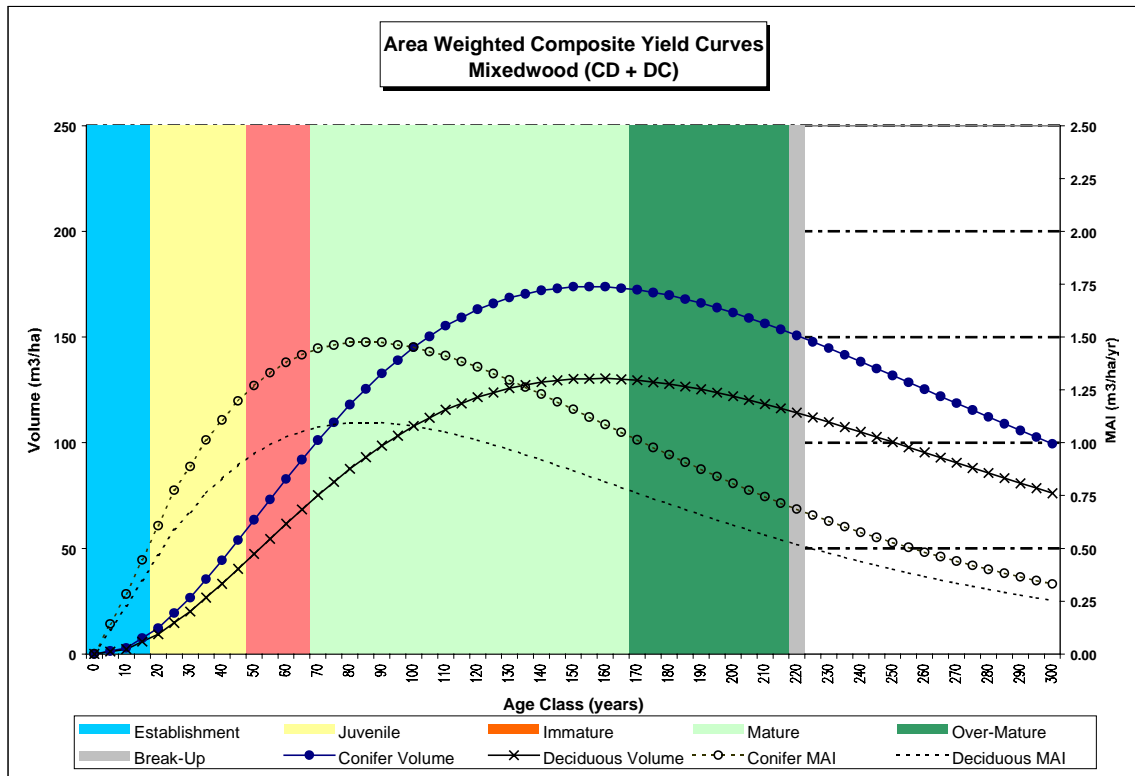


C-SB

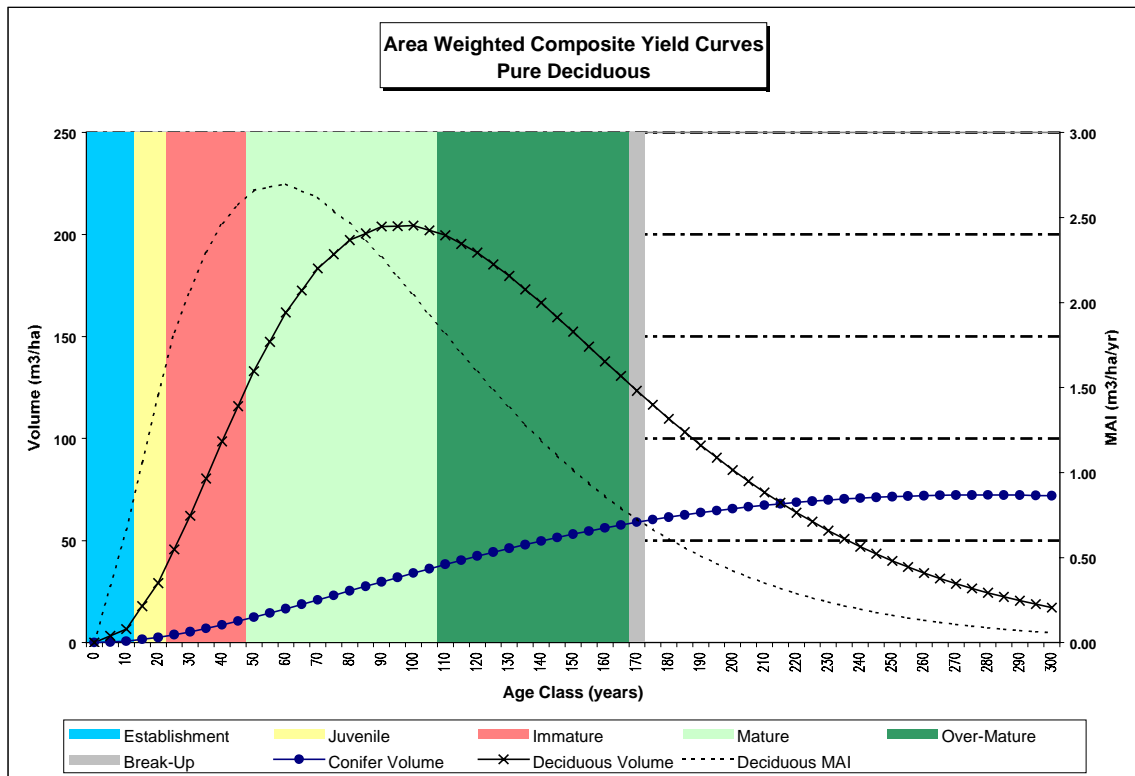


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MX



D



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Some general characteristics of each seral stage are described in the following table. Figure 4-4 provides a summary of the relative proportions of each seral stage in the landscape area.

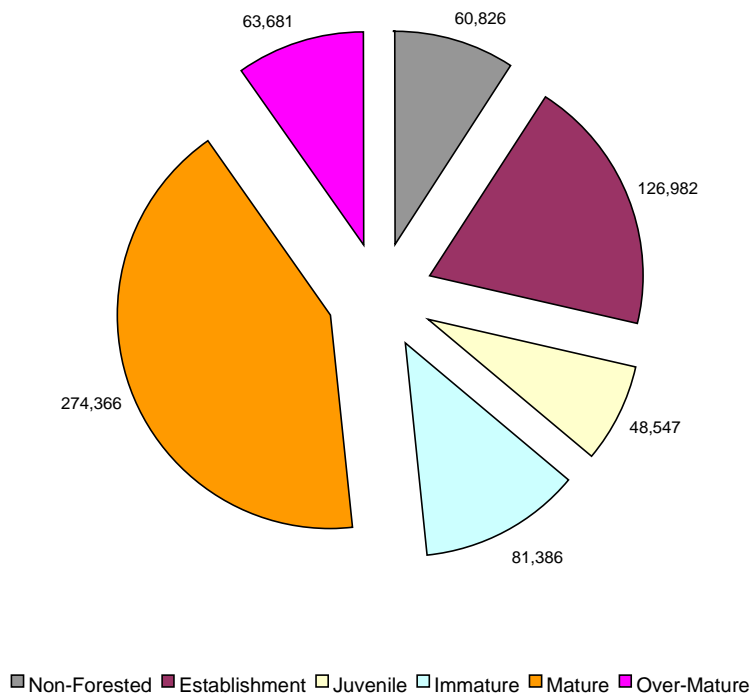
Table 4-8: Seral Stage Definitions

Seral Stage	Description	Pine	Pure Conifer Black Spruce	White Spruce	Mixedwood	Pure Deciduous
Establishment	Age Range	0-15 years	0-15 years	0-15 years	0-15 years	0-10 years
	Grass/Shrub content	Low to Medium	Low	Low to Medium	High	High
	Crown Closure	Low	Low	Low	Low	Low
	Height range	0.1-5 m	0.1-2 m	0.1-3 m	0.1-5 m	0.1-5 m
Juvenile	Age Range	16-39 years	16-79 years	16-39 years	16-49 years	11-29 years
	Grass/Shrub content	Low	Low	Medium	Medium	Medium
	Crown Closure	Low	Low	Low	High	High
	Height range	5-15 m	3-15 m	4-15 m	5-15 m	5-10 m
Immature	Age Range	40-89 years	80-109 years	40-59 years	50-69 years	30-49 years
	Grass/Shrub content	Low	Low	Low	Medium	Low
	Crown Closure	Medium	Medium	Medium	High	High
	Height range	15-20 m	15-18 m	15-20 m	15-20 m	10-20 m
Mature	Age Range	90-179 years	110-229 years	60-129 years	70-169 years	50-109 years
	Grass/Shrub content	Low	Low	Low	Low	Low
	Crown Closure	High	Medium	Medium	High	High
	Height range	20-25 m	18-20 m	20-25 m	20-25 m	20-25 m
Over Mature	Age Range	180+ years	230+ years	130+ years	170+ years	110+ years
	Grass/Shrub content	Low	Low	Low	Medium	Medium
	Crown Closure	High	Medium	Medium	Medium	Medium
	Height range	25+ m	20+ m	25+ m	25+ m	25+ m

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Figure 4-3: Seral Stage Distribution



Seral stage areas that currently exist within the landscape are summarized in the following table:

Table 4-9: Seral Stage Area Summary

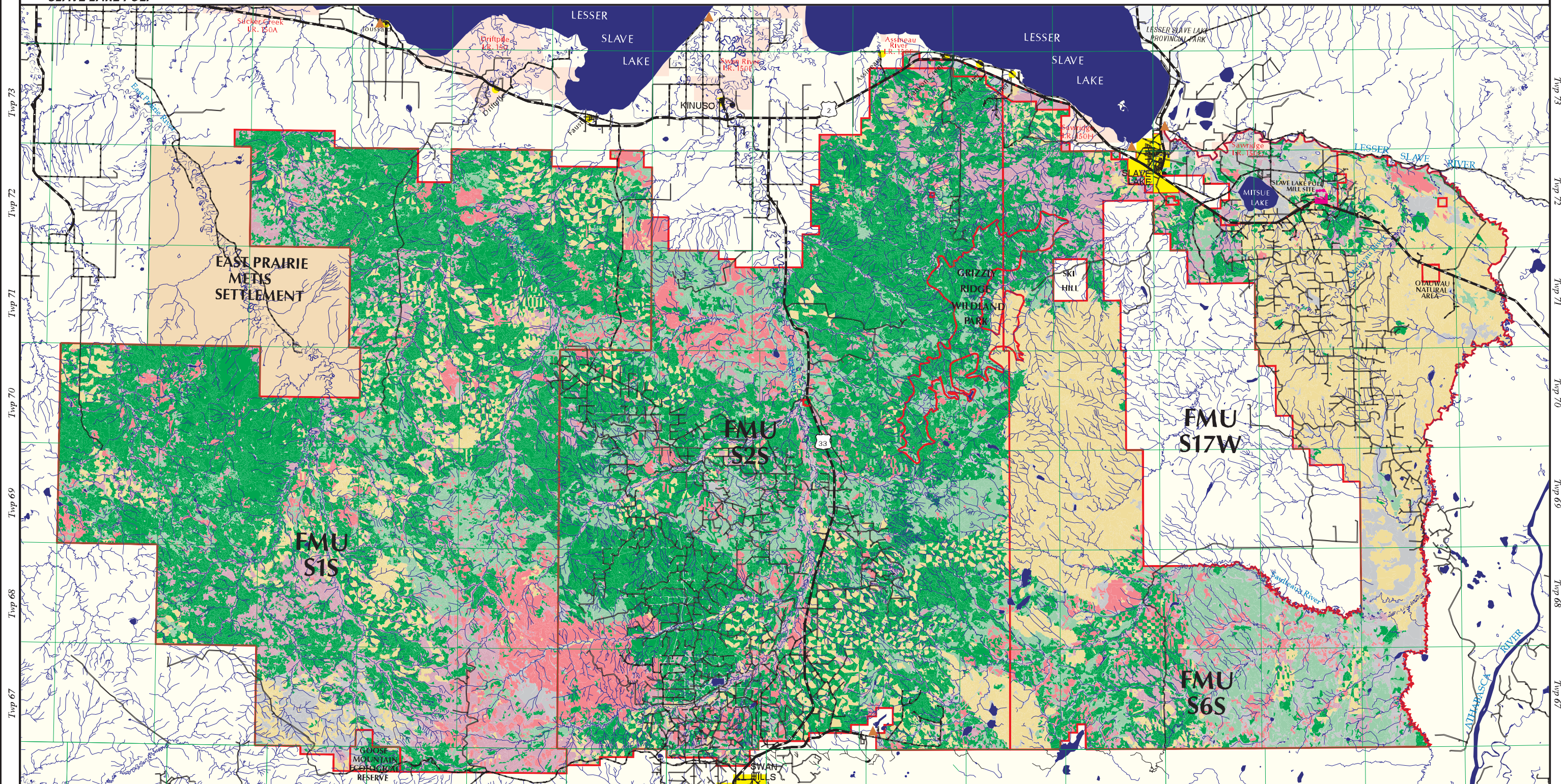
Seral Cover Type	Seral Stage	Mixedwood	Upper Foothills	Lower Foothills	Total
Non-Forested	N/A	23,395	13,129	24,301	60,826
C-PL Pure Conifer Pine Dominant	Establishment	299	20,160	18,048	38,507
	Juvenile	1,233	13,957	4,299	19,489
	Immature	97	16,965	9,923	26,986
	Mature	54	36,167	17,465	53,687
	Over-Mature	.	360	11	371
	Sub-Total	1,684	87,609	49,747	139,039
C-SB Pure Conifer Black Spruce Dominant	Establishment	13,575	3,117	12,783	29,475
	Juvenile	2,529	2,903	12,527	17,959
	Immature	2,684	3,790	8,881	15,355
	Mature	4,801	22,291	22,696	49,787
	Over-Mature	0	0	0	0
	Sub-Total	23,590	32,102	56,886	112,578
C-SW Pure Conifer	Establishment	2,186	1,467	8,790	12,442
	Juvenile	48	838	882	1,768

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Seral Cover Type	Seral Stage	Mixedwood	Upper Foothills	Lower Foothills	Total
White Spruce Dominant	Immature	58	257	1,324	1,640
	Mature	1,027	4,892	9,316	15,234
	Over-Mature	1,850	16,729	15,116	33,694
	Sub-Total	5,169	24,182	35,428	64,779
MX Mixedwood	Establishment	5,448	981	17,148	23,577
	Juvenile	1,875	994	5,953	8,821
	Immature	615	1,420	7,368	9,402
	Mature	5,311	5,210	37,572	48,094
	Over-Mature	84	8	370	462
	Sub-Total	13,332	8,612	68,411	90,355
D Pure Deciduous	Establishment	5,626	370	16,984	22,980
	Juvenile	56	104	350	510
	Immature	10,734	872	16,397	28,002
	Mature	11,472	4,071	92,021	107,564
	Over-Mature	4,465	1,005	23,685	29,154
	Sub-Total	32,352	6,422	149,437	188,211
Total		99,522	172,057	384,210	655,789

The spatial distribution of the seral stages across the landscape are presented on the following map.

SERAL STAGE DISTRIBUTION



PLANIMETRIC LEGEND

- | | | |
|----------------|---------------------|------------------------|
| Village/Hamlet | Perennial Stream | Towns |
| Campgrounds | Intermittent Stream | Parks |
| Paved Roads | Indefinite Stream | First Nations Reserves |
| Gravel Roads | Lakes/Major Rivers | Metis Settlements |
| Tertiary Roads | | |

SERAL STAGES

- | | | |
|---------------|----------|--------------|
| Establishment | Immature | Over Mature |
| Juvenile | Mature | Non Forested |

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4.4.5 Patch Characteristics

Patch characteristics for each cover type, and seral stages within each cover type, are summarized in this section. Three patch definitions have been defined and analyzed. Patches are contiguous areas of the same:

- ◆ Cover type
- ◆ Seral stage
- ◆ Cover type and seral stage combination

The distribution of patch sizes across the landscape is shown in Tables 4-10 to 4-12.

Table 4-10: Cover Type Patch Summary

Cover Type	Total area (ha)	Average size (ha)	Minimum size (ha)	Maximum size (ha)	Number of patches
Naturally Non-Forested	44,059 ⁸	15	0	5,699	2,907
Anthropogenic Non-Forested	12,193	25	0	5,934	496
Forested	594,962	647	0	196,987	919
Total	651,214				4,322
C-PL	139,039	50	0	19,782	2,769
C-SW	64,779	15	0	5,063	4,300
C-SB	112,578	25	0	3,511	4,507
MX	90,355	19	0	2,918	4,879
D	188,211	29	0	29,118	6,568
Forested Total	594,962				23,023

Table 4-11: Seral Stage Patch Summary

Seral Stage	Total area (ha)	Average size (ha)	Minimum size (ha)	Maximum size (ha)	Number of patches
Establishment	126,982	58	0	20,156	2,181
Juvenile	48,547	24	0	5,954	2,035
Immature	81,386	30	0	4,433	2,684
Mature	274,366	56	0	52,996	4,917
Over-Mature	63,681	19	0	3,546	3,427
Total	594,962				15,244

Table 4-12: Cover Type & Seral Stage Patch Summary

Cover Type	Seral Stage	Total area (ha)	Average size (ha)	Minimum size (ha)	Maximum size (ha)	Number of patches
C-PL	Establishment	38,507	29	0	8,882	1,330
C-PL	Juvenile	19,489	45	0	5,224	431
C-PL	Immature	26,986	35	0	3,006	780

⁸ Does not include 4,575 ha of water (lakes and rivers) but does include 1,167 ha of unclassified area in the Phase 3 portion of FMU S6.

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Cover Type	Seral Stage	Total area (ha)	Average size (ha)	Minimum size (ha)	Maximum size (ha)	Number of patches
C-PL	Mature	53,687	20	0	2,493	2,743
C-PL	Over-mature	371	11	0	152	35
C-SW	Establishment	12,442	9	0	436	1,439
C-SW	Juvenile	1,768	13	0	149	134
C-SW	Immature	1,640	8	0	53	214
C-SW	Mature	15,234	11	0	1,019	1,435
C-SW	Over-mature	33,693	14	0	2,976	2,472
C-SB	Establishment	29,475	28	0	2,253	1,066
C-SB	Juvenile	17,959	15	0	591	1,185
C-SB	Immature	15,355	18	0	1,042	842
C-SB	Mature	49,787	16	0	1,262	3,080
C-SB	Over-mature	0	0	0	0	0
MX	Establishment	23,577	9	0	983	2,541
MX	Juvenile	8,821	18	0	694	502
MX	Immature	9,402	11	0	230	849
MX	Mature	48,094	14	0	1,264	3,521
MX	Over-mature	462	7	0	123	63
D	Establishment	22,980	5	0	2,745	4,497
D	Juvenile	510	2	0	66	303
D	Immature	28,002	41	0	4,098	678
D	Mature	107,564	48	0	27,672	2,243
D	Over-mature	29,154	19	0	3,165	1,549
Total		594,959				33,932

4.4.6 Connectivity and Juxtaposition

Patch size and distribution are important characteristics that may influence ecosystem use and function. This is thought to be especially relevant in consideration of wildlife values. The edge-to-edge distance between similar patches and the existence of corridors between those patches may have a significant effect upon the value of the landscape for particular species. In addition, the proximity of varied ecotypes to each other may effect the level of use of portions of the landscape. The following tables summarize the connectivity and juxtaposition of cover type and seral stage patches within the landscape.

**Table 4-13: Cover Type Patch Connectivity
(nearest neighbour distance between similar patches)**

Cover Type	Average Distance (m)	Maximum Distance (m)
Naturally Non-Forested	244	2,624
Anthropogenic Non-Forested	518	3,454
Forested	40	480
C-PL	140	8,737
C-SW	224	4,668
C-SB	198	5,181
MX	181	5,009
D	162	6,278

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Table 4-14: Seral Stage Patch Connectivity
(nearest neighbour distance between similar patches)

Seral Stage	Average Distance (m)	Maximum Distance (m)
Establishment	169	7,515
Juvenile	294	11,592
Immature	245	6,295
Mature	98	6,768
Over-mature	231	5,839

Table 4-15: Cover Type & Seral Stage Patch Connectivity
(nearest neighbour distance between similar patches)

Cover Type	Seral Stage	Average Distance (m)	Maximum Distance (m)
C-PL	Establishment	153	3,827
	Juvenile	135	3,948
	Immature	213	5,941
	Mature	125	8,280
	Over-mature	671	3,966
C-SW	Establishment	218	4,200
	Juvenile	896	18,796
	Immature	925	7,685
	Mature	340	5,910
	Over-mature	220	4,352
C-SB	Establishment	104	2,538
	Juvenile	323	13,374
	Immature	312	5,651
	Mature	170	4,747
	Over-mature	N/A	N/A
MX	Establishment	207	7,512
	Juvenile	419	5,516
	Immature	509	13,877
	Mature	174	8,620
	Over-mature	2,641	19,616
D	Establishment	166	11,528
	Juvenile	3,329	15,590
	Immature	328	11,820
	Mature	139	5,501
	Over-mature	272	6,199

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Table 4-16: Cover Type Patch Juxtaposition
(percentage of edge adjacent to other cover types)

	C-PL	C-SW	C-SB	MX	D	Nat. Non-Forested	Anth. Non-Forested
C-PL		21%	42%	15%	11%	20%	28%
C-SW	16%		11%	19%	18%	13%	10%
C-SB	39%	14%		14%	13%	18%	20%
MX	15%	25%	15%		35%	15%	12%
D	12%	27%	16%	40%		31%	25%
Naturally Non-Forested	11%	9%	10%	8%	15%		5%
Anthropogenic Non-Forested	8%	4%	6%	4%	6%	3%	
Total	100%	100%	100%	100%	100%	100%	100%

Table 4-17: Seral Stage Patch Juxtaposition
(percentage of edge adjacent to other seral stages)

	Estab.	Juvenile	Immature	Mature	Over-Mature	Nat. Non-Forested	Anth. Non-Forested
Establishment		5%	4%	14%	8%	21%	24%
Juvenile	4%		17%	11%	7%	11%	7%
Immature	5%	28%		25%	9%	18%	12%
Mature	43%	38%	52%		63%	35%	44%
Over-Mature	11%	10%	8%	28%		12%	8%
Naturally Non-Forested	22%	14%	14%	12%	9%		5%
Anthropogenic Non-Forested	14%	4%	5%	8%	4%	3%	
Total	100%	100%	100%	100%	100%	100%	100%

4.4.7 Fragmentation

Forest fragmentation is defined as “the change in the forest landscape from extensive and continuous forest cover to a mosaic of smaller patches separated by open areas or very young stands of forest”⁹ (Dunster, 1996). Within the Slave Lake Pulp FMA there are two main man-caused activities that increase the fragmentation of the forest:

- ◆ *Oil and gas exploration – the establishment of road networks, seismic lines, pipelines and transmission lines has a significant impact on the fragmentation of the forest. These activities tend to create permanent breaks in the forest structure.*
- ◆ *Timber harvesting – the historical “cut-and-leave” pattern that was mandated for timber harvesting activities has contributed to the current landscape pattern. As forests regenerate and leave patches are harvested, the fragmentation of the area will be reduced.*

⁹ Dunster, J and Dunster, K. 1996. Dictionary of Natural Resource Management. UBC Press, 6344 Memorial Rd., Vancouver, B.C.

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Forest fragmentation has become more prevalent on the landscape over the past several decades. The fragmentation of the forest has both positive and negative effects on all forest resource users. For example, a "fragmented" forest may be more accessible thereby creating more potential for recreational use. However, some wildlife species, with a preference for more contiguous types, may prefer less fragmented forest areas. Forest fragmentation also occurs naturally as a result of disturbances or by permanent landscape features (i.e. topography).

4.4.8 Disturbance and Succession Patterns

Wildfire is the most predominant historical natural disturbance event that occurs on the landscape. The impact of these events have varied with weather conditions and the success of fire suppression activities.

Insects and diseases have not been a significant threat to the FMA historically, however, monitoring programs are under development, which will allow us to become aware of changes to this risk potential.

4.4.8.1 Fire History Characteristics

The results of a review of the historical fire occurrence (1971 to 2000) in the FMA area is presented in the following graphs. The information presented in this section was obtained from the Forest Protection Division of Alberta Sustainable Resource Development¹⁰. Upon review of the data the following observations can be made:

- 1) *Significant fire events occur on the landscape.*
- 2) *The annual area burned varies dramatically on the landscape. Over the past 30 years the area burned has ranged from 0 hectares to over 90,000 hectares. Approximately 8950 hectares burn every year in the general vicinity of the FMA area.*
- 3) *The number of fires that occur on the landscape is quite consistent. Annually, an average of 30 fires per year occur in the area, ranging from 3 to 99 fires over the past 30 years. The average fire size has been approximately 295 hectares.*

¹⁰ Fires within the range of latitude 54.75 to 55.25 and longitude of -114.25 to -116.5.

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Figure 4-4: Historical Fires in the FMA Area – Area Burned

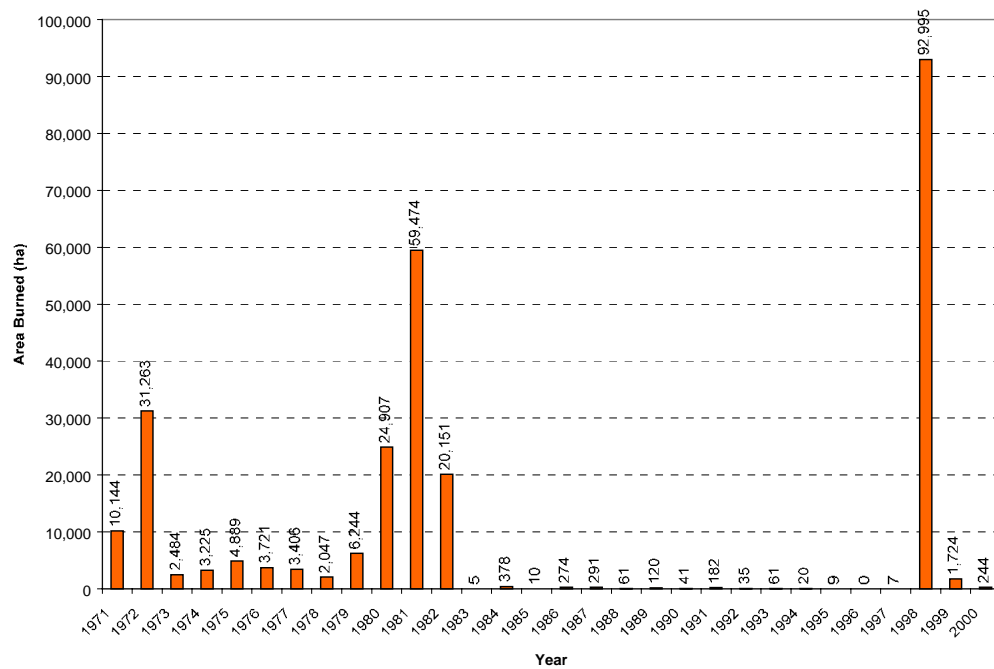
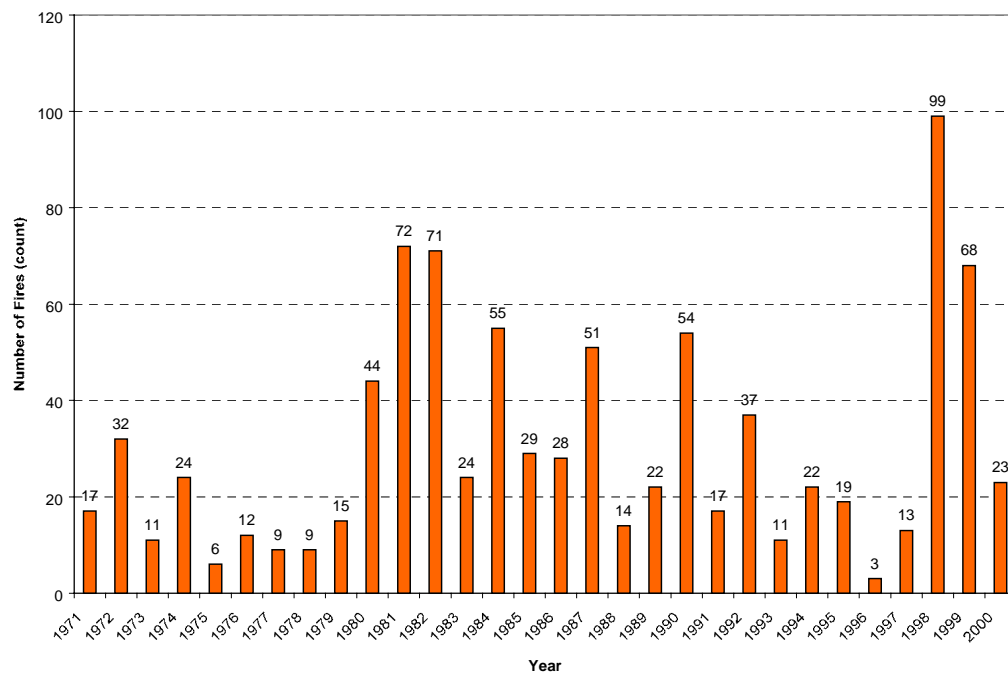


Figure 4-5: Historical Fires in the FMA Area – Number of Fires



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Historical fire weather information, from 1990 to 2001 is presented in the following tables¹¹.

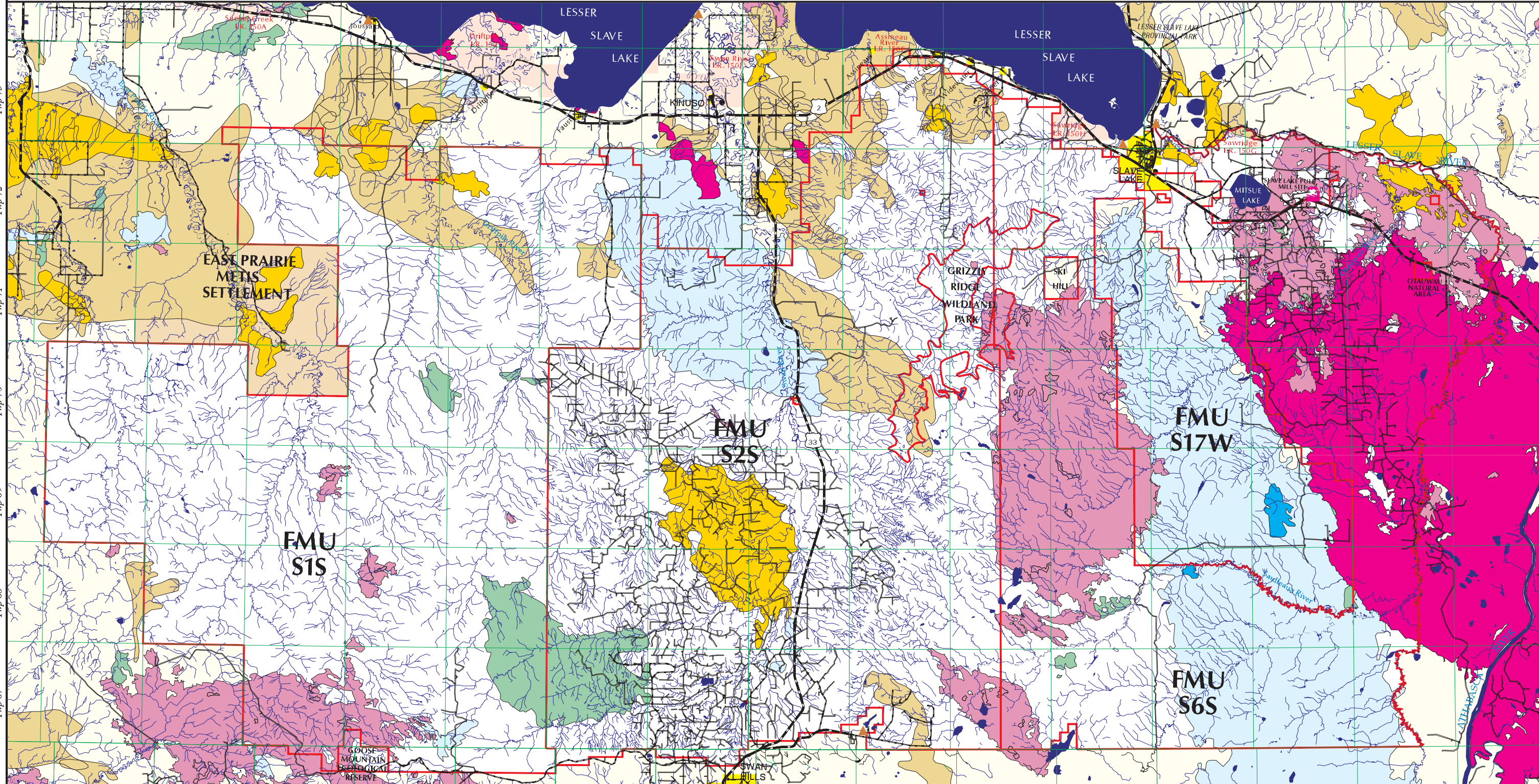
Table 4-18: Historical Fire Weather Data

Year	April	May	June	July	August	September
Fire Weather Index						
1990	0.4	5.8	5.2	5.7	9.4	8.2
1991	6.2	7.2	2.8	5.6	6.8	1.6
1992	3.3	5.8	6.4	2.6	8.4	0.8
1993	3.0	8.9	8.0	0.3	2.9	2.6
1994	10.5	7.1	3.4	3.1	3.5	7.8
1995	N/A	9.3	6.4	0.9	1.9	12.5
1996	N/A	2.6	2.2	1.9	3.5	0.8
1997	N/A	2.2	2.6	4.5	4.3	5.1
1998	7.5	13.5	8.2	5.5	14.5	11.1
1999	6.0	9.6	7.7	9.1	10.4	7.5
2000	7.2	2.8	5.5	2.4	2.6	4.1
2001	18.0	14.1	4.0	2.9	8.5	11.4
Average Temperature (°C)						
1990	3.79	11.11	14.77	17.50	16.50	14.46
1991	8.20	12.20	13.29	17.79	19.44	10.97
1992	8.65	9.77	15.99	15.72	15.66	6.65
1993	6.02	12.57	13.77	13.93	15.27	12.12
1994	7.13	11.37	13.92	17.35	16.85	15.43
1995	N/A	11.89	15.62	15.05	12.64	15.26
1996	N/A	5.63	12.43	15.33	16.55	9.30
1997	N/A	9.08	13.61	16.60	16.50	14.53
1998	9.49	16.19	15.24	18.02	19.60	12.59
1999	7.95	10.01	13.12	14.62	17.71	12.30
2000	6.54	6.79	13.12	16.46	13.58	10.89
2001	7.83	10.70	13.23	16.04	18.75	12.31
Average Drought Code¹²						
1990	15	85	107	141	243	161
1991	83	72	101	131	193	231
1992	27	84	107	149	222	180
1993	105	121	174	65	101	97
1994	34	69	68	44	114	216
1995	N/A	172	181	110	95	182
1996	N/A	31	25	31	45	87
1997	N/A	76	74	76	122	243
1998	32	145	210	146	302	378
1999	157	197	232	259	308	327
2000	235	186	156	107	120	107
2001	181	195	184	129	130	282

¹¹ Data obtained from daily (PM) weather observations provided by Forest Protection Division. Observations were recorded at Deer Mountain (DM), Flat Top (FT), Goose Mountain (GM), House Mountain (HM) and Sauleteux Auto (S1) weather stations.

¹² Drought code is an index of the moisture content of coarse woody fuels and deep soils (high values indicate low moisture levels, 300 is considered a high value).

FIRE HISTORY BY DECADE



PLANIMETRIC LEGEND

- | | | |
|----------------|---------------------|------------------------|
| Village/Hamlet | Perennial Stream | Towns |
| Campgrounds | Intermittent Stream | Parks |
| Paved Roads | Indefinite Stream | First Nations Reserves |
| Gravel Roads | Lakes/Major Rivers | Metis Settlements |
| Tertiary Roads | | |

"E" CLASS FIRE HISTORY BY DECADE

- | | | | |
|--------|--------|--------|--------|
| 1930'S | 1950'S | 1970'S | 1990'S |
| 1940'S | 1960'S | 1980'S | 2000'S |

* Most recent burn shown where overlap exists

* Data source: Lands and Forest Division of Alberta Sustainable Resource Development

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4.4.8.2 Insect and Disease

The Slave Lake Pulp FMA has a wide range of tree species and age classes. Due to this wood profile, many insects and diseases are found in endemic populations on a yearly basis. Following is a list of the most prevalent insects and diseases that occur on the FMA. Although other forest pests may be found on the FMA, this table identifies the pests that may have a significant impact on commercial tree species.

Table 4-19: Forest Pests

Forest Pests	Description	Historical Occurrence	Potential Impact	Potential Forest Management Implications
Forest Tent Caterpillar (<i>Malacosoma disstria</i>)	Target Species: Trembling Aspen & Balsam Poplar Target Species Age Range: All Feeds on: Leaves	Reoccurring on FMA	High	Lower growth & yield, Possible mortality of trees
Large Aspen Tortrix (<i>Choristoneura conflictana</i>)	Target Species: Trembling Aspen Target Species Age Range: All Feeds on: Leaves	Reoccurring on FMA	High	Lower growth & yield, Possible mortality of trees
Spruce Budworm (<i>Choristoneura fumiferana</i>)	Target Species: White Spruce, Balsam Fir & Black Spruce Target Species Age Range: All Feeds on: Needles	No major outbreaks noted	High	Lower growth & yield, Possible mortality of trees
Spruce Beetle (<i>Dendroctonus rufipennis</i>)	Target Species: White Spruce Target Species Age Range: mid to old age Feeds on: under the bark	Reoccurring on FMA	High	Mortality, Reduces length of merchantability, Wood quality
Bruce Spanworm (<i>Operophtera bruceata</i>)	Target Species: Trembling Aspen Target Species Age Range: All Feeds on: Leaves	Reoccurring on FMA	Med	Lower growth & yield, Possible mortality of trees
White Pine Weevil (<i>Pissodoes strobi</i>)	Target Species: White Spruce Target Species Age Range: Young Stands Feeds on: Terminal leaders	No major outbreaks noted	Medium	Lower growth & yield, Reduced wood quality (deformed stems)
Twig Blight (<i>populus spp.</i>)	Target Species: Trembling Aspen & Balsam Poplar Target Species Age Range: Young Stands Effects: Terminal leaders	Reoccurring on FMA	Medium	Lower growth & yield
Armillaria (<i>Ostoyae sinipina</i>)	Target Species: Lodgepole pine and white spruce Target Species Age Range: All ages Effects on: Infection of roots and lower stems	No major outbreaks noted	Low	Regeneration Success Growth Loss Mortality

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Forest Pests	Description	Historical Occurrence	Potential Impact	Potential Forest Management Implications
Western Gall Rust (<i>Pinus spp.</i>)	Target Species: Lodgepole pine and Jack pine Target Species Age Range: Young Stands Effects on: Fungus attacks new leader growth	Reoccurring on FMA	Low	Reduced wood quality (deformed stems)
Root Collar Weevil (<i>Hylobius warreni</i>)	Target Species: Lodgepole pine, Jack pine and white spruce Target Species Age Range: Young Stands Feeds on: Roots	No major outbreaks noted	Low	Lower growth & yield, Regeneration Success
Tomentosus root and butt rot (<i>Inonotus tomentosus</i>)	Target Species: Spruce, Pine, Aspen, Balsam Poplar Target Species Age Range: all ages Effects: Lower stem, inside bark	No major outbreaks noted	Low	Lower growth & yield, Mortality
Dwarf Mistletoe (<i>Arceuthobium americanum</i>)	Target Species: Lodgepole pine, Jack pine Target Species Age Range: All ages Effects: Leaves/branches	No major outbreaks noted	Low	Lower growth & yield, Mortality
Black Army Cutworm (<i>Actebia fennica</i>)	Target Species: Coniferous and deciduous trees Target Species Age Range: Young Stands Feeds on: Leaves	Found on FMA after 1998 and 2001 Fires	Low	Restrictions to viable regeneration practices

4.4.8.3 Water Disturbances

Water flow in the region is strongly influenced by snowmelt runoff, but seasonal hydrographs are not snowmelt-dominated with a single maximum peak with spring runoff. In some years snowmelt is prominent and in other years minor when compared to overall total flow. Summer flows in the region are very responsive to rainfall (often peaking within 24-48 hours) and are characterized by numerous sharp, well pronounced peak flows in response to summer precipitation. In late summer and fall, flow decreases steadily into the winter to minimum flows in late February or early March. Ninety five percent of annual flows occur from April to October on average, with the remaining flow occurring during the winter months.

Maximum daily flows are usually generated more by summer rainfall than snowmelt runoff in the region. Probabilities of maximum flows for major drainages in the region show 2-year return period events ranged from 23 m³/sec for medium basins (< 200 km²) to 187 m³/sec for a larger basin (1900 km²).

Water balance analysis for selected basins indicated that annual flow accounts for about 30% to 40% of annual precipitation and evapotranspiration the remaining 60% to 70%. This relatively high proportion of runoff suggests a low level of water storage in the basins, which is consistent with rapid response to rainfall and observations of highly fluctuating flows.

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4.4.8.4 Other Natural Disturbances

Wind is another natural disturbance agent that occurs in the landscape area. The impacts are difficult to assess given that the disturbances occur, to some degree, across the entire area every year. Significant damage may occur to standing timber, especially in areas that have been exposed as a result of industrial activities. Soil moisture conditions also play a role in the impact of the wind disturbance. When severe wind events coincide with wet soil conditions, shallow-rooted species such as white spruce, black spruce and birch are more vulnerable to blowing down.

4.4.9 Timber Harvesting and Access

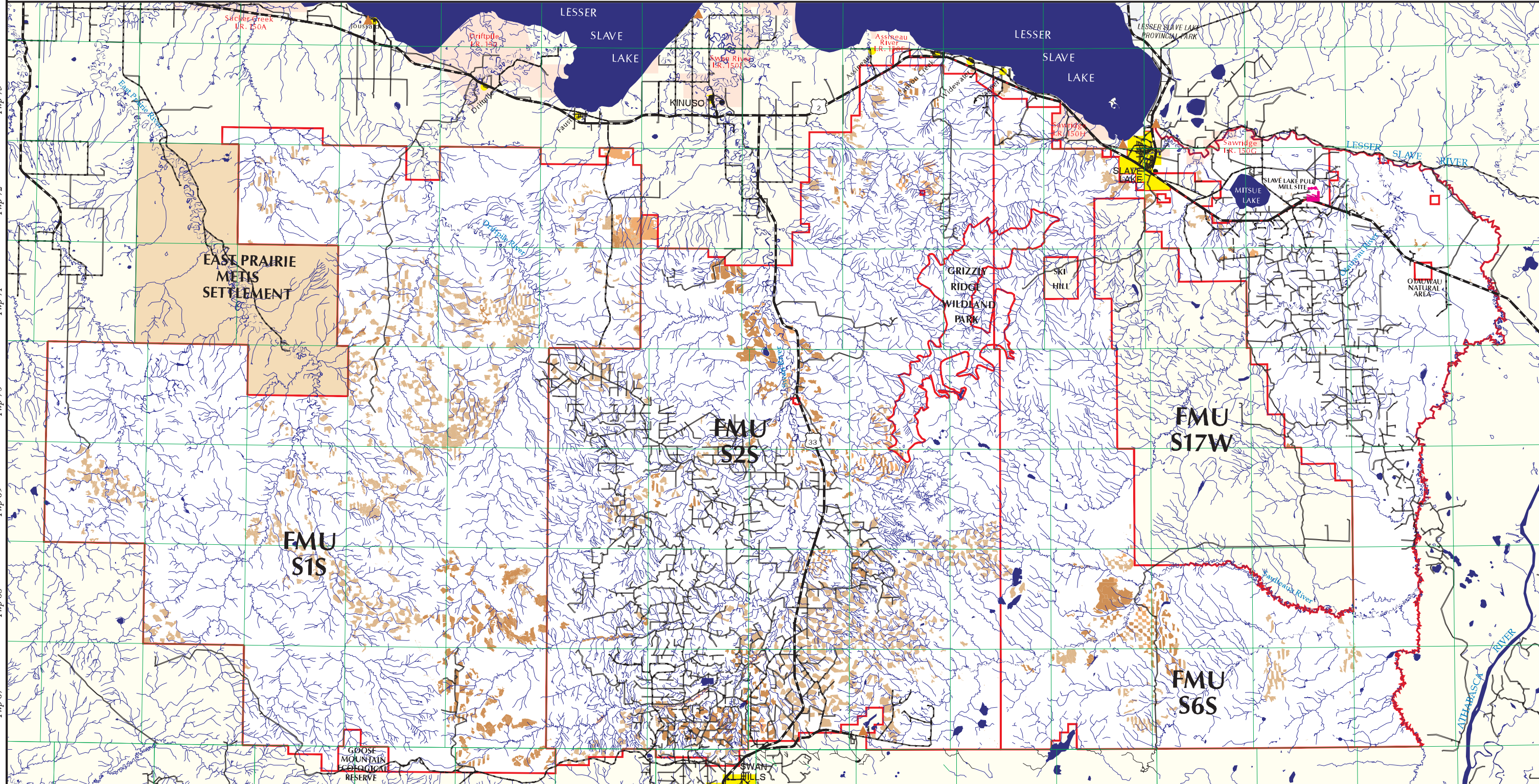
4.4.9.1 Historical Patterns of Harvesting

Harvesting has occurred on the landscape for several decades. Industrial harvest of the forest resource has been prevalent on the landscape since the mid-1900's. The harvest patterns that currently exist on the landscape are consistent with the mandate and goals of the provincial forestry regulators. The following map illustrates the historical harvest patterns on the landscape.

A few observations can be made upon review of the historical harvest pattern:

- ◆ *Harvest activities have been somewhat concentrated.*
- ◆ *Harvest mandate was successfully implemented on the ground.*
- ◆ *Many regions of the FMA have had little or no timber harvesting.*
- ◆ *Salvage operations related to wildfires have had a significant impact on the location, timing and severity of the recent harvest activities.*

HISTORICAL HARVEST PATTERN



PLANIMETRIC LEGEND

- | | | |
|----------------|---------------------|------------------------|
| Village/Hamlet | Perennial Stream | Towns |
| Campgrounds | Intermittent Stream | Parks |
| Paved Roads | Indefinite Stream | First Nations Reserves |
| Gravel Roads | Lakes/Major Rivers | Metis Settlements |
| Tertiary Roads | | |

CUTBLOCK AGE CLASS

- | | |
|---------|---------|
| 0 - 15 | 31 - 45 |
| 16 - 30 | 46 + |

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4.4.10 Access Patterns

Access routes within the FMA were developed to address two primary needs:

- ◆ *Major thoroughfares (Highway 2 and 33) to facilitate travel between communities.*
- ◆ *Access to specific areas, predominantly for resource extraction industries. These features will range in landbase impact from permanent, year-round roads to temporary exploratory seismic lines. This full range of features allows access, in one form or another, into many regions of the landscape.*

The general overview map on page 4-2 illustrates the current pattern of access features on the landscape.

4.4.11 Non-Timber Resource Extraction Industries

Several non-timber resource extraction industries exist on the FMA area. The most prevalent of these industries is oil and gas. Other industries including surface material extraction (e.g. gravel pits), trapping, hunting, fishing and tourism are also present throughout the management area. The map on the following page illustrates the location of some of these industries.

4.4.12 Historical Land Use - 1912 Dominion of Canada Report

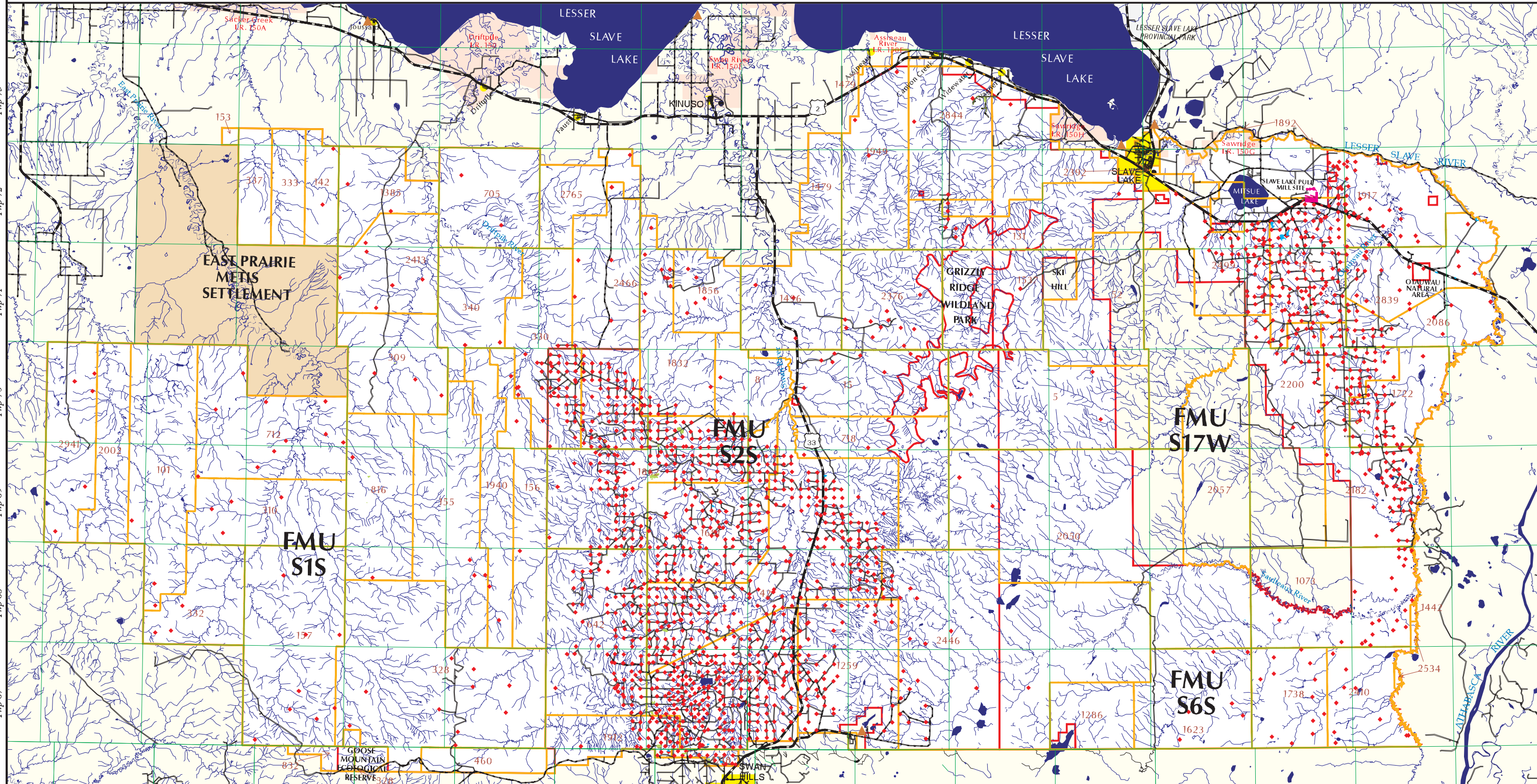
A copy of a report prepared for the Dominion of Canada in 1912 which describes the "Slave Lake Forest Reserve" is presented in Appendix F.

The document provides a unique summary of the forest conditions within the general vicinity of the Slave Lake Pulp FMA as it existed 90 years ago. With the exception of the introduction of industrial activity, the historical conditions appear to be quite similar to what we see today.

NON-TIMBER RESOURCE EXTRACTION INDUSTRIES



Scale = 1:375 000

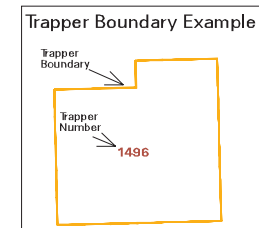


PLANIMETRIC LEGEND

- | | | |
|----------------|---------------------|------------------------|
| Village/Hamlet | Perennial Stream | Towns |
| Campgrounds | Intermittent Stream | Parks |
| Paved Roads | Indefinite Stream | First Nations Reserves |
| Gravel Roads | Lakes/Major Rivers | Metis Settlements |
| Tertiary Roads | | |

NON-TIMBER RESOURCE EXTRACTION INDUSTRIES

- | |
|-----------------|
| Wellsite |
| Gravel Pit |
| Industrial Site |



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4.4.13 Hazard Assessments

Wildfire is the most significant threat to the forest resource in the FMA. As a result, the potential disturbance is explored further in this section. Additional threats including insect, disease, water and wind disturbances do exist, however the potential for serious forest management implications are less significant.

4.4.13.1 Wildfire Threat Assessment

The wildfire threat has been assessed by evaluating several common elements including fire behavior potential, fire occurrence risk, values at risk, barriers to fire spread and fire suppression resources. Each of these components of the risk assessment are described in detail in this section. Maps illustrating these features are presented in the following pages.

Fire Behavior Potential

An assessment of the landscape area indicates that, despite the recent major fire events, a significant wildfire threat still exists. A majority of the FMA is covered by the highly volatile O1 (grass) fuel type or extremely intense C2 (boreal spruce) fuel type. In addition, these two fuel types are inter-mixed in the FMA, creating a dangerous combination of these fuels in close proximity to each other. These fuel classes were calculated using Alberta government software (AVI2FBP). The classes are consistent with the Canadian Forest Fire Behavior Prediction System fuel types.

Table 4-20: FBP Fuel Types

FBP Fuel Type	Description	Percent of Area
C1	Spruce-Lichen Woodland	0.9%
C2	Boreal Spruce	27.9%
C3	Mature Lodgepole Pine	5.9%
C4	Immature Lodgepole Pine	3.1%
C7	Ponderosa Pine/Douglas Fir	0.0%
D1	Leafless Aspen	27.0%
M1	Boreal Mixedwood – Leafless	7.5%
NF	Non-Fuel	2.9%
O1a	Matted Grass	24.4%
WA	Water	0.4%
	Total	100.0%

Fire Occurrence Risk

Fires causes can be grouped into two categories:

- ♦ *Lightning-caused – Approximately 70% of all forest fires are caused by lightning strikes. Fires started by lightning are unavoidable and unpredictable.*
- ♦ *Man-caused – The remaining 30% of fires are caused by man. Many of these fires are avoidable. Examples of man-caused forest fires include trees falling across power lines, abandoned camp fires and exposure of volatile fuels (i.e. grass) to hot exhaust pipes.*

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Values at Risk

Several values are at risk to wildfire within the FMA. The creation of a comprehensive database of known values at risk, prior to wildfire ignition, would greatly facilitate the efficient allocation of fire suppression resources. The Slave Lake Pulp FMA area has been identified as one of the largest regions of northern Alberta with very high values at risk. The protection of human life is the highest value at risk in any fire suppression operation. The FMA boundary is in close proximity to many permanent residences in several towns and hamlets, Indian reserves, Metis settlements, acreages and farms. Additionally, individuals may be at the many industrial sites and campgrounds (including the roads required to access to them) at any given time.

The stability of the watersheds of the north slopes of the Swan Hills is a unique value that sets the area apart from other regions in northern Alberta. In addition, the significant investments made in the forest resource provide increased values that require serious consideration in the prioritization of suppression activities.

Barriers to Fire Spread

Many features, both natural and man-made, exist that will act as barriers to fire spread. These include the following:

- ◆ *Lakes, rivers, streams*
- ◆ *Roads, seismic lines, pipelines, transmission lines and other man-made clearings*
- ◆ *Pure deciduous stands*
- ◆ *Slope and topography.*

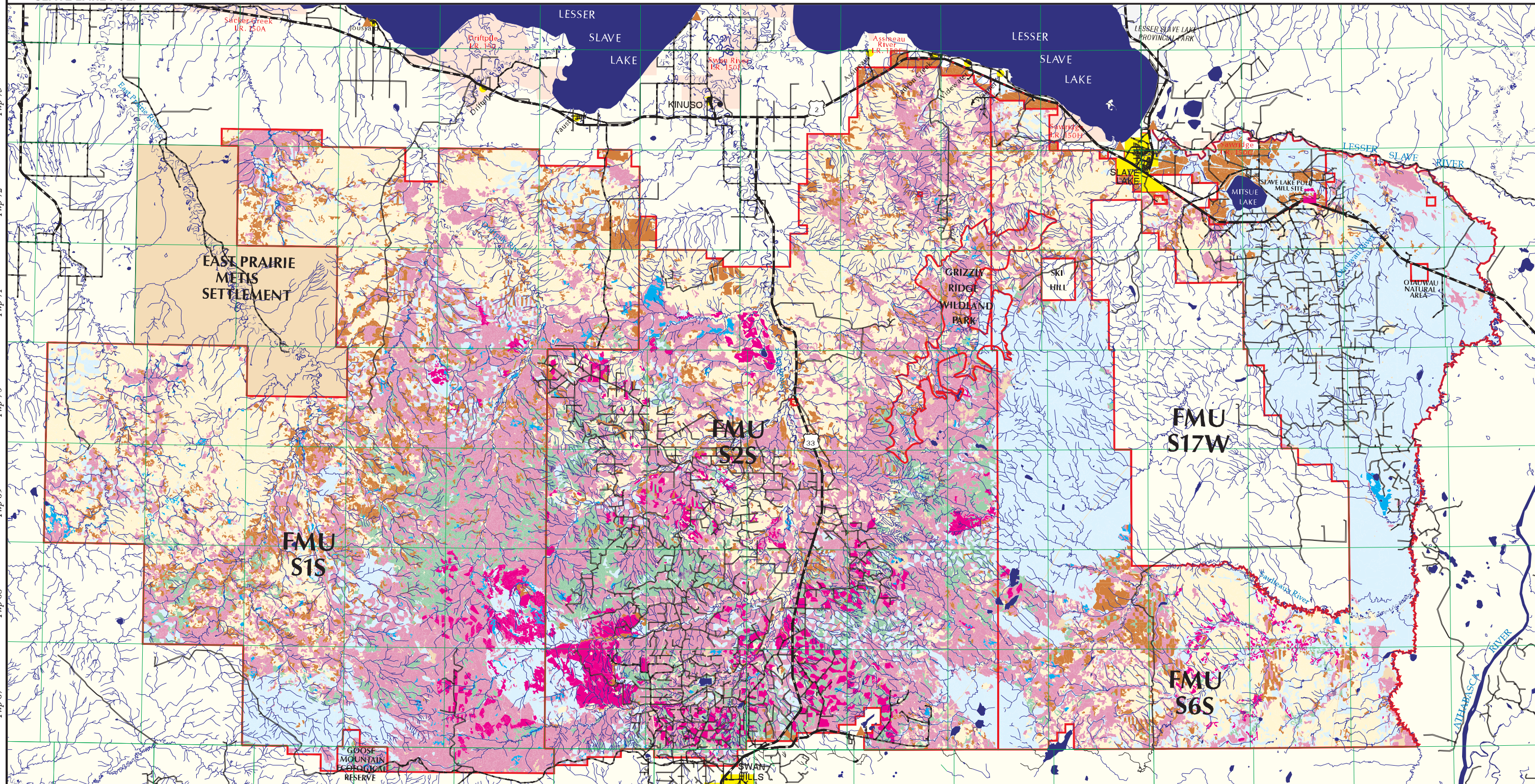
Suppression

Many forest fire suppression resources exist in the FMA. These would include features such as lookout tower locations, fuel caches, staging camps and approved water-bomber lakes. Alberta Sustainable Resource Development has the mandate of undertaking fire suppression activities. As a result, the department has significant resources at its disposal for the detection and suppression of forest fires.

FIRE BEHAVIOR POTENTIAL



Scale = 1:375 000



PLANIMETRIC LEGEND

- | | | |
|----------------|---------------------|------------------------|
| Village/Hamlet | Perennial Stream | Towns |
| Campgrounds | Intermittent Stream | Parks |
| Paved Roads | Indefinite Stream | First Nations Reserves |
| Gravel Roads | Lakes/Major Rivers | Metis Settlements |
| Tertiary Roads | | |

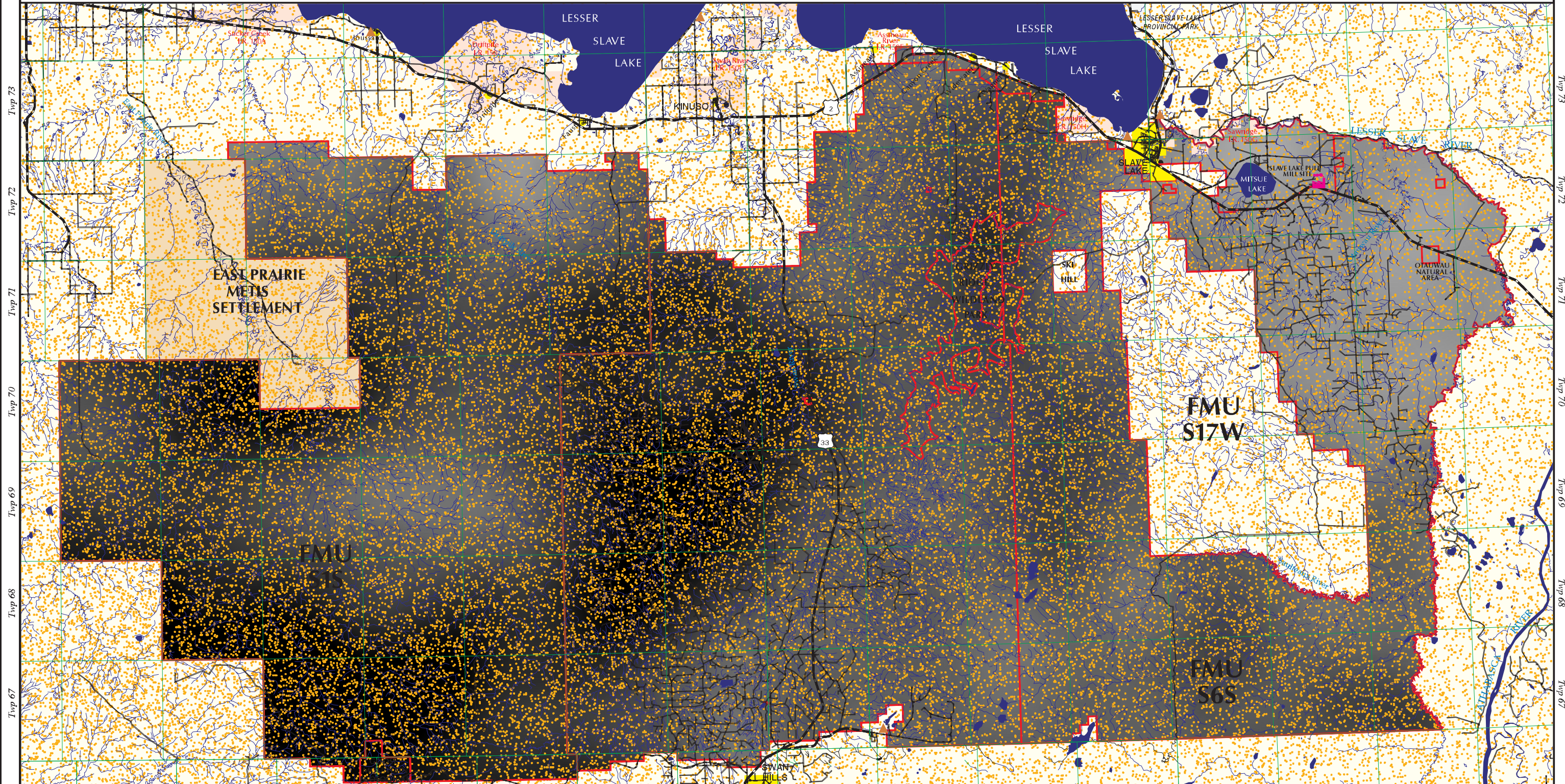
FUEL TYPES

- | | | |
|--|---|----------|
| Fuel Type C-1
Spruce/Lichen Woodland | Fuel Type C-7
Ponderosa Pine-Douglas Fir | Non-Fuel |
| Fuel Type C-2
Boreal Spruce | Fuel Type D-1
Leafless Aspen | |
| Fuel Type C-3
Mature Jack or Lodgepole Pine | Fuel Type M-1
Boreal Mixedwood-leafless | |
| Fuel Type C-4
Immature Jack or Lodgepole Pine | Fuel Type O-1
Matted Grass | |

* All recent cutblocks less than 10 years old
classified as matted grass fuel type
* All cutblocks greater than 10 years old
classified as per the DFMP regeneration assignments



DISTRIBUTION OF LIGHTNING STRIKES (1992-1995)



PLANIMETRIC LEGEND

- | | | |
|--|---|---|
| ● Village/Hamlet | — Perennial Stream | Towns |
| ▲ Campgrounds | — Intermittent Stream | Parks |
| — Paved Roads | --- Indefinite Stream | First Nations Reserves |
| --- Gravel Roads | █ Lakes/Major Rivers | Metis Settlements |
| --- Tertiary Roads | | |

DENSITY OF LIGHTNING EVENTS

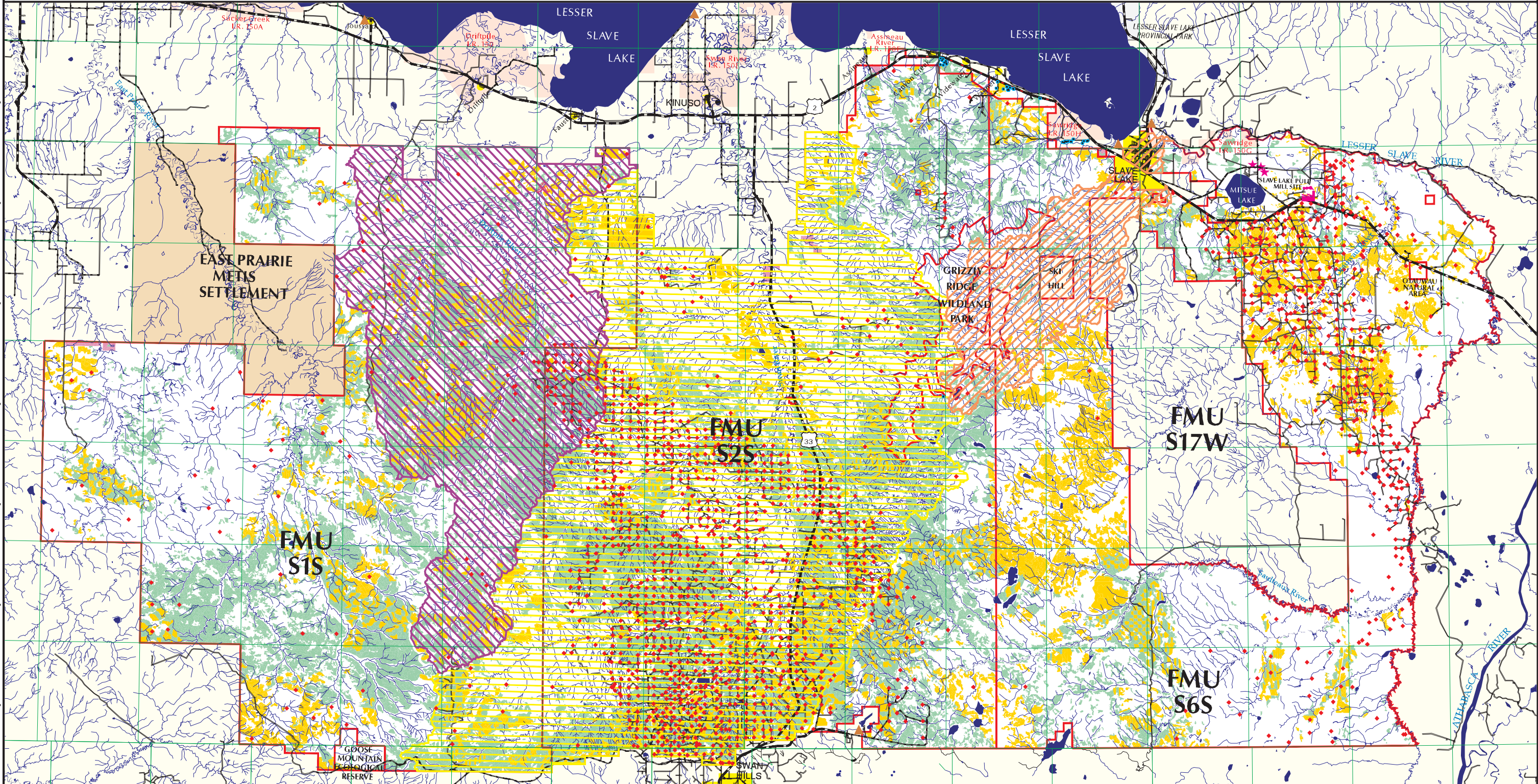


Lightning Strike Data Provided by:
Provincial Forest Fire Center
10th Floor, 9920 - 108th Street
Edmonton, Alberta
T5K 2M4

VALUES AT RISK



Scale = 1:375 000



PLANIMETRIC LEGEND

- | | | |
|------------------|-----------------------|--------------------------|
| ● Village/Hamlet | — Perennial Stream | ■ Towns |
| ▲ Campgrounds | — Intermittent Stream | ■ Parks |
| — Paved Roads | — Indefinite Stream | ■ First Nations Reserves |
| — Gravel Roads | ■ Lakes/Major Rivers | ■ Metis Settlements |
| — Tertiary Roads | | |

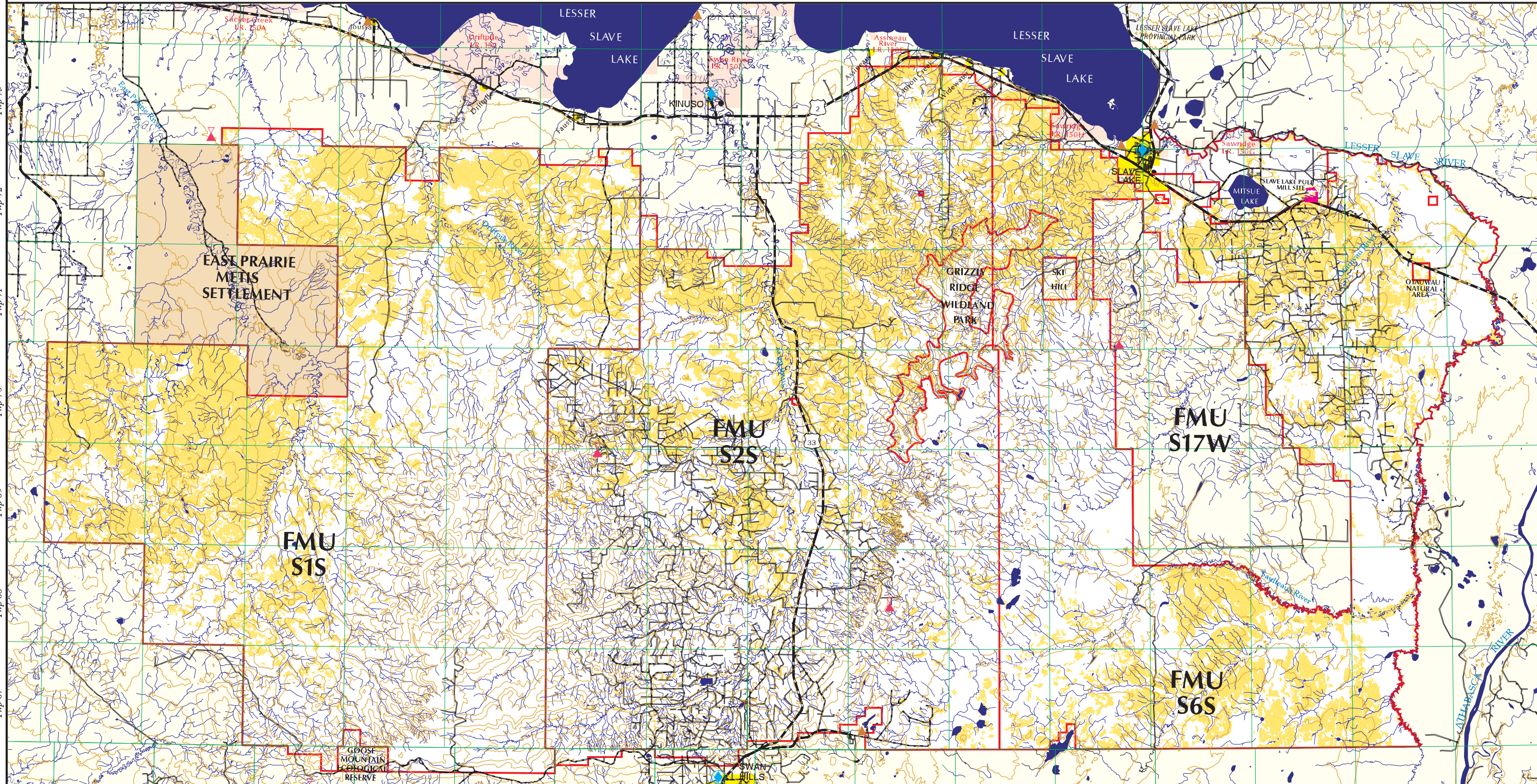
VALUES AT RISK

- | | | |
|------------------|------------------------|----------------------------|
| ◆ Wellsites | ■ Industrial Sites | ■ Swan River Major Basin |
| ● Acreages/Farms | ■ Mature Timber | ■ Driftpile Major Basin |
| ▲ Trapper Cabins | ■ Cutblocks | ■ Sawridge Creek Watershed |
| ★ Mill Sites | ■ Grazing Dispositions | |

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Map Version 1.00
Map Date May 08, 2002
Silvacom Ref #: H-018
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BARRIERS TO FIRE SPREAD



PLANIMETRIC LEGEND

- | | | |
|------------------|-----------------------|--------------------------|
| ● Village/Hamlet | — Perennial Stream | ■ Towns |
| ▲ Campgrounds | — Intermittent Stream | ■ Parks |
| — Paved Roads | — Indefinite Stream | ■ First Nations Reserves |
| — Gravel Roads | ■ Lakes/Major Rivers | ■ Metis Settlements |
| — Tertiary Roads | | |

BARRIERS TO FIRE SPREAD

- | |
|-------------------------|
| ◆ Staging Area |
| ▲ Fire Towers |
| — 50M Contour Interval |
| ■ Pure Deciduous Stands |

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4.5 Biophysical Inventory

Slave Lake Pulp has not completed an inventory of all of the plant and animal species which occur in the FMA. However, a study has recently been completed for the Alberta Government for the Grizzly Ridge Wildland Provincial Park. The park is embedded completely within the Slave Lake Pulp FMA and contributes to the landscape values in the forest management plan. A list of the species that were identified within the park is presented in Table 4-21¹³. The species listing is not a comprehensive inventory of the animal species that are known to exist on the FMA (e.g. grizzly bears do not show up in the list). One of the DFMP strategies is to develop and maintain a listing of the wildlife species that are present on the FMA.

Table 4-21: Biophysical Inventory – Grizzly Ridge Wildland Park

Mammals	Moose (<i>Alces alces</i>)	Mule Deer (<i>Odocoileus hemionus</i>)
	Coyote (<i>Canis latrans</i>)	White-tailed Deer (<i>Odocoileus virginianus</i>)
	Gray Wolf (<i>Canis lupus</i>)	Deer Mouse (<i>Peromyscus maniculatus</i>)
	Wapiti (<i>Cervus elaphus</i>)	Masked Shrew (<i>Sorex cinereus</i>)
	Southern Red-backed Vole (<i>Clethrionomys gapperi</i>)	Red Squirrel (<i>Tamiasciurus hudsonicus</i>)
	Snowshoe Hare (<i>Lepus americanus</i>)	Black Bear (<i>Ursus americanus</i>)
	Canada Lynx (<i>Lynx canadensis</i>)	Meadow Jumping Mouse (<i>Zapus hudsonius</i>)
	Marten (<i>Martes americana</i>)	
	Fisher (<i>Martes pennanti</i>)	
Birds	Sharp-shinned Hawk (<i>Accipiter striatus</i>)	White-winged Crossbill (<i>Loxia leucoptera</i>)
	Mallard (<i>Anas platyrhynchos</i>)	Lincoln's Sparrow (<i>Melospiza lincolni</i>)
	American Pipit (<i>Anthus rubescens</i>)	Connecticut Warbler (<i>Oporornis agilis</i>)
	Cedar Waxwing (<i>Bombycilla cedrorum</i>)	Mourning Warbler (<i>Oporornis philadelphia</i>)
	Ruffed Grouse (<i>Bonasa umbellus</i>)	Black-capped Chickadee (<i>Parus atricapillus</i>)
	Red-tailed Hawk (<i>Buteo jamaicensis</i>)	Gray Jay (<i>Perisoreus canadensis</i>)
	Common Redpoll (<i>Carduelis flammea</i>)	Rose-breasted Grosbeak (<i>Pheucticus ludovicianus</i>)
	Pine Siskin (<i>Carduelis pinus</i>)	Black-billed Magpie (<i>Pica pica</i>)
	Swainson's Thrush (<i>Catharus ustulatus</i>)	Hairy Woodpecker (<i>Picoides villosus</i>)
	Brown Creeper (<i>Certhia americana</i>)	Black-backed Woodpecker (<i>Picoides arcticus</i>)
	Evening Grosbeak (<i>Coccothraustes vespertinus</i>)	Three-toed Woodpecker (<i>Picoides tridactylus</i>)
	Northern Flicker (<i>Colaptes auratus</i>)	Boreal Chickadee (<i>Poecile hudsonica</i>)
	Olive-sided Flycatcher (<i>Contopus cooperi</i>)	Golden-crowned Kinglet (<i>Regulus satrapa</i>)
	Common Raven (<i>Corvus corax</i>)	Ruby-crowned Kinglet (<i>Regulus calendula</i>)
	Yellow Warbler (<i>Dendroica petechia</i>)	American Redstart (<i>Setophaga ruticilla</i>)
	Magnolia Warbler (<i>Dendroica magnolia</i>)	Red-breasted Nuthatch (<i>Sitta canadensis</i>)
	Yellow-rumped Warbler (<i>Dendroica coronata</i>)	Yellow-bellied Sapsucker (<i>Sphyrapicus</i>)
	Palm Warbler (<i>Dendroica palmarum</i>)	
	Blackpoll Warbler (<i>Dendroica striata</i>)	
	Black-throated Green Warbler (<i>Dendroica virens</i>)	

¹³ A complete copy of the report entitled Natural History Inventory 2000 - Grizzly Ridge Wildland Park (Wallis & Wershler, 2001) can be obtained from Alberta Sustainable Resource Development, Natural Resources Service.

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	Pileated Woodpecker (<i>Dryocopus pileatus</i>)	various
	Alder Flycatcher (<i>Empidonax alnorum</i>)	Chipping Sparrow (<i>Spizella passerina</i>)
	Least Flycatcher (<i>Empidonax minimus</i>)	Great Gray Owl (<i>Strix nebulosa</i>)
	Horned Lark (<i>Eremophila alpestris</i>)	Tree Swallow (<i>Tachycineta bicolor</i>)
	Spruce Grouse (<i>Falcipennis canadensis</i>)	Solitary Sandpiper (<i>Tringa solitaria</i>)
	American Kestrel (<i>Falco sparverius</i>)	Winter Wren (<i>Troglodytes troglodytes</i>)
	Common Loon (<i>Gavia immer</i>)	American Robin (<i>Turdus migratorius</i>)
	Common Yellowthroat (<i>Geothlypis trichas</i>)	Tennessee Warbler (<i>Vermivora peregrina</i>)
	Sandhill Crane (<i>Grus canadensis</i>)	Blue-headed Vireo (<i>Vireo solitarius</i>)
	Bald Eagle (<i>Haliaeetus leucocephalus</i>)	Warbling Vireo (<i>Vireo gilvus</i>)
	Dark-eyed Junco (<i>Junco hyemalis</i>)	Red-eyed Vireo (<i>Vireo olivaceus</i>)
		Canada Warbler (<i>Wilsonia canadensis</i>)
		White-throated Sparrow (<i>Zonotrichia albicollis</i>)
Amphibians	Striped (Northern) Chorus Frog (<i>Pseudacris triseriata</i>)	Wood Frog (<i>Rana sylvatica</i>)
Plants	LYCOPODIACEAE (club-mosses)	ROSACEAE (roses)
	Lycopodium annotinum	Amelanchier alnifolia
	Lycopodium clavatum	Comarum palustre
	Lycopodium complanatum	Fragaria virginiana
	Lycopodium obscurum	Geum aleppicum
	EQUISETACEAE (horsetails)	Geum macrophyllum
	Equisetum arvense	Geum rivale
	Equisetum fluviatile	Potentilla rivalis
	Equisetum sylvaticum	Prunus pensylvanica
	DRYOPTERIDACEAE (ferns)	Prunus virginiana
	Athyrium filix-femina	Rosa acicularis
	Dryopteris carthusiana	Rubus arcticus
	Dryopteris expansa	Rubus chamaemorus
	Gymnocarpium dryopteris	Rubus idaeus
	Phegopteris connectilis	Rubus parviflorus
	PINACEAE (pines)	Rubus pedatus
	Abies lasiocarpa	Rubus pubescens
	Picea glauca	Sorbus scopulina
	Picea mariana	FABACEAE (peas)
	Pinus contorta	Lathyrus ochroleucus
	POACEAE (grasses)	Vicia americana
	Agrostis scabra	GERANIACEAE (geraniums)
	Beckmannia syzigachne	Geranium bicknellii
	Bromus ciliatus	Geranium richardsonii
	Calamagrostis canadensis	CALLITRICHACEAE (water
	Cinna latifolia	Callitriche palustris
	Festuca saximontana	EMPETRACEAE
	Oryzopsis asperifolia	Empetrum nigrum
	Schizachne purpurascens	BALSAMINACEAE (touch-me-not
	CYPERACEAE (sedges)	Impatiens noli-tangere
	Carex aquatilis	VIOLACEAE (violets)
	Carex canescens	Viola palustris
	Carex deweyana	ONAGRACEAE (evening-primroses)
	Carex diandra	Circaea alpina
	Carex disperma	Epilobium angustifolium
	Carex limosa	Epilobium ciliatum

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**Plants
(cont'd)**

Carex pauciflora	ARALIACEAE (ginsengs)
Carex paupercula	Aralia nudicaulis
Carex utriculata	Oplopanax horridum
Eriophorum brachyantherum	APIACEAE (carrots)
Eriophorum vaginatum	Heracleum maximum
Scirpus microcarpus	Osmorhiza depauperata
JUNCACEAE (rushes)	CORNACEAE (dogwoods)
Juncus filiformis	Cornus canadensis
LILIACEAE (lilies)	PYROLACEAE (wintergreens)
Disporum trachycarpum	Moneses uniflora
Maianthemum canadense	Orthilia secunda
Maianthemum racemosum	Pyrola elliptica
Maianthemum trifolium	ERICACEAE (heaths)
Streptopus amplexifolius	Andromeda polifolia
ORCHIDACEAE (orchids)	Chamaedaphne calyculata
Corallorrhiza trifida	Gaultheria hispida
Listera cordata	Kalmia polifolia
Platanthera orbiculata	Ledum groenlandicum
Spiranthes romanzoffiana	Vaccinium cespitosum
SALICACEAE (willows)	Vaccinium membranaceum
Populus balsamifera	Vaccinium myrtilloides
Populus tremuloides	Vaccinium oxycoccos
Salix arbusculoides	Vaccinium vitis-idaea
Salix bebbiana	PRIMULACEAE (primroses)
Salix discolor	Trientalis borealis
Salix petiolaris	GENTIANACEAE (gentians)
Salix planifolia	Gentianella amarella
BETULACEAE (birches)	MENYANTHACEAE
Alnus incana	Menyanthes trifoliata
Alnus viridis	BORAGINACEAE (borages)
Betula glandulosa	Mertensia paniculata
Betula neoalaskana	SCROPHULARIACEAE (figworts)
Betula pumila	Castilleja miniata
URTICACEAE (nettles)	Melampyrum lineare
Urtica dioica	Pedicularis labradorica
SANTALACEAE (sandalwoods)	Rhinanthus minor
Geocaulon lividum	PLANTAGINACEAE (plantains)
CARYOPHYLLACEAE (pinks)	Plantago major
Cerastium nutans	RUBIACEAE (madders)
RANUNCULACEAE (crowfoots)	Galium boreale
Actaea rubra	Galium triflorum
Caltha natans	CAPRIFOLIACEAE (honeysuckles)
Delphinium glaucum	Linnaea borealis
Ranunculus abortivus	Lonicera involucrata
Ranunculus gmelinii	Sambucus racemosa
Ranunculus lapponicus	Symphoricarpos albus
Thalictrum sparsiflorum	Viburnum edule
Thalictrum venulosum	ADOXACEAE (moschatels)
FUMARIACEAE (fumitories)	Adoxa moschatellina
Corydalis sempervirens	ASTERACEAE (composites)
BRASSICACEAE (mustards)	Achillea millefolium
Arabis glabra	Achillea sibirica
Cardamine pensylvanica	Arnica cordifolia
SAXIFRAGACEAE (saxifrages)	Aster ciliolatus

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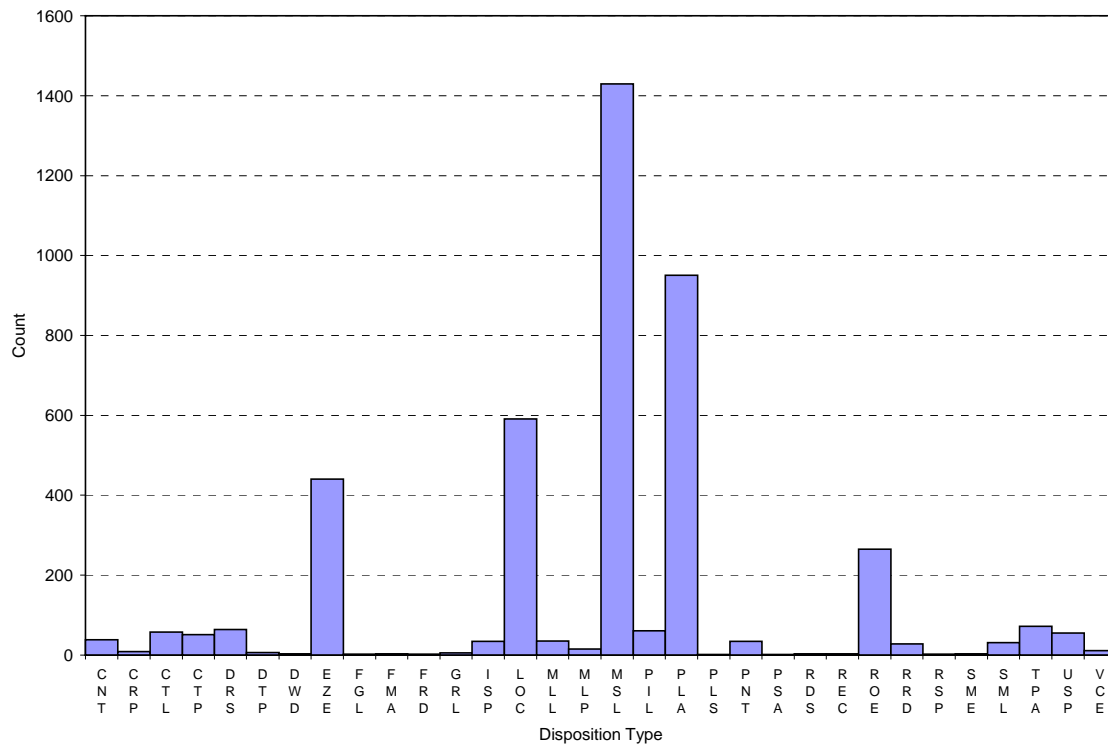
Chrysosplenium iowense	Aster conspicuus
Mitella nuda	Aster puniceus
Tiarella trifoliata	Bidens cernua
GROSSULARIACEAE (currants)	Hieracium albiflorum
Ribes glandulosum	Hieracium umbellatum
Ribes hirtellum	Petasites frigidus
Ribes lacustre	Petasites sagittatus
Ribes triste	Senecio pauciflorus
	Senecio triangularis
	Solidago canadensis
	Taraxacum officinale

4.6 Landscape Use and Function

4.6.1 Land Use and Allocation

Approximately 4,300 dispositions are currently active in the landscape area. The most prevalent disposition types are mineral surface leases (MSL = 1,430), pipeline agreements (PLA = 951), licenses of occupation (LOC = 591), easements (EZE = 440) and rights of entry (ROE = 265).

Figure 4-6: Current Land Use Dispositions



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The most prevalent companies maintaining active dispositions on the FMA area are summarized in the following table.

Table 4-22: Twenty Most Prevalent Companies

Company	Number of Dispositions
Chevron Canada Ltd.	685
Apache Canada Ltd.	516
Home Oil Company Ltd.	494
ATCO Electric Ltd.	451
Conoco Canada Ltd.	316
Star Oil & Gas Ltd.	274
Canadian Natural Resources Ltd.	143
Penn West Petroleum Ltd.	138
Response Energy Corporation	73
Pembina Pipeline Corporation	70
Slave Lake Pulp Corporation	53
Millar Western Forest Products Ltd. ¹⁴	52
Land and Forest Division (Edmonton)	46
Alberta Transportation	43
Pengrowth Corporation	41
Alberta Plywood Ltd.	39
Husky Oil Operations Ltd.	32
Real Resources Inc.	31
Nova Gas Transmission Ltd.	31
Land and Forest Division (Slave Lake)	28

4.6.2 Forest Productivity

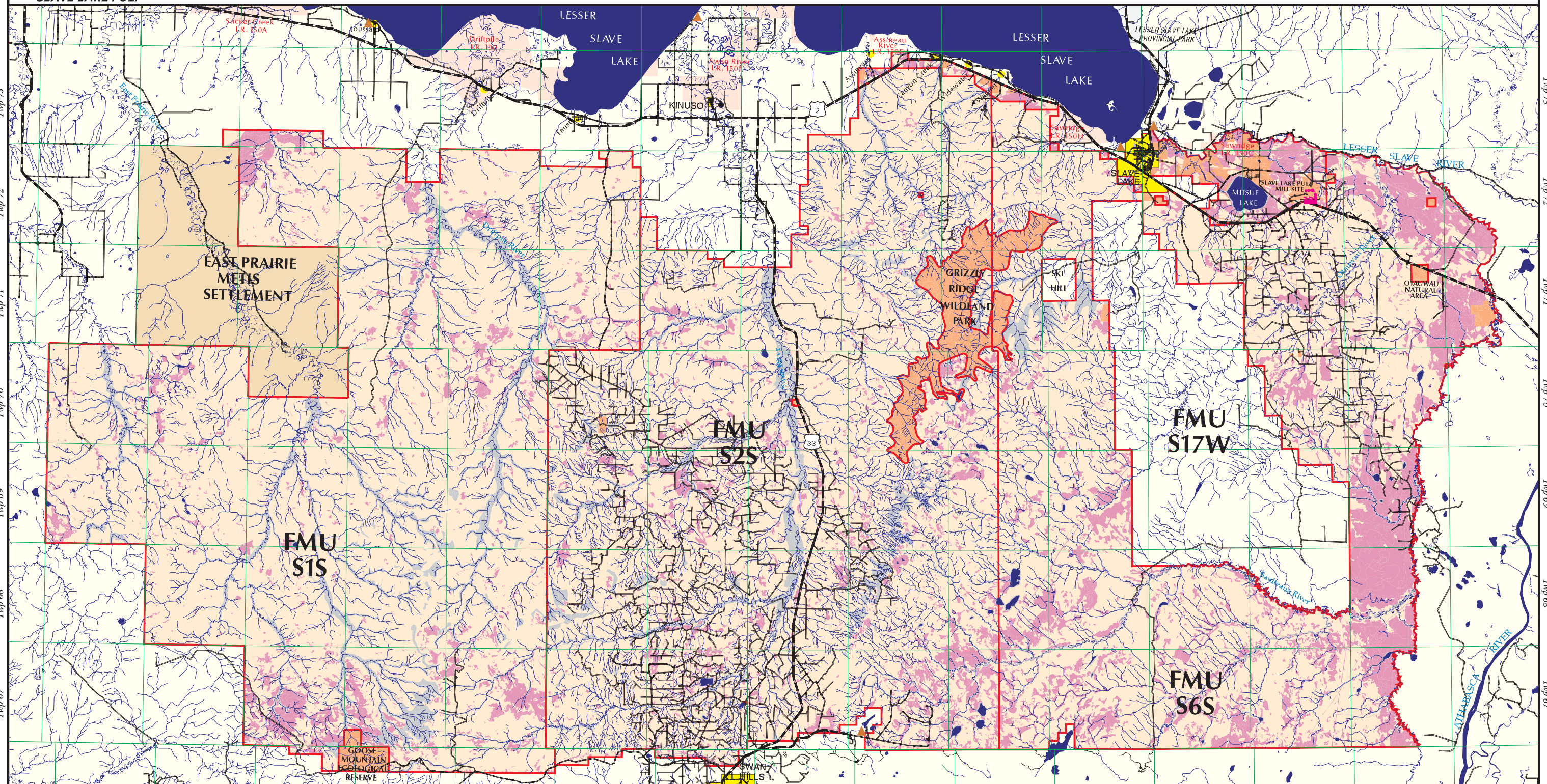
The landscape has been stratified into four productivity classes. The categories were assigned based on the current, temporary assessment of the FMA region. These categories may change as management objectives, technology and legislation evolve over time.

Table 4-23: Forest Productivity Summary

Forest Productivity Class	Description	Area (ha)
Productive	Includes areas currently assigned to the net landbase and potentially productive ground within recent burn areas	480,460
Non-productive	Includes areas that are currently non-forested or have failed current merchantability tests	94,145
Non-operational	Includes buffers, inoperable areas and the fish and wildlife corridor along the Swan River.	63,312
Protected areas	Non-FMA areas including Grizzly Ridge Wildland Park, Otauwau Natural Area, Goose Mountain Ecological Reserve and other land dispositions	17,871
Total		655,788

¹⁴ Also includes "Millar Western Industries Ltd" dispositions.

FOREST PRODUCTIVITY CATEGORIES



PLANIMETRIC LEGEND

- | | | |
|----------------|---------------------|------------------------|
| Village/Hamlet | Perennial Stream | Towns |
| Campgrounds | Intermittent Stream | Parks |
| Paved Roads | Indefinite Stream | First Nations Reserves |
| Gravel Roads | Lakes/Major Rivers | Metis Settlements |
| Tertiary Roads | | |

FOREST PRODUCTIVITY CATEGORIES

- | | |
|----------------|------------|
| Productive | Inoperable |
| Non-Productive | Protected |

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4.6.3 Timber Resource

The timber resource of the FMA provides many direct and indirect benefits to the local community and the Province of Alberta. The management of this renewable resource on a sustainable basis provides opportunities for long-term investments in the forest products industry. These investments provide employment opportunities and form a foundation on which the local communities can build. A detailed description of the forest resource is provided earlier in this chapter.

4.6.4 Fish and Wildlife Resources

The management area supports a diverse range of habitat types and several fish and wildlife species. Habitat needs for individual species vary significantly. Many areas that are considered unproductive, from a forest management perspective, are quite productive wildlife regions. Many species require a mixture of forested and non-forested areas in close proximity to one another to satisfy their specific needs. The landscape contains significant regions of forest stands, open grasslands, muskeg, flooded areas and numerous streams and lakes.

4.6.5 Water Resources

The wetlands, streams and lakes in the FMA provide habitat for many species of fish and wildlife. The wildlife populations, in combination with the aesthetic value of the area, provide recreational opportunities for many users (i.e. anglers, hunters, trappers and tourists).

4.6.6 Recreational Resources

Permanent recreation areas exist within the FMA (e.g. Edith Lake and Chrystina Lake). In addition, several informal sites and trails are used for camping, by ATV and snowmobile groups and many other user groups. Several trappers and the Junior Forest Wardens also maintain cabins and are active within the FMA. Due to the close proximity of the FMA to significant urban areas, increased pressure may occur from recreational users.

4.6.7 Historical Resources

Alberta Community Development has recently passed the Historical Resources Act, which requires forestry companies to assess the potential impacts of forestry operations on historically significant sites. Slave Lake Pulp has since developed a historical resource model that will allow forest planners to determine the location of high risk areas and take appropriate actions.

4.6.8 Other Cultural Resources

The trapping industry is one user group in the FMA that might be considered a cultural user. Although the industry might also be considered recreational, since few trappers make their livelihood through trapping. Sixty-seven traplines currently exist on the FMA.

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4.6.9 Access

Permanent access routes within the FMA facilitate use by recreational users. However, only a small percentage of the FMA area is easily accessible year-round. Large tracts of land are only accessible during the winter, or with the use of off-highway vehicles.

4.6.10 Visual Resources / Aesthetics

The region with the highest aesthetic value within the FMA is the Mooney Creek watershed. This area is visible from the Town of Slave Lake and from the eastern shore of Lesser Slave Lake. Lower aesthetic value areas include small portions of the FMA visible from Highway 2.

4.7 Landscape Use Interdependence

The intent of this section is to provide some insight into the likely impacts of implementation of this plan on non-timber values. Several assumptions were made in the development of this detailed forest management plan. For example, this plan assumes that no significant natural disturbances will occur during the life of the plan. If any of the assumptions change, it is possible that the impact on non-timber values would also change.

- ◆ *Timber – A primary goal of the forest management plan is to maintain, or enhance, the productive capacity of the forest resource. Over time, the forest should achieve a more balanced range in ages, while maintaining approximately the current proportion of cover types, across the landscape.*
- ◆ *Hydrology & Fish – Current Provincial and Federal legislation is intended to mitigate the impacts of forestry operations on water quality and quantity through the use of vegetated buffers and strategic harvest patterns. Proper implementation of legislated guidelines and adherence to progressive watercourse protection protocols should minimize the effect of forestry practices on these values.*
- ◆ *Wildlife – Forestry activities change the structure of the forest. Mature stand types are removed and replaced with young, vigorously growing forests. These activities may result in the temporary displacement of specific individuals. However, the intent is that, across the landscape, a diverse range of stand types and ages will be maintained. This range of stand types will allow for natural wildlife cycles and processes to continue to occur.*
- ◆ *Trapping – The detailed forest management plan is a landscape level plan. Maintaining the integrity and health of the forest at a broad level is an important objective. However, achieving those landscape level goals may not be consistent with smaller landscape unit objectives (e.g. traplines). Across the landscape, the health of the fur bearer population should not be negatively impacted by forestry operations.*
- ◆ *Soil – Conducting forestry operations in appropriate conditions should mitigate any impacts on soil productivity.*
- ◆ *Tourism/Recreation – Forest management activities should not negatively impact the recreational potential of the FMA. As operations continue over time, a healthy forest, with a variety of stand types and ages, will be maintained which should continue to support a wide range of recreational uses.*

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4.8 Landscape Management Unit Profiles

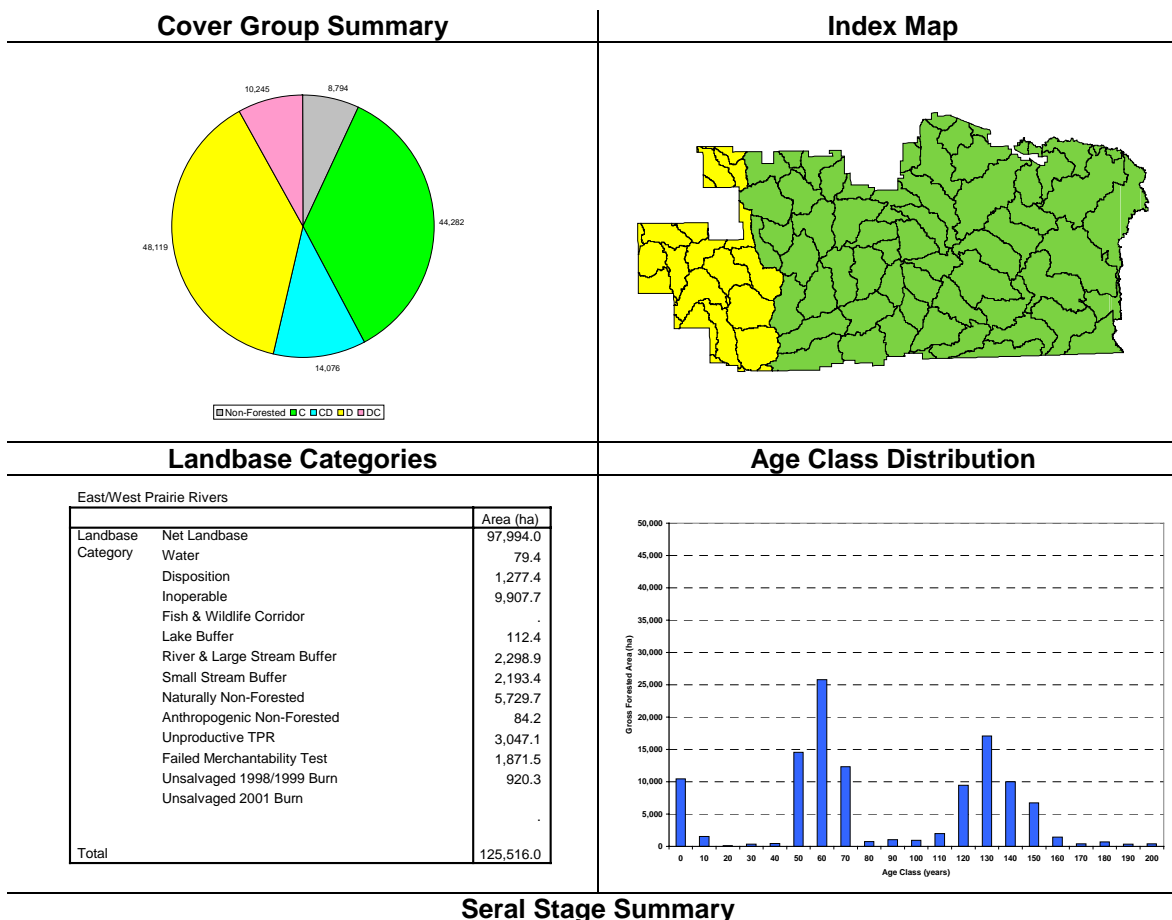
A summary profile of each landscape management unit is provided in this section. Information presented includes:

- ◆ *Landbase category description*
- ◆ *Age class distribution*
- ◆ *Area summary by cover group and seral stage*
- ◆ *Summary of linear and point features within the basin*
- ◆ *Listing of operating units, traplines and watersheds that occur within the LMU.*

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Figure 4-7: East & West Prairie Rivers LMU Profile



Seral Stage Summary

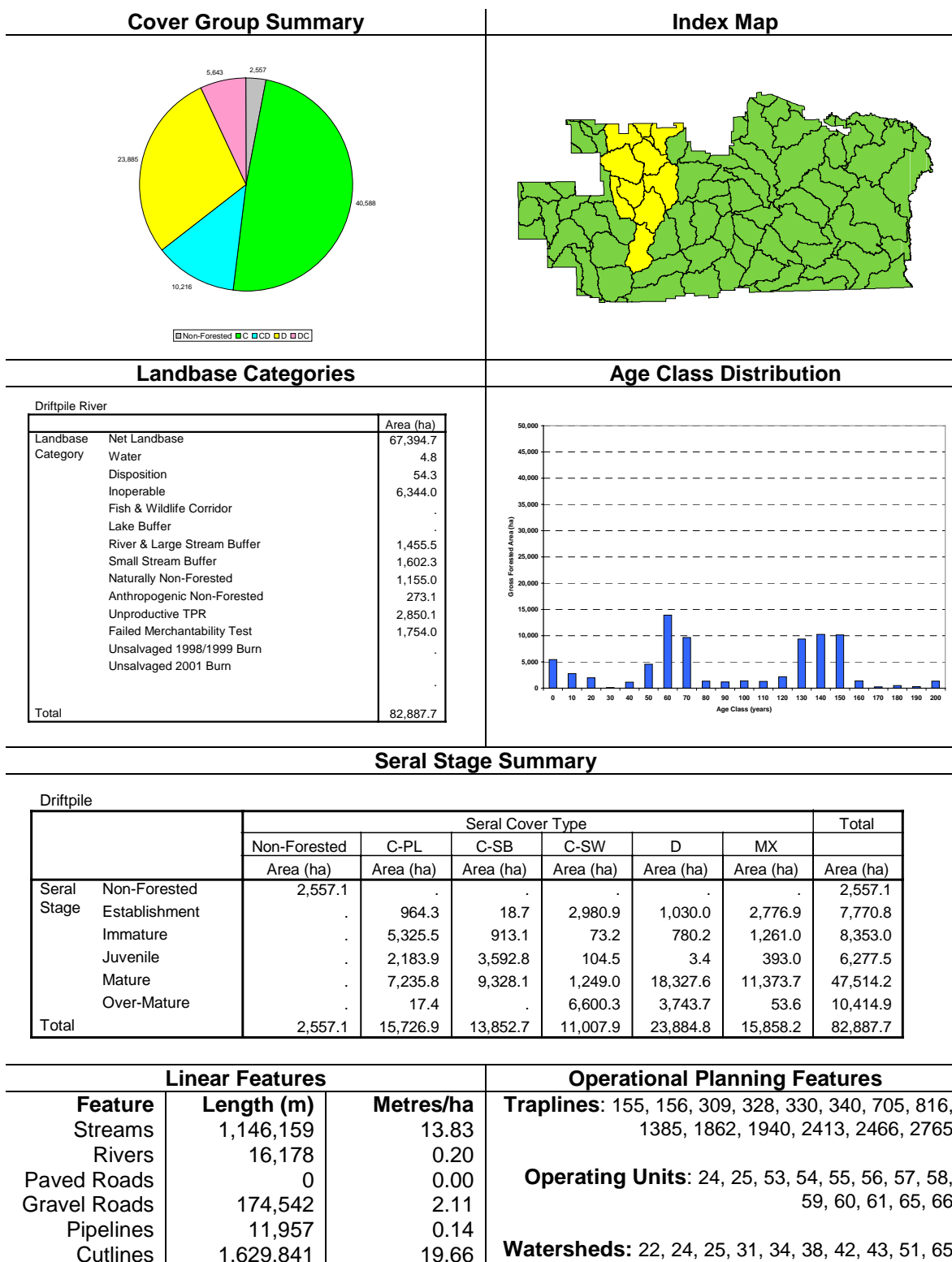
East/West Prairie		Seral Cover Type						Total
		Non-Forested	C-PL	C-SB	C-SW	D	MX	
		Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)
Seral Stage	Non-Forested	8,793.8	.	.	.	.	.	8,793.8
	Establishment	.	4,233.5	453.3	692.7	1,218.7	5,376.0	11,974.2
	Immature	.	4,875.2	292.3	666.2	253.6	4,108.3	10,195.7
	Juvenile	.	93.9	4,426.6	20.8	.	407.8	4,949.2
	Mature	.	9,352.2	7,442.1	1,564.6	38,400.8	14,406.7	71,166.3
	Over-Mature	.	258.2	.	9,910.3	8,245.8	22.5	18,436.8
Total		8,793.8	18,813.0	12,614.3	12,854.5	48,119.0	24,321.4	125,516.0

Linear Features			Operational Planning Features
Feature	Length (m)	Metres/ha	Traplines: 101, 142, 153, 155, 157, 309, 310, 328, 332, 333, 337, 712, 816, 832, 1385, 2002, 2413, 2941 Operating Units: 55, 58, 59, 61, 62, 64, 65, 66, 67, 68, 69, 70, 71, 72 Watersheds: 15, 16, 17, 18, 19, 33, 39, 47, 48, 49, 50, 54, 55, 56, 58, 59, 63, 64, 68, 69, 71, 72, 76, 79, 83, 85, 86, 87
Streams	1,733,841	13.81	
Rivers	5,145	0.04	
Paved Roads	0	0.00	
Gravel Roads	140,944	1.12	
Pipelines	0	0.00	
Cutlines	2,919,751	23.26	

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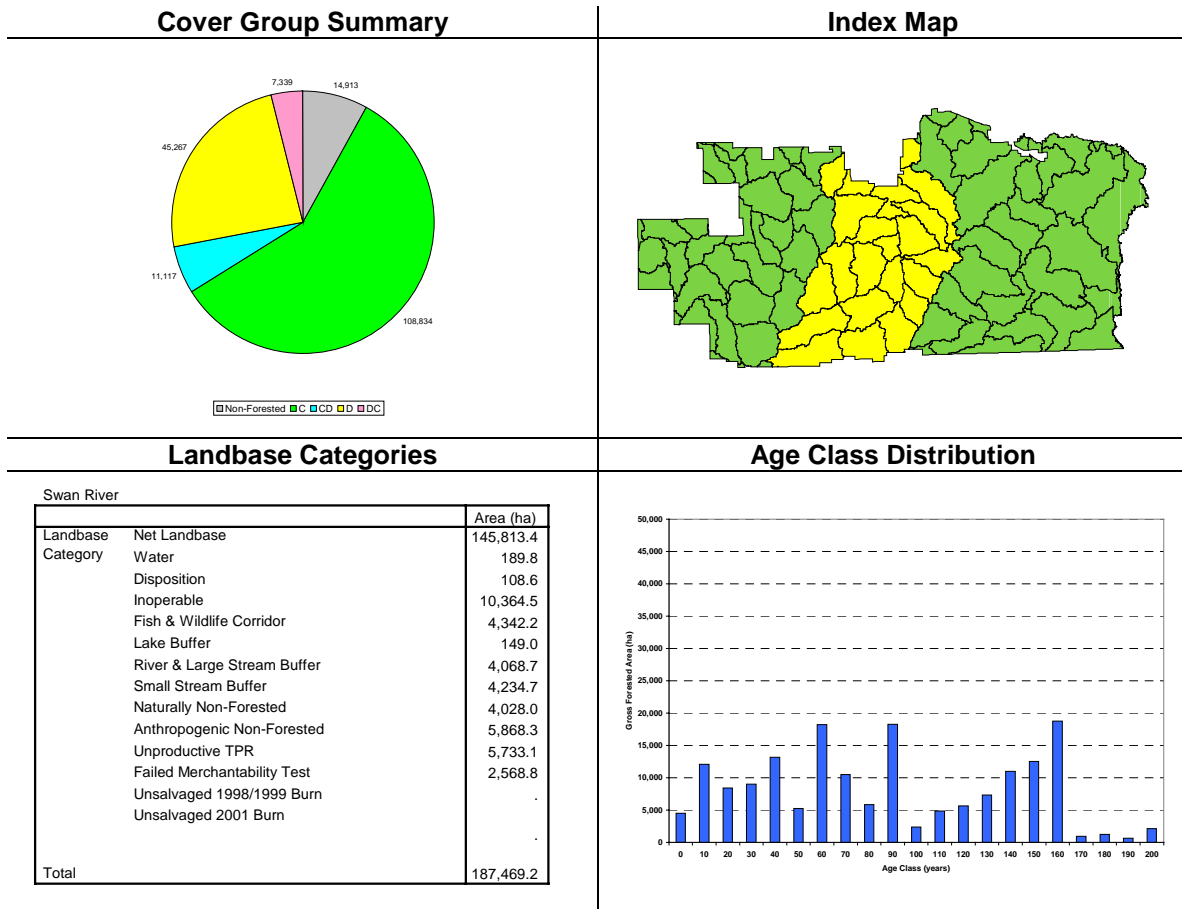
Figure 4-8: Driftpile River LMU Profile



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Figure 4-9: Swan River LMU Profile



Seral Stage Summary

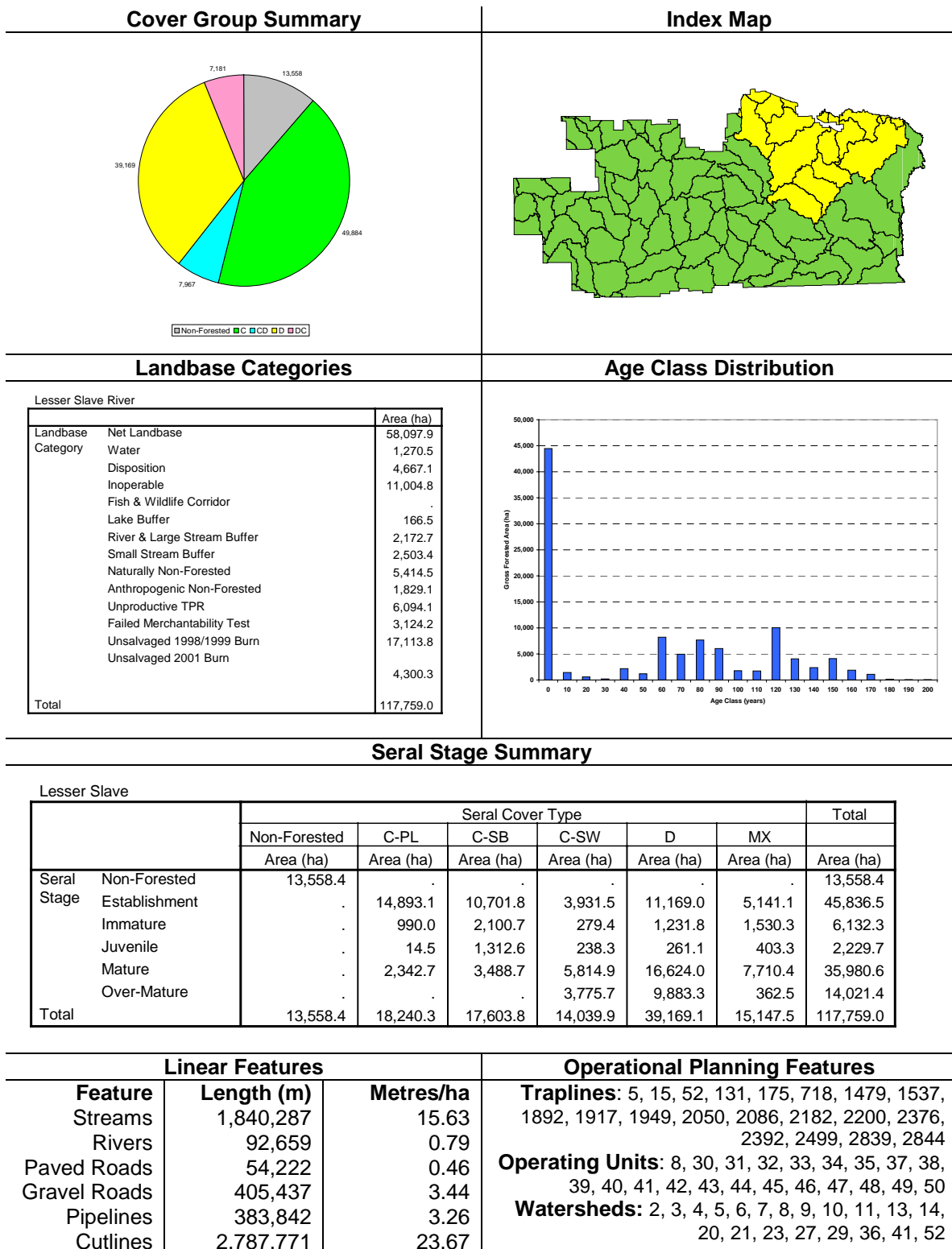
Swan		Seral Cover Type						Total
		Non-Forested	C-PL	C-SB	C-SW	D	MX	
		Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)
Seral Stage	Non-Forested	14,912.5	.	.	.	.	.	14,912.5
	Establishment	.	6,489.4	64.6	860.9	404.8	1,694.7	9,514.5
	Immature	.	11,148.3	5,671.2	446.3	11,019.7	2,011.0	30,296.4
	Juvenile	.	15,213.4	5,481.6	1,280.8	169.7	4,554.8	26,700.3
	Mature	.	25,442.2	21,085.7	3,741.3	30,009.2	10,186.0	90,464.4
	Over-Mature	.	93.8	.	11,814.8	3,663.1	9.4	15,581.1
Total		14,912.5	58,387.1	32,303.1	18,144.1	45,266.5	18,455.8	187,469.2

Linear Features			Operational Planning Features
Feature	Length (m)	Metres/ha	Traplines: 5, 8, 15, 42, 156, 328, 330, 460, 642, 718, 1259, 1479, 1496, 1537, 1681, 1718, 1832, 1856, 1862, 1901, 1912, 1940, 1949, 2050, 2376, 2446, 2466, 2765
Streams	3,409,019	18.18	Operating Units: 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 48, 49, 50, 51, 52, 53, 56, 60, 61, 62, 63, 64
Rivers	45,070	0.24	Watersheds: 12, 28, 30, 32, 35, 37, 40, 45, 46, 53, 57, 62, 73, 78, 80, 88, 89, 90, 91, 92, 93, 94
Paved Roads	49,548	0.26	
Gravel Roads	1,116,044	5.95	
Pipelines	796,276	4.25	
Cutlines	3,414,870	18.22	

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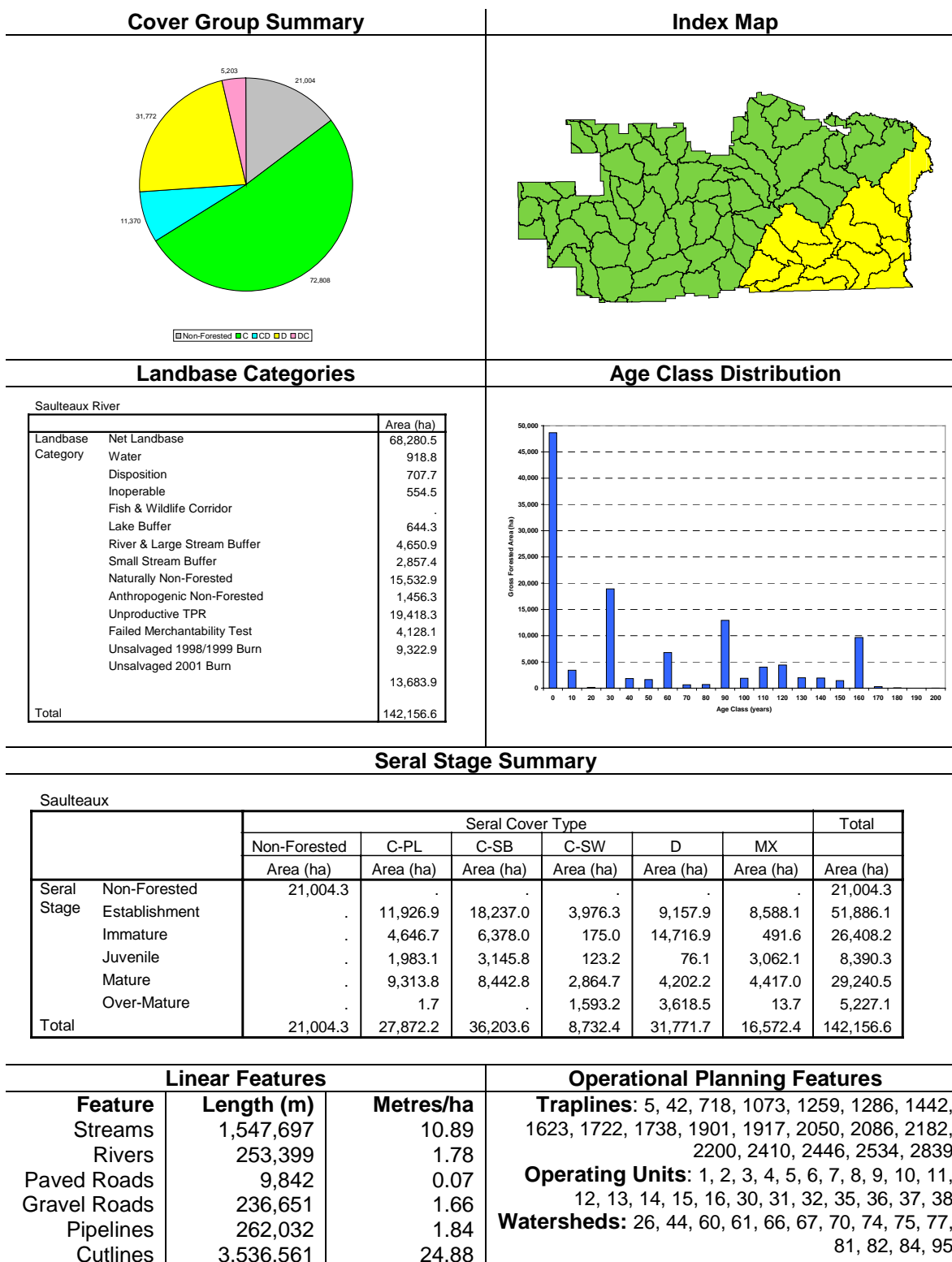
Figure 4-10: Lesser Slave River LMU Profile



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Figure 4-11: Sauteaux River LMU Profile



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5.0 Resource Management Philosophy and Goals

5.1 Slave Lake Pulp Management Philosophy

Slave Lake Pulp's primary goal, consistent with the Forest Management Agreement, is to optimize timber production from the Forest Management Area while mitigating the impacts of its forestry operations on the other values of the forest.

Slave Lake Pulp is currently operating under a Government approved Detailed Forest Management Plan and intends to build upon the principles of the existing Detailed Forest Management Plan. Slave Lake Pulp will take direction from Alberta Sustainable Resource Development and the other stakeholders through the Detailed Forest Management Planning Team to build a plan acceptable to the parties involved and consistent with the requirements of the Detailed Forest Management Planning Manual (April 1998 version).

This plan incorporates a number of major new initiatives developed through the planning process. The new plan will involve the realignment of the Forest Management Units under the FMA area. The plan will be fully spatially sequenced covering a twenty-year period and the stakeholders have agreed to proceed with the concept of a single landbase. Principles of Sustainable Forest Management, open and consultative processes, sound forest management, adaptive management, and multiple use are incorporated in the plan. Coarse filter approaches and a range of management intensities are considered in this plan. Slave Lake Pulp anticipates that this evolution in forest management will promote the long term goal of managing the timber resource in a manner that supports multiple use of the forest, while sustaining forest health integrating other environmental, economic and societal objectives. Slave Lake Pulp believes that a balanced approach with the flexibility to accommodate change is necessary for a successful plan.

The forest will be managed to produce a sustainable supply of both coniferous and deciduous timber. A management strategy based on the stratification of the forest into coniferous, deciduous and mixedwood forest types will be pursued in the development of this Detailed Forest Management Plan.

5.2 Slave Lake Pulp Resource Management Goals

Slave Lake Pulp and the Detailed Forest Management Planning Team cooperatively developed an extensive list of resource management goals. These goals can be identified as either ecological or socioeconomic in nature and are listed as follows:

Ecological Goals

- 1) *Mitigate the impacts of forestry practices on biological diversity.*
- 2) *Mitigate the impacts of forestry practices on wildlife.*
- 3) *Maintain an acceptable range of native commercial tree species and their genetic diversity on the FMA.*
- 4) *Reduce the risk of significant loss of productive forest from insect and disease.*
- 5) *Maintain or enhance site productivity.*

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- 6) *Mitigate the impacts of forestry practices on forest soils.*
- 7) *Mitigate the impacts of forestry practices on water quality and quantity.*
- 8) *Protect sensitive sites.*
- 9) *Mitigate the impacts of forestry practices on hydrological cycles.*
- 10) *Mitigate the impacts of forestry practices on fish and fish habitat.*
- 11) *Manage the FMA based on sound scientific principles.*
- 12) *Maintain or increase the productive forest landbase.*

Socioeconomic Goals

- 13) *Reduce significant loss of productive forest from forest fire.*
- 14) *Actively participate in forest policy decision making.*
- 15) *Maintain or enhance sustainable fibre supply.*
- 16) *Maintain or enhance the long-term competitiveness of Slave Lake Pulp.*
- 17) *Mitigate the impacts of forestry practices on known commercial and non-commercial non-timber values.*
- 18) *Develop and maintain long-term relationships with local aboriginal and Metis organizations.*
- 19) *Contribute to the economic stability of local communities.*
- 20) *Encourage and support fair, effective and informed public participation and provide the opportunity for effective communication.*

5.3 Guiding Principles

5.3.1 Sustainable Forest Management

Slave Lake Pulp recognizes the need to maintain and enhance the long-term health of the forest ecosystem while maintaining social, ecological and economic values. The principles of Sustainable Forest Management as outlined in *Criteria and Indicators of Sustainable Forest Management in Canada* (see Appendix C) have been used as a template in the development of the goals and objectives of this plan. Slave Lake Pulp recognizes that it is a national document that is currently under revision and may change over time; however, the company believes that the basic principles are sound and intends to incorporate applicable concepts within the DFMP.

5.3.2 Open and consultative process in the development of the Detailed Forest Management Plan.

Consistent with the Interim Forest Management Planning Manual – Version 1998, Slave Lake Pulp has developed this plan in an open and consultative manner, and has made all reasonable

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efforts to involve all stakeholders, including Government agencies, other resource users and the general public. (See appendix G for a list of meeting dates)

An open and extensive ongoing public input process was used to get meaningful public input at all stages of plan development. Slave Lake Pulp and the DFMP Planning Team have established a process whereby the public, in the vicinity of the Forest Management Area, have been provided, on an ongoing basis, with the opportunity to have input to the DFMP process.

5.3.3 Sound forest management principle.

Slave Lake Pulp is committed to following sound forest management principles that are biologically, socially, economically and operationally feasible. To ensure that the desired objectives are satisfied, Slave Lake Pulp intends to rely on the most up to date information for decision making purposes; however, Slave Lake Pulp recognizes that even with the most up to date information, some questions may not be answered. To address these, Slave Lake Pulp intends to rely on a common sense principle that is based on combining scientific information with expert opinion and local knowledge. Slave Lake Pulp intends to use management practices that are biologically appropriate to the silviculture of the species being considered. Areas in which sound scientific information is seriously lacking will be supplemented through an ongoing research and development program. The main purpose of these programs are to further the science of forest management.

5.3.4 Adaptive management principle.

Slave Lake Pulp and the DFMP Planning Team recognize that the forest is a dynamic system that is in a constant state of change; that public values change; that constant research provides new knowledge and that the DFMP needs to be a dynamic process that recognizes, quantifies, analyses and addresses change. This recognition has resulted in a number of commitments in which adaptive management can be implemented.

- ◆ *Slave Lake Pulp is committed to the support of ongoing research and operational trials, with the intent of applying research results on an operational basis.*
- ◆ *Slave Lake Pulp is committed to monitoring timber harvesting activities on the Forest management Area; analysis of the results; and feedback into planning and operations. Appropriate changes will be implemented as part of the adaptive management process.*
- ◆ *Slave Lake Pulp is committed to implementing the DFMP through integrated General Development Plans (GDP) and Annual Operating Plans (AOP) to ensure that activities are consistent with the DFMP and the operations of the other forest users.*

5.3.5 Multiple use principle

Slave Lake Pulp recognizes the many uses of the forest, other than timber production. The use of the forest by other commercial forest resource users including other forest companies, oil and gas operators, recreation users, trappers and grazing disposition holders, are acknowledged in this plan. Other values of the forest, including water quality and quantity, protected areas, and ecological diversity are also recognized and accommodated within the plan in a number of fashions including:

- ◆ *Solicit input from other stakeholders in the development and implementation of this plan.*

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- ♦ *Use of a single DFMP for all forest industry stakeholders in the FMA.*
- ♦ *Make reasonable attempts to balance biological, social and economic factors.*
- ♦ *Development of strategies and tactics specific to other resource values.*

5.3.6 Amalgamation of FMA into a Single Sustained Yield Unit

Slave Lake Pulp and the stakeholder timber companies were faced with the re-allocation of a portion of the S1 FMU. This, combined with the severe impact of the recent fires on the S6 FMU, resulted in a desire to lessen the impact of fire on individual companies and expand the management potential of the entire FMA area. The stakeholders and the company have agreed to administer the allowable cuts in the FMA under a single sustained yield management unit. Each stakeholder was reallocated a percentage of the conifer wood supply based on a combination of AAC and AAC potential. The conifer AAC will apply to the revised S1S boundary and the historic S6 and S2 boundaries while the deciduous AAC will be derived from solely within the FMA boundary.

The company has agreed to attempt to maintain traditional working circles for each stakeholder unless addressed specifically in the plan.

5.3.7 Spatial Sequencing

Historically, the linkage from detailed forest management plans to the general development plan and the annual operating plan has been theoretical. Sustainable Resource Development has indicated that all management plans must provide a spatial linkage to the harvest from the plan. The first twenty years of this plan's harvest schedule will be done spatially to provide a solid link from the plan to actual harvest operations. The DFMP Planning Team has recognized that deviations from the spatial plan will occur however only significant variations will result in a need to revisit the AAC calculation and the effects on the DFMP.

5.3.8 Single Landbase vs. Discrete Landbase

Slave Lake Pulp and the stakeholders have agreed to operate the FMA under a single landbase concept. In this process, the landbase designation is no longer necessarily maintained. Instead, the companies will plan, harvest and reforest with the intent of maintaining a flow of coniferous and deciduous timber from the landscape with the focus on increasing the fiber supply while reducing the cost and maintaining or enhancing the other forest values. The major fiber supply shift in this proposal entails assigning all secondary species as a portion of the AAC.

The single landbase concept will be implemented through jointly integrated harvest and reforestation plans. FMA task groups have been established to coordinate the harvest and reforestation planning. In addition the Fish and Wildlife Integrated Technical Committee will continue to operate to provide support and monitoring of the other forest values.

5.3.9 Landscape Level Management

5.3.9.1 Fire Smart Landscape and Management

Slave Lake Pulp and the stakeholders have identified that the risk of fire loss for timber and all other forest values is extreme within the FMA. The DFMP is designed to limit the potential losses to catastrophic fire events. The strategies and tactics contained within the plan have an overriding

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objective to eliminate these major events. The intent is not to eliminate fire from the landscape but to better assist the province in protecting identified values at risk. Such values include communities, infrastructure, watersheds and timber. The majority of the FMA has been identified as having moderate to high values at risk under these criteria. The plan includes strategic harvest scheduling and site specific tactics to limit the probability for large-scale fires and destruction of communities and infrastructure.

5.3.9.2 Watershed Management

Slave Lake Pulp has completed a hydrologic assessment of the FMA. This plan includes a number of strategies to reduce the impact of harvest operations on water quality and regime. Specific management tactics such as watercourse buffer establishment and maintenance will be an integral part of the plan. Harvest scheduling will be assessed on a watershed basis to ensure maximum protection of water quality and reduction of the potential for major stream flow events attributable to harvesting activities.

5.3.9.3 Coarse Filter and Fine Filter

Slave Lake Pulp intends to use a coarse filter approach in the implementation of this plan. This approach involves maintaining a range of representative forest ecosystems on a landscape basis. The company intends to maintain an acceptable range of forest conditions such as, stand sizes, species composition, stand structure and age class distribution on a landscape basis. Slave Lake Pulp will complete a landscape assessment that will help determine the acceptable range of future forest conditions. The company is committed to working with Alberta Sustainable Resource Development towards developing a fine filter approach during the term of this plan.

5.3.10 Range of Management Intensities

A management approach that adopts the concept of using a range of management intensities will be used in this plan. Management options to be considered include, multiple use forest management, enhanced forest management, special management areas and protected areas.

5.3.10.1 Multiple use Forest Management

Most of the Forest Management Area will be designated for multiple use forest management, including consideration for other forest values such as wildlife, biodiversity, water, timber supply and recreation values.

5.3.10.2 Stand Density Management (SDM)

Some areas within the FMA will be managed intensively for timber production but are not intended to preclude the opportunity for other uses within the SDM area. Timber supply analysis will allow for the evaluation of the pros and cons of stand density management, using crop planning.

5.3.10.3 Special Management Areas

Areas such as, inoperable slopes, mineral licks, riparian areas, and other sensitive areas will be considered for special management. Slave Lake Pulp intends to work closely with the government and the other stakeholders, through the Fish and Wildlife Technical Integration Committee (FWITC), to ensure that sensitive areas are identified and managed appropriately.

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5.3.10.4 Protected areas

There are several protected areas within, and adjacent to, the FMA boundary, including the Grizzly Ridge , the Otauwau Natural Area and Goose Mountain Ecological Reserve. Slave Lake Pulp worked closely with the local communities and the government in ensuring that the Grizzly Ridge Wildland Provincial Park site was protected because of its ecological significance. These protected areas are intended to serve as benchmark areas.

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6.0 FMA Goals, Objectives and Strategies

6.1 Introduction

Maintaining continuity between the management philosophy and the practical application of that philosophy on the landscape requires a direct link between the goals and objectives to the strategies designed to fulfill those identified criteria. This has been accomplished by organizing the goals into two broad types:

- ◆ *Ecological Goals (Goals 1-12)*
- ◆ *Socioeconomic Goals (Goals 13-20)*

Further to this broad division, each goal has one or more identified objectives. These objectives are subsequently supported through a variety of strategies and tactics. The forest industry must demonstrate its achievement of the identified goals and objectives through the strategies and tactics. This requires that a monitoring system be linked to each objective and strategy. The monitoring programs are identified within each objective below and are described in detail in Chapter 7. The linkage to the Preferred Forest Management Strategy is contained in Chapter 8.

6.2 Ecological Goals



Goal # 1 - Mitigate the impacts of forestry practices on biological diversity.

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| Objective 1.1 | ◆ <i>Complete a landscape assessment for the determination of an acceptable range of forest conditions.</i> |
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The current forest composition must be evaluated to determine the potential impacts future activities may have on the forest structure. The detailed summary of the landscape will include variables such as forest vegetation, anthropogenic disturbances, fire history and landscape use. Once the current condition is established, the future state of selected variables will be predicted and evaluated for selected management scenarios.

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| Strategy 1.1.1 | ◆ <i>Complete a landscape assessment of the current landscape that will be used to evaluate the impacts of planned forest management activities on the future forest condition.</i> |
| Strategy 1.1.2 | ◆ <i>Identify knowledge gaps in the landscape assessment by November 2005.</i> |
| Monitoring | ◆ <i>M1 - Landscape assessment is complete and presented in Chapter 4.</i>
◆ <i>M11 – Landscape assessment gap analysis completed by November 2005</i> |

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- Objective 1.2 ♦ *Develop an understanding of the natural range of forest conditions by completing a natural disturbance study by November 2005.*

Natural forest disturbances on the landscape are varied in size, spatial distribution and timing of occurrence. Over time, these disturbances have created a complex mosaic of stand types and conditions in the FMA. Although natural factors such as wind, insects and disease have all contributed to the current mosaic, forest fires remain the most prevalent and damaging disturbance agent in the area. Historical fire suppression and other landuse activities on the FMA have changed what the composition of the forest would have been, therefore, the current forest condition should not be considered natural. The completion of a natural disturbance study for the FMA would provide insights into how these processes occur and will improve our understanding of the contribution of these disturbances to the health of the forest.

- Strategy 1.2.1 ♦ *Complete a study of natural disturbance patterns for the FMA area, which focuses on wildfire, but will also include insect, disease and other natural disturbance agents. The objectives of the study will be to determine the size, shape, timing, and magnitude of historical disturbances, including the pattern of residual, undisturbed patches.*

- Monitoring ♦ *M10 – Completion of the natural disturbance study by November 2005.*

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- Objective 1.3 ♦ *Develop stand level management strategies*

Stand management strategies are designed to ensure that key biodiversity indicators are maintained, within a natural range of variability, in specific stand types across the FMA. These strategies are important for the maintenance of biodiversity attributes across the landscape.

- Strategy 1.3.1 ♦ *Structure containing live and dead trees will be retained to create old forest characteristics in young and mid aged post harvest forests¹ (Schieck et al, 2000). Representative patch retention will be practiced to a minimum level of 1% of the scheduled harvest area within each operating unit and up to an average level of 3% of the scheduled harvest area across individual Landscape Management Units (LMU's) over the term of the DFMP. The area retained on the harvest areas will be assessed through a post-harvest assessment program.*

- ♦ *Recognizing that many harvest areas will not require retention areas due to their small size, the retention area locations will be assigned based on the following priority:*

- 1) Unmapped watercourses that require a buffer*
- 2) Special wildlife concerns such as mineral licks, dens, nests etc.*

¹ Schieck, J. Stuart-Smith, K. Norton, M. 2000. Bird communities are affected by amount and dispersion of vegetation retained in mixedwood boreal forest harvest areas. *Forest Ecology and Management* 126. 239-254.

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- 3) *Large cut blocks greater than 100 ha.*
- 4) *Connectivity between riparian areas and upland sites.*
- Strategy 1.3.2 ♦ *Maintain coarse woody debris (CWD) over the short term, by leaving standing and downed woody debris on the site during forestry operations*
- ♦ *In areas where “pile and burn” is the slash abatement strategy up to 5% of slash piles will be retained on a cutblock level.*
- Strategy 1.3.3 ♦ *Maintain coarse woody debris (CWD) over the long term, by leaving live residual trees within the cutblock during forestry operations. Over time, these trees will die and contribute to CWD on the site in the future.*
- Strategy 1.3.4 ♦ *Promote the natural regeneration of trees in conjunction with reforestation activities including suckering, vegetative propagation and natural seeding.*
- Monitoring ♦ *M33 - Post harvest reports*
- ♦ *M16 - Retention areas*
- ♦ *M34 – Silviculture report*

Objective 1.4 ♦ *Develop landscape level management strategies*

Landscape level strategies are broader in scope and nature than stand level strategies. They are intended to ensure that strategic planning decisions account for specific biodiversity values over the landscape. Stand level strategies are important for achieving large scale objectives and contribute to biodiversity values for the entire management area (i.e. the sum of the stands is the landscape).

- Strategy 1.4.1 ♦ *Implement the stand level management strategies identified in Objective 1.3.*
- Strategy 1.4.2 ♦ *Design harvest areas with the intent to follow natural landscape patterns. This would include the broad range of stand types, shapes and sizes.*
- Strategy 1.4.3 ♦ *Undertake wildlife monitoring programs to evaluate wildlife presence on the FMA .*
- Strategy 1.4.4 ♦ *Regenerate areas within two years of harvest.*
- Strategy 1.4.5 ♦ *Manage for a range of mature and overmature seral stages on the FMA such that their combined representation on the landscape will not vary from the current range by more than 20 percent during the*

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term of this plan. The assessment will include changes that are a result of forest management practices and will not include natural or anthropogenic disturbances.

- ◆ *The purpose is to maintain a variety of seral stages on the landscape to provide habitat types for a multitude of species. Population distribution and abundance of wildlife will change as seral stages evolve over time.*
- Strategy 1.4.6 ◆ *Conduct appropriate silvicultural activities on abandoned or cancelled anthropogenic features to promote the re-establishment of pre-disturbance plant species.*
- Strategy 1.4.7 ◆ *Defer forest harvesting of unburned islands within the Chisholm, Mitsue and Agnes Lake fires for the next twenty years.*
- Strategy 1.4.8 ◆ *On a landscape level, reforest sites with commercial native tree species, approximately in proportion to pre-harvest types.*
- Monitoring ◆ *M34 – Silviculture report*
- ◆ *M16 - Retention areas*
- ◆ *M33 - Annual AOP report*

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| Objective 1.5 | ◆ <i>Develop and maintain a government approved forest inventory of the FMA.</i> |
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The maintenance of a current and accurate inventory of the FMA area is a key element in the evaluation of the current landbase composition and the impacts of planned operations on the future landscape condition. The forest inventory, and associated sampling data which uses the inventory as a foundation, is a primary source of data that will be used for the evaluation of biological diversity in the management area.

- Strategy 1.5.1 ◆ *AVI Continuous Forest Inventory – On an annual basis, complete a re-inventory of approximately ten percent of the FMA area to AVI version 2.1 specifications.*
- Strategy 1.5.2 ◆ *Conifer understorey – Within five years of the approval of this plan, complete an inventory identifying the significance of areas with conifer understorey in deciduous dominant stand types, within the FMA. The specifications and methodology of the inventory acquisition to be determined by the FMA stakeholder planning team.*
- Strategy 1.5.3 ◆ *Timber harvesting updates – On an annual basis, complete updates of the inventory in areas where timber harvesting has occurred.*

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Strategy 1.5.4 ♦ *Landuse updates – Every five-years, acquire new orthophoto mosaics where required on the FMA and use the orthophotos to identify new areas of disturbance (i.e. oil and gas). Alternative methods of acquiring the update information may be explored.*

Monitoring ♦ *M2 - Audit and approval of AVI data by the Provincial Government.*

- *Report on status of re-interpretation progress in the stewardship report*
- *Periodic reporting to stakeholders on progress of inventory projects*

♦ *M14 - Completion of the conifer understorey inventory within five-years of the approval of the DFMP.*

Objective 1.6 ♦ *Evaluate and make provisions for the maintenance of commercial tree understories on a landscape basis.*

Understories contribute significantly to the biodiversity of the landbase. Multi-tiered stands provide unique characteristics and structure in the areas that they occur. The identification of these areas will provide information regarding the amount and distribution of these features on the FMA. Forest harvesting plans will be designed to minimize damage to, and promote the long term stability of, identified understories.

Strategy 1.6.1 ♦ *Conifer understorey – Within five years of the approval of this plan, complete an inventory identifying the significance of areas with conifer understorey in deciduous dominant stand types, within the FMA. The specifications and methodology of the inventory acquisition to be determined by the FMA stakeholder planning team.*

Strategy 1.6.2 ♦ *Identify areas containing conifer and/or deciduous understories in annual harvest plans and employ harvesting methods that will strive to minimize damage to those understories.*

Strategy 1.6.3 ♦ *Provide training for timber harvesting operators in understorey protection techniques.*

Monitoring ♦ *M34 - Annual Silviculture Reports.*

- ♦ *M21 - Training records for timber harvest operators*
- ♦ *M24 – Working Group reports*
- ♦ *M33 – Annual Harvest Report*
- ♦ *M14 - Completion of the conifer understorey inventory within five-years of the approval of the DFMP.*

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Objective 1.7 ♦ *Mitigate the impacts of timber harvesting on forest fragmentation.*

Forest fragmentation is defined as “the change in the forest landscape from extensive and continuous forest cover to a mosaic of smaller patches separated by open areas or very young stands of forest”² (Dunster, 1996). Forest fragmentation has become more prevalent on the landscape over the past several decades. The fragmentation of the forest has both positive and negative effects on all forest resource users. For example, a more fragmented forest may be more accessible thereby creating more potential for recreational use. However, some wildlife species, with a preference for more contiguous types, may prefer less fragmented forest areas. Forest fragmentation also occurs naturally as a result of disturbances or by permanent landscape features (i.e. topography).

- Strategy 1.7.1 ♦ *Avoid increased fragmentation of the landscape using a single pass harvest system. The harvesting of complete patches in a short period will reduce fragmentation of large contiguous areas into many smaller patches that vary in seral stage development. In the past, harvest planning created uniform patch sizes reducing the variability of patch sizes across the landscape and increasing the amount of edge and fragmentation. The intent of the spatial sequence is to create a range of opening sizes that will sustain the larger tracts of contiguous habitat required by some species while providing for species that require multiple habitat types.*
- Strategy 1.7.2 ♦ *Design harvest areas with the intent to follow natural landscape patterns. This would include the broad range of stand types, shapes and sizes.*
- Strategy 1.7.3 ♦ *Develop a reclamation plan within five years to conduct appropriate silvicultural activities on abandoned or cancelled anthropogenic features. The objective of the reclamation plan will be to promote the re-establishment of pre-disturbance plant species.*
- Strategy 1.7.4 ♦ *Eliminate arbitrary administrative boundaries, such as FMU's, which restrict forest management activities.*
- Strategy 1.7.5 ♦ *Concentrate harvesting activities in areas that are fragmented by current cut-and-leave patterns that exist on portions of the landscape.*
- Monitoring ♦ *M15 - Follow spatial sequence.*
- ♦ *M13 - Development of reclamation plan within five years of plan approval.*

² Dunster, J. and Dunster, K. 1996. Dictionary of Natural Resource Management. UBC Press, University of British Columbia, 6344 Memorial Rd. Vancouver, B.C.

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- Objective 1.8 ♦ *Make provisions for the maintenance of mixed and pure cover types on a landscape basis.*

The broad range of mixed and pure stand types present on the FMA contributes significantly to the biodiversity of the landbase. The identification of these areas will provide information regarding the amount and distribution of these features on the FMA. Maintaining the current distribution of these stand types (approximately) will ensure that this important element of the diversity of the landscape is retained.

- Strategy 1.8.1 ♦ *Identify the current extent and distribution of pure and mixedwood stands on the landscape.*
- Strategy 1.8.2 ♦ *On a landscape basis, maintain approximately the same relative proportions of pre-harvest cover groups (C, CD, DC & D).*
- Strategy 1.8.3 ♦ *Consider implementation of mixedwood crop plans as developed by the Mixedwood Management Association.*
- Monitoring ♦ *M33 - Summaries to be included in each annual harvest plan.*
- ♦ *M34 - Annual Silviculture Report – stocking, establishment and performance measures.*

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- Objective 1.9 ♦ *Identify plant species on the FMA by 2005.*

Plant species, both commercial and non-commercial, are important indicators of the biological diversity of the FMA. Plant communities provide the habitat requirements for the wildlife species that are present on the landscape. Creating and maintaining a current, accurate listing of the plant species that exist on the FMA is an important building block in the assessment of biological diversity.

- Strategy 1.9.1 ♦ *Plants identified in the FMA permanent sample plot program and pre-harvest assessments will be recorded. A master list of the tallied species will be maintained.*
- Monitoring ♦ *M16 - Completion of an initial list by 2005.*

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Objective 1.10 ♦ *Monitor and control the spread of noxious and restricted weeds on forest industry dispositions.*

The Public Lands Act states that disposition holders must “cut, keep down and destroy all noxious weeds, and restricted weeds to which the *Weed Control Act* applies”. In order to abide by the Public Lands Act, we must control the spread of noxious weeds and eradicate restricted weeds.

Strategy 1.10.1 ♦ *Create a weed information library of reference material and pressed weed samples.*

Strategy 1.10.2 ♦ *Train related full time staff, summer students, and/or field contractors to identify restricted and noxious weeds.*

Strategy 1.10.3 ♦ *Develop a Weed Management Plan by May 2003 which will include education, prevention, detection, monitoring, and control strategies:*

- *Education and prevention will describe awareness training requirements for staff and contractors. Training will include prevention methods including cleaning equipment and reclamation procedures.*
- *The approach and schedule for detection and monitoring will be described.*
- *Strategies for weed control will be outlined. The treatments may include mowing, cutting, hand pulling, and herbicides.*

Strategy 1.10.4 ♦ *All forest industry users will follow provincial requirements to control weed occurrences within their dispositions and report these occurrences to Slave Lake Pulp.*

Strategy 1.10.5 ♦ *All forest users are encouraged to report incidences of noxious or restricted weeds. All incidents should be reported to the owner of the disposition and Slave Lake Pulp.*

Monitoring ♦ *M25 - Weed Management Plan*
♦ *M17 - 5-year Forest Health Report.*

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Goal # 2 – Mitigate the impacts of forestry practices on wildlife.

Objective 2.1 ♦ *Identify known wildlife species on the FMA by 2005.*

A complete inventory of the wildlife species that occur on FMA area is not currently available. An accurate listing of wildlife species that are present on the FMA is required before management strategies can be designed to mitigate the impacts of forestry practices on them. Several strategies have been developed to fill in this knowledge gap.

- Strategy 2.1.1 ♦ *Document results from the Grizzly Ridge Wildland Provincial Park Biophysical Inventory.*
- Strategy 2.1.2 ♦ *Document Lesser Slave Lake Bird Observatory inventory results.*
- Strategy 2.1.3 ♦ *Develop and implement monitoring programs for selected small mammals and songbirds by 2003.*
- Monitoring ♦ *M16 - Development of a preliminary list of wildlife on the FMA by 2005*

Objective 2.2 ♦ *Identify the known forest dependent wildlife species classified as threatened, rare or endangered by 2005.*

Specific management strategies may be required to ensure that threatened, rare or endangered species are not negatively impacted by forestry activities. In order to determine which strategies may be required, the list of wildlife species that are known to occur on the FMA will be evaluated against provincial or federal listings of these sensitive species.

- Strategy 2.2.1 ♦ *Threatened, rare or endangered wildlife species will be identified from the known species list created in Objective 2.1.*
- Monitoring ♦ *M16 - Endangered or threatened species list.*

Objective 2.3 ♦ *Work cooperatively with Sustainable Resource Development and other forest users to coordinate the quality, quantity and duration of access.*

Access increases use by other forest users thereby increasing disturbance, harvest and the potential for harassment of wildlife species. In addition, access creates linear disturbances that may effect species movement, habitat selection and use, as well as predator/prey relationships.

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| Strategy 2.3.1 | ◆ <i>Whenever possible and practical, existing access will be used during field operations.</i> |
| Strategy 2.3.2 | ◆ <i>Single pass harvesting will be used to minimize the number of entries into a harvest plan area and coordinate annual harvesting operations.</i> |
| Strategy 2.3.3 | ◆ <i>In-block roads will be rolled back to reduce access opportunities and wildlife harassment potential and maintain the productive landbase.</i> |
| Strategy 2.3.4 | ◆ <i>Upon completion of operations all temporary roads will be reclaimed in a manner that will prevent highway vehicle use.</i> |
| Strategy 2.3.5 | ◆ <i>A road corridor development plan will be developed and implemented by 2005. In order to ensure that the access development plan addresses impacts on wildlife, the Fish and Wildlife Service will be requested to assist in the development of the plan.</i> |
| Strategy 2.3.6 | ◆ <i>Where the forest industry has primary control of a section of new road, the industry shall manage access if the road is active longer than 6 months. This will be accomplished using a technique that is effective for the situation and addresses management objectives.</i> |
| Monitoring | ◆ <i>M29 - Access will be monitored using an access monitoring system such as Forest Access Management System (FAMS). The system will be used to track all new roads and crossings created and controlled by the forest industry on the FMA. Grade, condition, status, and maintenance will be tracked for each road and crossing for a minimum period of 3 years following deactivation or until satisfactorily reclaimed.</i> |
| | ◆ <i>M26 - Completion of the road development plan by 2005.</i> |

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| Objective 2.4 | ◆ <i>Develop strategies for the mitigation of forestry practices on wildlife habitat.</i> |
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"Forestry practices alter plant species composition, plant community structure, microclimate, and soil; there will be a change in animal species that are dependent on specific vegetation and soil conditions. Those adapted to, and dependent on, early successional conditions may be favored, while those adapted to, and dependent on, later successional conditions will be adversely affected. As ecological succession results in the regrowth of the forest the early-successional animal species will be lost, and the later successional species will once again occupy the area."³ (Kimmins, 1997)

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| Strategy 2.4.1 | ◆ <i>Manage for a range of mature and overmature seral stages on the FMA such that their combined representation on the landscape will</i> |
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³ Kimmins, J.P. 1997. *Balancing Act: Environmental issues in forestry*, 2nd Ed. UBC Press, University of British Columbia, 6344 Memorial Rd. Vancouver, B.C.

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not vary from the current range by more than 20 percent during the term of this plan. The assessment will include changes that are a result of forest management practices and will not include natural or anthropogenic disturbances.

- ◆ *The purpose is to maintain a variety of seral stages on the landscape to provide habitat types for a multitude of species. Population distribution and abundance of wildlife will change as seral stages evolve over time.*
- Strategy 2.4.2
- ◆ *Avoid increased fragmentation of the landscape using a single pass harvest system. The harvesting of complete patches in a short period will reduce fragmentation of large contiguous areas into many smaller patches that vary in seral stage development. In the past, harvest planning created uniform patch sizes reducing the variability of patch sizes across the landscape and increasing the amount of edge and fragmentation. The intent of the spatial sequence is to create a range of opening sizes that will sustain the larger tracts of contiguous habitat required by some species while providing for species that require multiple habitat types.*
- Strategy 2.4.3
- ◆ *Maintain connectivity, by providing continuity of habitats across the landscape⁴ (Harrison and Voller, 1998). Corridors are used to link portions of the landscape to allow for species movement. No set method of providing connectivity can be used because it varies with the landscape and species in question. During the planning process both landscape and stand level connectivity will be reviewed to ensure it is retained over time.*
- Strategy 2.4.4
- ◆ *Structure containing live and dead trees will be retained to create old forest characteristics in young and mid aged post harvest forests (Schieck et al, 2000). Representative patch retention will be practiced to a minimum level of 1% of the scheduled harvest area within each operating unit and up to an average level of 3% of the scheduled harvest area across individual Landscape Management Units (LMU's) over the term of the DFMP.*
 - ◆ *Recognizing that many of the harvest areas will not require retention areas due to their small size, the retention area locations will be assigned based on the following priority.*
 - 1) *Unmapped watercourses that require a buffer*
 - 2) *Special wildlife concerns such as mineral licks, dens, nests etc.*
 - 3) *Large cut blocks greater than 100 ha.*

⁴ Harrison, S. and Voller, J. 1998. Conservation Biology Principles for Forested Landscapes, UBC Press University of British Columbia, 6344 Memorial Rd. Vancouver, B.C.

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4) Connectivity between riparian areas and upland sites.

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| Strategy 2.4.5 | ◆ Retain borrow pits exceeding 0.1 hectares in size which are created as a result of road construction activities to increase the amount of wetland areas. Portions of the borrow pits should contain shallow areas less than 1 meter in depth to create wetlands which are of value to wildlife. In addition, these wetlands will contribute to the fire protection efforts as they will be available for suppression activities. |
| Strategy 2.4.6 | ◆ Operate in compliance with the Boreal Caribou Committee guidelines. |
| Monitoring | <p>◆ M12 - Every five years the abundance and distribution of seral stages across the FMA will be determined. The results will be compared with the predicted results that were formulated at the beginning of the planning period.</p> <p>◆ M12 - The average patch size of each seral stage and the average distance to similar patches will be compared to the existing landscape. This information will be used as an indication of the level of fragmentation across the landscape and the connectivity of similar patches.</p> <p>◆ M33 - Leave areas will be identified during the harvest planning process and tracked to ensure compliance. The sum of all the residual areas across the FMA will be monitored annually to ensure the target minimums within the LMU are maintained.</p> <p>◆ M37 – Annual Caribou Plan – showing compliance with guidelines.</p> |

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| Objective 2.5 | ◆ Support a process for the assessment of wildlife presence on the FMA |
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In addition to the wildlife monitoring programs that will be developed for the FMA area, the assessment of wildlife use will be strengthened through the support of current SRD monitoring programs and knowledge provided by local individuals.

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| Strategy 2.5.1 | ◆ Work with local government wildlife officials in the assessment of wildlife use on the FMA. |
| Strategy 2.5.2 | ◆ Work with local trappers in the assessment of wildlife use on the FMA |
| Monitoring | ◆ M16 - Wildlife Monitoring Report –summarize activities and progress of the wildlife monitoring projects. |

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Goal # 3- Maintain an acceptable range of native commercial tree species and their genetic diversity on the FMA.

Objective 3.1 ♦ *Replace harvested forest stands with trees that most closely resemble the natural gene pool.*

Maintenance of biodiversity is a primary goal of this detailed forest management plan. The ability to achieve this goal centers around maintaining existing tree species as well as striving to ensure the full range of genetic material. The companies recognize the need to reforest harvested areas with trees propagated from gene pools that most closely resemble the removed trees. Reforestation through vegetative propagation such as root collar sprouting or suckering predominates the deciduous tactics for stand replacement while conifer replacement utilizes a vast array of tactics in a continuum from natural regeneration to planting and stand density management.

Strategy 3.1.1 ♦ *Promote the natural regeneration of trees in conjunction with reforestation activities including suckering, vegetative propagation and natural seeding.*

Strategy 3.1.2 ♦ *Reforest areas using seedlings grown from seed collected from within the same general geographic region and in accordance with the seed zone guidelines for the Province of Alberta.*

Strategy 3.1.3 ♦ *Identify areas containing conifer and/or deciduous understories in annual harvest plans and employ harvesting methods that will strive to minimize damage to those understories.*

Strategy 3.1.4 ♦ *Participate in forest regeneration research.*

Strategy 3.1.5 ♦ *Follow provincial policy regarding genetically modified stock or exotic species on the FMA area.*

Strategy 3.1.6 ♦ *On a landscape basis, maintain approximately the same relative proportions of pre-harvest cover groups (C, CD, DC & D).*

Monitoring ♦ *M33 – Annual Harvest Report – identifying protected understories..*

♦ *M34 - Submission of Annual Silviculture Report for the FMA.*

♦ *M36 - Submission of an Annual Research Report.*

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Goal # 4 - Reduce the risk of significant loss of productive forest from insect and disease.

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| Objective 4.1 | ◆ <i>Develop an understanding of the natural range of forest conditions by completing a natural disturbance study by November 2005.</i> |
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Natural forest disturbances on the landscape are varied in size, spatial distribution and timing of occurrence. Over time, these disturbances have created a complex mosaic of stand types and conditions in the FMA. Although natural factors such as wind, insects and disease have all contributed to the current mosaic, forest fires remain the most prevalent and damaging disturbance agent in the area. Historical fire suppression and other landuse activities on the FMA have changed what the composition of the forest would have been, therefore, the current forest condition should not be considered natural. The completion of a natural disturbance study for the FMA would provide insights into how these processes occur and will improve our understanding of the contribution of these disturbances to the health of the forest.

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| Strategy 4.1.1 | ◆ <i>Complete a study of natural disturbance patterns for the FMA area, which focuses on wildfire, but will also include insect, disease and other natural disturbance agents. The objectives of the study will be to determine the size, shape, timing, and magnitude of historical disturbances, including the pattern of residual, undisturbed patches.</i> |
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| Monitoring | ◆ <i>M10 - Completion of the natural disturbance study by November 2005.</i> |
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| Objective 4.2 | ◆ <i>Work collaboratively with other forest resource users and research organizations to stay abreast of current research and technology which will aid in the development of strategies for timely identification and mitigation of insect and disease infestations.</i> |
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Several organizations exist which aim to improve the understanding of insect and disease impacts on the forest resource. Active participation in these groups will ensure that we are aware of current or potential outbreaks in the vicinity of the FMA. These groups also provide a forum for discussion of current prevention and control techniques in use or being studied.

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| Strategy 4.2.1 | ◆ <i>Maintain active membership within the Northwest Boreal Integrated Pest Management Working Group</i> |
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| Strategy 4.2.2 | ◆ <i>Maintain active membership within the Provincial Integrated Pest Management Working Group.</i> |
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| Strategy 4.2.3 | ◆ <i>Maintain a current library of forest health publications including annual reports, info-note, and research papers.</i> |
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| Monitoring | ◆ <i>M17 - 5 Year Forest Health Report</i> |
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Objective 4.3 ♦ *Detect and monitor the occurrence of forest insect and disease pests.*

Pests of concern on the Slave Lake Pulp FMA are listed in Table 4-19 in the landscape assessment (Chapter 4). The detection and monitoring strategies outlined below are intended to focus on the species identified in landscape assessment.

- Strategy 4.3.1 ♦ *Full-time operations staff, summer staff, and field contractors will be trained to identify common insects and diseases in conjunction with field work activities (this would include activities such as Block Layout, Pre-Harvest Prescriptions, and Regeneration Surveys). Sightings will be recorded and submitted to Slave Lake Pulp.*
- ♦ *All forest resource users will be encouraged to record and report insect and disease sightings to Slave Lake Pulp.*
- Strategy 4.3.2 ♦ *Obtain reports from Sustainable Resource Development detailing insect and disease sightings obtained during overview aerial surveys.*
- Strategy 4.3.3 ♦ *Reported sightings will be mapped and confirmed. Confirmed cases will be shared with relevant timber disposition holders and the government. Confirmed cases will be added to a forest health database for the FMA.*
- Strategy 4.3.4 ♦ *Site specific management plans will be developed which outline monitoring and control strategies for confirmed cases with potential for significant impacts on forest sustainability.*
- Strategy 4.3.5 ♦ *Slave Lake Pulp has been participating (in conjunction with the Northwest Boreal Integrated Pest Management Working Group) in the development of an insect and disease monitoring system. A primary goal of the system is to correlate the impact of insect and disease infections on growth and yield. The system will be linked to the PSP program and will be initiated in 2003.*
- Monitoring ♦ *M17 - 5 Year Forest Health Report, Forest Health monitoring system and Forest Health Database*

Objective 4.4 ♦ *Minimize the impact of forest insect and disease pests.*

The identification of high risk sites, where insect and disease pests may have significant impacts on the health of the forest, will facilitate the development of appropriate control treatments that will mitigate the effect on the sustainability of the resource.

- Strategy 4.4.1 ♦ *Identify high risk cover types for insect and disease on the FMA by November 2005. This information will be used to evaluate the likelihood of forest health epidemics and aid in the planning of harvest scheduling.*

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| Strategy 4.4.2 | ◆ <i>Assess data obtained through the insect and disease detection and monitoring programs to determine if additional monitoring or control measures are required.</i> |
| Strategy 4.4.3 | ◆ <i>In the event of an outbreak, Slave Lake Pulp will take a lead role in managing the pest. The forest industry will work together to decrease the impact of the event.</i> |
| Monitoring | ◆ <i>M17 - Insect and Disease High Risk cover type, Forest Health monitoring system and 5 Year Forest Health Report</i> |

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Goal # 5 - Maintain or enhance site productivity.

Forestry practices have the potential to impact site productivity and the site's capacity to grow trees. Improper harvesting and silviculture techniques can have negative influences on site productive capacity. Many factors could be affected; however, the primary concerns are soil degradation (Goal 6) and reforestation success. Lesser contributing factors could include such aspects as increased water, increased erosion potential, increased fire risk and introduction of site limiting species such as noxious weeds and non-native species.

Objective 5.1 ♦ *To meet, or exceed, government regulated regeneration standards.*

Slave Lake Pulp and the stakeholder companies are committed to meeting or exceeding the regulated regeneration standards. The current 2000 regeneration standards sufficiently address the requirements of this plan but are limiting in their restriction to pre-defined landbases. The forest companies are utilizing a single landbase concept which reflects the intent to grow combinations of both deciduous and coniferous species on forest lands in pure and mixedwood types. Opportunity to refine the regeneration standards (along the lines of Model II) will be explored through the Silviculture Working Group.

- Strategy 5.1.1 ♦ *Form a Silviculture Working Group with the mandate to develop silviculture strategies and processes that fulfill the requirements outlined in the DFMP.*
- Strategy 5.1.2 ♦ *Conduct pre-harvest assessments (PHA) as defined by the silviculture working group to determine the most effective reforestation strategies.*
- Strategy 5.1.3 ♦ *Complete initial reforestation treatment within 2 years of harvest.*
- Strategy 5.1.4 ♦ *Conduct surveys required to meet legislated requirements to evaluate regeneration success.*
- ♦ *Achieve regulated stocking levels on all cutover areas.*
- Strategy 5.1.5 ♦ *Follow existing government approved regeneration standards until such time as FMA specific regeneration standards are approved.*
- Strategy 5.1.6 ♦ *All coniferous and deciduous species identified in the cover types and included in the growth and yield analysis associated with the inventory will be considered as acceptable species. These currently include white spruce, black spruce, lodgepole pine, jack pine, balsam fir, larch, aspen, balsam poplar, and birch species.*
- Strategy 5.1.7 ♦ *Employ the most cost-effective tools available to facilitate the establishment of desired species on each cutblock. These tools include, but are not limited to, drag scarification, leave for natural, prescribed burning, planting, seeding, mechanical stand tending,*

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chemical stand tending, thinning, manual site preparation, mechanical site preparation and chemical site preparation.

Strategy 5.1.8 ♦ *Conduct research in growth and yield with particular attention to regenerated yields.*

Monitoring ♦ *M34 - Submission of Annual Silviculture Report*

♦ *M33 - Submission of Annual Operating Plan*

♦ *M36 - Submission of Annual Research Report*

Objective 5.2 ♦ *Develop a strategy for the mitigation of forestry practices on site productivity.*

The forest companies recognize the need to maintain the maximum site productivity on the net landbase. Continual loss of the productive forest landbase will negatively impact the sustainability of the forest resource. Operations under inappropriate site conditions can be limiting to both coniferous and deciduous regeneration success. Soil compaction and displacement during skidding and land lost to in-block roads can significantly reduce site productivity. In addition, land lost to inappropriate regeneration strategies will result in loss of productivity and increased costs. Slash pile accumulations may impact the site's capacity to support regenerated stands. Slash reduction tactics may be incorporated in the companies' harvest and regeneration strategies.

Strategy 5.2.1 ♦ *Under normal circumstances, harvest operations will be conducted under dry or frozen ground conditions*

Strategy 5.2.2 ♦ *The forest companies will adhere to the Soil Conservation Guidelines developed by the province.*

Strategy 5.2.3 ♦ *Roads will be kept to a minimum while still maintaining safe and efficient harvesting and log haul operations. As a general rule, the in-block roads will be limited to no more than 5% of the block area. Blocks exceeding 5% will be reported in the Annual Harvest Report.*

Strategy 5.2.4 ♦ *Slave Lake Pulp will continue to investigate the potential to incorporate sludge materials onto deactivated logging roads and reclaimed land use dispositions.*

Strategy 5.2.5 ♦ *Reduce the amount of area lost to the productive landbase due to slash accumulation. The tactics used will include pile and burn, spreading, tight piling (without burning) or delimbing at the stump. The specific tactic employed will reflect the risk for wildfire and benefit to other forest values such as down and woody debris and wildlife habitat. Up to 5% of the slash piles will be retained for wildlife habitat and other forest values.*

Monitoring ♦ *M34 - Annual Silviculture Report*

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- ◆ *M33 - Annual Operating Plan – Harvest Report*
- ◆ *M13 – Reclamation Report*

Objective 5.3	◆ <i>Develop a process for understanding the impacts of forestry practices on site productivity.</i>
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The forest companies jointly support a number of research initiatives, which address the impact of forestry practices on site productivity. The understanding of the interrelationship between forestry practices and impacts on site productivity is improving with additional research. The correlation between site productivity, regeneration performance and DFMP assumptions will be validated when regenerated stands reach pre-defined thresholds.

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| Strategy 5.3.1 | ◆ <i>The forest companies will continue to support organizations and research projects to investigate the potential adverse effects of forestry practices on site productivity.</i> |
| Strategy 5.3.2 | ◆ <i>Develop a process to validate yield curves with model II regeneration standards by 2010.</i> |
| Monitoring | ◆ <i>M36 - Annual Research Report</i> |

Objective 5.4	◆ <i>Develop a strategy for the inclusion of site productivity issues in the FMA ground rules.</i>
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Site productivity issues should be addressed at all operational stages (from planning until final regeneration after harvest). The forest companies recognize that losses due to cumulative effects will gradually put increased pressure on the productive capacity of the net landbase. Proactive strategies must be entrenched within all phases of operations to successfully sustain the forest resource.

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| Strategy 5.4.1 | ◆ <i>The forest companies will incorporate site productivity concerns into the FMA ground rules.</i> |
| Monitoring | ◆ <i>M3 - FMA ground rules are to be completed within six months of the plan being approved.</i> |

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Goal # 6 – Mitigate the impacts of forestry practices on forest soils.

Maintenance of the productive capacity of forest soils is crucial to sustaining the commercial fibre supply within the FMA. Continual land withdrawal, loss of site productivity and exclusions for other forest values will have negative fibre supply impacts. The companies recognize that many of these are beyond their direct control. Mitigation of the impacts on the tree-growing medium is within the control of the forest industry.

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| Objective 6.1 | ◆ <i>Develop collaborative FMA Ground Rules within six months of the approval of this plan; and, make allowances for the inclusion of measures to mitigate the impacts of forestry practices on forest soils.</i> |
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Forest practices have the potential to have detrimental effects on forest soils. The need to provide processing facilities with freshly harvested fibre supplies is process dependent. Historically, the majority of the coniferous timber has been harvested under frozen ground conditions and the deciduous supply was acquired in late summer on through early spring. Inventory control targets are designed to carry a minimal amount of inventory through the summer months. These economic factors must be balanced with potential negative effects on soil structure, soil moisture and soil displacement.

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| Strategy 6.1.1 | ◆ <i>Develop measures to reduce the potential negative impacts of forestry operations on forest soils within the FMA ground rules.</i> |
| Strategy 6.1.2 | ◆ <i>Establish an FMA ground rule working group upon submission of the plan and complete the ground rules within six months of plan approval.</i> |
| Monitoring | ◆ <i>M3 - Development of FMA Ground Rules within six months of plan approval.</i> |

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| Objective 6.2 | ◆ <i>Operate in compliance with all applicable soil conservation guidelines.</i> |
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Protection of the soil resource is paramount to maintaining the productive capacity of the forest. The forest companies support adherence to the Forest Soils Conservation Guidelines as published by SRD. The guidelines provide minimum target levels for the impact of forestry operations on forest soils.

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| Strategy 6.2.1 | ◆ <i>The forest companies will adhere to the Soil Conservation Guidelines developed by the province.</i> |
| Strategy 6.2.2 | ◆ <i>All deviations from the standards in the Soil Conservation Guidelines will be reported in block inspections.</i> |
| Monitoring | ◆ <i>M33 – Annual Harvest Plans</i> |

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- *Annual Operating Plan will state planned deviations from the Soil Conservation Guidelines.*
- *Report deviations from Soil Conservation Guidelines to SRD in Annual Harvest Report.*

Objective 6.3	◆ <i>Increase understanding of the impacts of forestry practices on forest soils with the intent to apply knowledge gained.</i>
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The Slave Lake Pulp FMA area does not have a complete soils inventory on any of its land area. A summary of the Canadian Land Classification rating for timber production, which gives crude approximations for the soil classification on the FMA, is provided in the landscape assessment. This lack of soil information creates a need for more complete soils information on all harvested sites.

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| Strategy 6.3.1 | ◆ <i>The companies will work together with SRD to improve the scientific information base used to develop the Soil Conservation Guidelines.</i> |
| Strategy 6.3.2 | ◆ <i>Pre-harvest assessments, where completed, will include a field soils assessment.</i> |
| Strategy 6.3.3 | ◆ <i>The companies will design a consistent soils assessment system within 2 years of plan approval.</i> |
| | ◆ <i>Implement the soil assessments through the PHA and PSP programs.</i> |
| Strategy 6.3.4 | ◆ <i>The companies will continue to participate in research aimed at understanding the impacts of forestry operations on soils.</i> |
| | ◆ <i>Results of these various studies will be applied to forest operations, where applicable.</i> |
| Monitoring | ◆ <i>M33 - Annual Operating Plans – PHA's</i> |
| | ◆ <i>M6 - Soils Assessment Program Development and Implementation Schedule.</i> |
| | ◆ <i>M36 - Annual Research Report</i> |
| | ◆ <i>M23 - Permanent Sample Plot Program</i> |

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Goal # 7 - Mitigate the impacts of forestry practices on water quality and quantity.

Objective 7.1 ♦ *Identify watersheds on an FMA basis within the term of this plan.*

Watershed boundaries must be defined for the entire landscape area. The watersheds are required to facilitate the evaluation of the potential impacts of forestry operations on water flow. The watershed network must be identified to evaluate the total cumulative downstream implications of various management strategies.

Strategy 7.1.1 ♦ *Delineate watersheds within the FMA which are approximately one township in average size. The watersheds will be used to evaluate potential impacts of forestry operations on water flow values through the use of appropriate modeling and monitoring techniques.*

Monitoring ♦ *M4 - Watershed boundaries have been identified, and are presented, in this DMFP. A description of the watersheds is provided in the Landscape Assessment (Chapter 4).*

Objective 7.2 ♦ *Develop strategies to mitigate the impacts of forestry practices on riparian areas.*

Riparian areas are important for many timber and non-timber values. These areas are key wildlife corridors, very rich, productive sites and act as water quality filters. Forestry practices should be designed in a manner that recognizes the sensitivity of these sites. However, current government policy may not provide the best management strategies for these sites. For example, the current mandate requires the maintenance of buffers along all permanent watercourses. However, these strips do not occur naturally along all watercourses. A diverse combination of a broad range of vegetation types along watercourses may improve the overall health of the landscape.

Strategy 7.2.1 ♦ *Develop FMA specific ground rules which will strive to maintain natural ranges in water quality and quantity levels on the FMA.*

Strategy 7.2.2 ♦ *Design forestry activities in the immediate vicinity of riparian areas in a manner that will not compromise the objectives of buffers.*

Monitoring ♦ *M3 - Development of ground rules for the SLP FMA.*

♦ *M33/M34 - Summary of how related road design, site prep prescriptions, etc have been designed to reduce potential buffer impact in annual plans.*

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- Objective 7.3 ♦ *Work collaboratively with other resource users to minimize the amount of roads, stream crossings and general site disturbance*

The impact of all anthropogenic land-use disturbances in the FMA will be minimized through cooperation between the industrial users. Sharing of existing resources will promote their efficient use and reduce the demand for construction of new access routes.

- Strategy 7.3.1 ♦ *Complete integrated (deciduous and coniferous) forest harvest plans cooperatively with all forest industry stakeholders in the FMA and coordinate the number, and timing, of entries into operating areas.*

- Strategy 7.3.2 ♦ *Where possible, enter into commercial road use agreements with companies that own roads on the FMA. These agreements will allow for the use of existing roads by both companies, thereby reducing the amount of new road construction required.*

- Monitoring ♦ *M33 - Development of integrated forest harvest planning procedures.*
- ♦ *M30 - Summary of the number of road use agreements.*

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- Objective 7.4 ♦ *Meet or exceed government requirements for road construction, maintenance and abandonment by ensuring that all FMA forest industry operations are within government guidelines.*

Current government legislation and guidelines strive to minimize the environmental impact of road development. Adherence to these policies will demonstrate that the forest industry is committed to meeting, or surpassing, the minimum expectations identified by the government.

- Strategy 7.4.1 ♦ *Approval of harvest plans and sign-off of reclaimed roads by inspecting officer*

- Strategy 7.4.2 ♦ *Design and implementation of watercourse crossing monitoring inspection procedures.*

- Monitoring ♦ *M29 – Access Development Report*
- *Maintain a log of road inspection forms.*
 - *Maintain a log of all crossing inspection forms.*
 - *Non-compliance tracking and adaptive management to fix any identified problems.*
 - *FAMS or other such programs*

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- Objective 7.5 ♦ *Work cooperatively with Sustainable Resource Development and interested industry partners to develop an understanding of the impacts of forestry practices on water quality and quantity.*

Research projects and trials are expensive and time consuming to conduct. Through the cooperation of all interested parties, research projects become less cost prohibitive. In addition, by bringing the experience and expertise of all interested parties together, the research will be more focussed and defensible.

- Strategy 7.5.1 ♦ *Participate in research projects, in cooperation with Sustainable Resource Development and other forestry stakeholders, that will further the understanding of the impacts of forestry practices on water quality and quantity.*

- Strategy 7.5.2 ♦ *Identify areas which are suitable candidates for watercourse and waterbody buffer management trials and initiate such trials by February 2005. The objective of the trials will be to determine the implications of various buffer treatments (e.g. variable buffer widths, partial harvesting within buffer areas) on the following:*

- *Windfirmness of buffer*
- *Water quality and quantity*
- *Fish habitat*
- *Use as wildlife corridors*

- Monitoring ♦ *M5 - Initiation of trial areas by February 2005.*

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Goal # 8 - Protect sensitive sites.

The FMA area has a number of unidentified sensitive sites, which are important for a variety of forest values. The forest industry, with the mandate as land manager will develop programs and processes designed to identify these sites. Further, it is their intent to provide some degree of protection for those sites deemed to be significant for proven forest values identified within the Management Plan.

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| Objective 8.1 | ◆ <i>Develop a process for the identification and incorporation of sensitive sites into forest management planning and operations within one year following the approval of this plan.</i> |
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Slave Lake Pulp and the forest companies within the FMA recognize the importance of protecting sites within the FMA, which may be sensitive to commercial operations, human disturbance or unnecessary exposure to increased activity. These sites are either important to specific people or groups or are vital links to ecological biodiversity and maintenance of species and species guilds. The companies will work with government and concerned groups to ensure the protection of these sites from exploitation or misuse. The presence of the Grizzly Ridge Wildland Provincial Park embedded within the FMA and the proposed Goose Mountain Special Place to the region exemplifies the commitment of the companies to protection of unique and rare features. All the forest companies currently within the FMA participated in the Special Places 2000 program, which was instrumental in the establishment of Grizzly Ridge Wildland Provincial Park.

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| Strategy 8.1.1 | ◆ <i>Work with Fish and Wildlife Service and local trappers to identify the location of mineral licks on the FMA.</i> |
| Strategy 8.1.2 | ◆ <i>Work with Fish and Wildlife Service and local trappers to locate trapper cabins on the FMA.</i> |
| Strategy 8.1.3 | ◆ <i>Identify major water source areas within the FMA and coordinate harvest operations to mitigate impacts on those sites.</i> |
| Strategy 8.1.4 | ◆ <i>Provide staff training for identifying sensitive sites and create standard operating procedures to ensure that all levels of operations recognize the need to mitigate impacts on these sites.</i> |
| Strategy 8.1.5 | ◆ <i>Provide historical resource predictability analysis for all harvest operations on the FMA and comply with the Alberta Community Development regulations as they apply to historical resources.</i> |
| Strategy 8.1.6 | ◆ <i>Work with aboriginal peoples to assist in identification of culturally significant sites.</i> |
| Monitoring | ◆ <i>M33 - Creation of a spatial GIS layer of sensitive sites. Include an evaluation of sensitive sites in annual harvest plans.</i> |
| | ◆ <i>M20 - Include Historical Resources Summaries in Stewardship</i> |

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| Objective 8.2 | ◆ <i>In collaboration with Sustainable Resource Development, develop site specific plans for identified sensitive sites as required.</i> |
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The forest industry within the FMA will work in conjunction with SRD to develop specific protection plans for sensitive sites.

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| Strategy 8.2.1 | ◆ <i>Report, and develop plans for, identified sensitive sites within the FMA.</i> |
| Strategy 8.2.2 | ◆ <i>The companies will report all unique and sensitive sites encountered within the forestry operations to SRD and applicable government agencies.</i> |
| Monitoring | ◆ <i>M33 - Annual Harvest Report – sensitive sites.</i> |

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Goal # 9 - Mitigate the impacts of forestry practices on hydrological cycles.

Objective 9.1 ♦ Mitigate the impacts of forestry practices on water flows.

The natural range of variability (NRV) in water flow varies dramatically from season-to-season and year-to-year. As a general rule, forestry practices have greater impacts on smaller watersheds or portions of watersheds. Extreme water flow events are attributed to extreme precipitation events.

Strategy 9.1.1 ♦ *Improve understanding of the impacts of forestry practices on hydrological cycles through the use of computer simulation models that evaluate the potential impacts of forestry operations on water flows.*

Strategy 9.1.2 ♦ *Design forestry activities in the immediate vicinity of riparian areas in a manner that will not compromise the objectives of buffers*

Strategy 9.1.3 ♦ *The forest companies will sequence the harvest such that water quality and quantity are maintained within an acceptable range. Constraints have been introduced into the harvest sequence to reduce the risk of significant negative impacts on water quality and stream flow. No more than 50% of the watershed will be allowed to fall below specified threshold species/age class levels throughout the term of the plan. These threshold levels were determined through consultation with hydrology specialists and are supported by research papers⁵ (Long and Smith, 1991). The identified thresholds are 10 years for pure deciduous; 15 years for deciduous dominated mixedwood, 25 years for pine and 40 years for other conifer and conifer dominated mixedwoods. The primary decision factor was the determination of the cutover's capacity to regain the pre-harvest leaf-area-index.*

Monitoring ♦ *M19 - Report of computer simulation results*

⁵ Long, James N. and Smith, Frederick W. 1991. Volume increment in *Pinus Contorta* var. *latifolia*: the influence of stand dynamics and crown dynamics. *Forest Ecology and Management*, 53 (1992) 53-64.

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Objective 9.2 ♦ *Develop a process for the identification of sensitive sites and key watersheds*

Some sites may be more susceptible to impact than others. Identification of these sites will aid in designing forestry operations in a manner that will minimize impact on these sites. In many cases, the most sensitive sites have already been identified and are protected through regulations (e.g. buffers along watercourses).

Strategy 9.2.1 ♦ *Identify major water source areas within the FMA and coordinate harvest operations to mitigate impacts on those sites.*

Strategy 9.2.2 ♦ *Provide staff training for identifying sensitive sites and create standard operating procedures to ensure that all levels of operations recognize the need to mitigate impacts on these sites.*

Strategy 9.2.3 ♦ *Use the results of strategy 9.1.1 to determine which watersheds may be particularly sensitive to forestry operations in the future. Design forest management plans that mitigate the impacts of forestry operations on these sites and watersheds.*

Strategy 9.2.4 ♦ *The companies will design a consistent soils assessment system within 2 years of plan approval. The assessment will assist in the evaluation of erosion potential and site sensitivity. The assessment will be completed through the use of pre-harvest assessments and permanent sample plots.*

Monitoring ♦ *M33 – Annual Harvest Reports*
♦ *M21 – Training and Employment Report*
♦ *M19 – Watershed Analyses Reports*
♦ *M6 - Start soils assessment system by summer 2004.*

Objective 9.3 ♦ *Mitigate the impacts of forestry practices on standing water*

The impacts of forestry practices on the surface area of water are typically mitigated through the use of vegetated buffers. The buffer areas act as water quality filters which are intended to reduce the level of sedimentation entering the waterbody as a result of forestry activities. Road building activities present an opportunity to increase the presence and spatial distribution of waterbodies across the FMA area. Retention of borrow pits can contribute to wildlife habitat when designed properly.

Strategy 9.3.1 ♦ *Maintain vegetated buffers along waterbody edges.*

Strategy 9.3.2 ♦ *Retain borrow pits exceeding 0.1 hectares in size which are created as a result of road construction activities to increase the amount of*

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wetland areas. Portions of the borrow pits should contain shallow areas less than 1 meter in depth to create wetlands which are of value to wildlife. In addition, these wetlands will contribute to the fires protection efforts as they will be available for suppression activities.

Strategy 9.3.3 ♦ *Identify areas which are suitable candidates for watercourse and waterbody buffer management trials and initiate such trials by February 2005. The objective of the trials will be to determine the implications of various buffer treatments (e.g. variable buffer widths, partial harvesting within buffer areas) on the following:*

- *Windfirmness of buffer*
- *Water quality and quantity*
- *Fish habitat*
- *Use as wildlife corridors*

Monitoring ♦ *M33 - Annual harvest plans*

♦ *M29 - Access development plans*

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Goal # 10 - Mitigate the impacts of forestry practices on fish and fish habitat.

Objective 10.1 ♦ *Identify known fish species on the FMA by 2005.*

A complete inventory of the fish species that occur on the FMA area is not currently available. An accurate listing of fish species that are present on the FMA is required before management strategies can be designed to mitigate the impacts of forestry practices on them.

Strategy 10.1.1 ♦ *Maintain support of a fish inventory program*

Strategy 10.1.2 ♦ *Develop a list of fish species on the FMA by 2005, with continuous updates, as new information becomes available.*

Monitoring ♦ *M16 - Present species list in the stewardship report.*

Objective 10.2 ♦ *Identify the known fish species classified as threatened, rare or endangered by 2005.*

Specific management strategies may be required to ensure that threatened, rare or endangered species are not negatively impacted by forestry activities. In order to determine which strategies may be required, the list of fish species that are known to occur on the FMA will be evaluated against provincial or federal listings of these sensitive species.

Strategy 10.2.1 ♦ *Threatened, rare or endangered species will be identified from the known species list.*

Monitoring ♦ *M16 - Present species list in the stewardship report.*

Objective 10.3 ♦ *Develop strategies for the mitigation of forest practices on fish and fish habitat*

Forest practices can affect fish populations by altering habitat and creating barriers to movement. Habitat alteration may result from a change in stream flow characteristics, increased sedimentation and changes in water yield. Barriers to movement are primarily a result of watercourse crossing structures that are improperly constructed or maintained.

Strategy 10.3.1 ♦ *Riparian area management strategies will meet or exceed government requirements. These requirements will only be altered when the management objective can be enhanced and after consultation with the appropriate government agencies.*

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- Strategy 10.3.2 ♦ *Watercourse crossing structures will meet or exceed government requirements.*
- Strategy 10.3.3 ♦ *The forest companies will sequence the harvest such that water quality and quantity are maintained within an acceptable range. Constraints have been introduced into the harvest sequence to reduce the risk of significant negative impacts on water quality and stream flow. No more than 50% of the watershed will be allowed to fall below specified threshold species/age class levels throughout the term of the plan. These threshold levels were determined through consultation with hydrology specialists (Rothwell, Silins) and are supported by research papers (Long and Smith, 1991). The identified thresholds are 10 years for pure deciduous; 15 years for deciduous dominated mixedwood, 25 years for pine and 40 years for other conifer and conifer dominated mixedwoods. The anthropogenic features were considered to be bare ground and are included in the 50% removal threshold. The primary decision factor was the determination of the harvest area's capacity to regain the pre-harvest leaf-area-index.*
- Monitoring ♦ *M29 - Access management summaries in the annual harvest reports (such as FAMS)*
- ♦ *M19 - Where required, WRENNs or similar watershed analyses will be included in harvest plans.*
- ♦ *M15 – Spatial Sequence Evaluation – report on percent harvested by LMU and watershed*
- ♦ *M27 – Forest Regulation Report - Non-conformances will be summarized in the stewardship report.*

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Goal # 11 - Manage the FMA based on sound scientific principles.

Objective 11.1 ♦ *Develop and maintain a staff of competent professionals dedicated to the practice of forestry.*

The companies fully commit to management of the FMA on sound scientific principles. It is recognized that socio-economic factors may influence the management of the forest resource, but as forest managers we will rely upon sound forest management principles to defend our practices. A crucial component is staff training and development. The companies support both professional organizations (The College of Alberta Professional Foresters and the College of Alberta Professional Forest Technologists) and their mandates. In addition, other science and natural resource related professions, such as biologists and engineers, provide valuable input into the development and refinement of forest management practices.

Strategy 11.1.1 ♦ *Provide opportunity for employees to maintain professional development through structured and non-structured training activities.*

Strategy 11.1.2 ♦ *Ensure that all plans are scrutinized and signed by registered forest practitioners.*

♦ *Ensure that all forestry operations are completed under the supervision of registered forest practitioners.*

Monitoring ♦ *M21 - Training and Employment Report in Stewardship Report*

♦ *M33 - Annual Operating Plans*

Objective 11.2 ♦ *On an ongoing basis, improve our understanding of the impacts of forest practices on the forest ecosystem*

The scientific basis for all forest management decisions is not necessarily complete. The companies recognize the need to identify gaps in the scientific knowledge base, which would permit informed decision making regarding the management of the forest resource. The quest for improved information and its application to forest management is the basis for adaptive management as outlined in the Forest Management Planning Manual. The gaps are best identified through analysis of the existing information base and feedback from application of the existing information to the forest. These feedback loops, or information monitoring, take a variety of shapes. These include inventory updates, volume yield reconciliation to yield curves, monitoring of other forest values, economic viability of forest strategies and many others. The implementation and monitoring program in Chapter 7 describes the feedback mechanisms.

Strategy 11.2.1 ♦ *Maintain a research and development program within the existing working groups and the DFMP Planning Team*

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- *Work with stakeholders to identify gaps in current knowledge of forest management strategies or objectives.*
- *Determine what studies are currently underway which will fill in the knowledge gaps.*
- *Promote the completion of objective, scientifically sound studies to fill in any remaining knowledge gaps with an emphasis on forest management topics.*

Monitoring

- ◆ *M36 - Annual research Report - Create a report of the gaps in current knowledge, as developed in conjunction with the FMA stakeholders. Include a prioritized list of study projects, which will guide future research. The research and development strategy report to be completed by December 2003*

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Goal # 12 - Maintain or increase the productive forest landbase.

Objective 12.1 ♦ *On an ongoing basis, minimize the amount of productive forested lands converted to non-forested land use.*

Reduction of the productive forest is an ongoing dilemma faced by the forest industry in Alberta. The many commercial users of the forested landbase require use of the land to accomplish their business pursuits. Many of these uses preclude other uses and in particular, forest production. The primary commercial users are oil and gas exploration and development; utility distribution and agricultural expansion. In addition, a number of non-commercial demands upon the forested landbase exist. These include land claims, protected areas, wildlife reserve areas, unique features and endangered species protected areas. The combination of all these withdrawals places immense pressure upon the forest industry to minimize the losses and wherever feasible, increase the productive forest landbase.

Strategy 12.1.1 ♦ *Work with SRD and applicants of new dispositions to utilize existing disturbances or unproductive forest types for the establishment of new dispositions.*

Strategy 12.1.2 ♦ *Work with SRD and other forest users to review reclamation standards to promote re-establishment of commercial tree species on reclaimed dispositions.*

Strategy 12.1.3 ♦ *Reforest all seismic lines within cutblocks unless specific alternate uses have been identified.*

Strategy 12.1.4 ♦ *Minimize losses to the productive landbase by working with utility disposition holders to reduce hazard trees along power lines.*

Strategy 12.1.5 ♦ *Complete prompt land use updates to record and document landbase changes.*

Strategy 12.1.6 ♦ *Complete periodic inventory updates to identify areas that have changed designation during the period of the plan.*

Monitoring ♦ *M18 - Land Use Report*

 ♦ *M34 - Annual Silviculture Report – reforest seismic lines*

 ♦ *M13 - Annual Reclamation Report*

 ♦ *M33 - Annual Operating Plans – (e.g. tree free plan etc.)*

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Objective 12.2 ♦ *Continuously explore opportunities to increase the productive forest landbase.*

Prompt establishment of commercial tree species on burned over areas of the FMA and on reclaimed dispositions could significantly offset productive landbase losses. The forest companies will access all TDA monies and commit to use of those monies for re-establishment of forest cover on cancelled landuse dispositions, burned areas or to enhance the growth of existing forests. This will provide greater long-term security of the fibre resource. The companies have agreed to proportionately share the expense and the gains attributed to afforestation efforts on the FMA.

Strategy 12.2.1 ♦ *Collect both coniferous and deciduous TDA money for all hectares in the FMA.*

♦ *Apply TDA money collected for both coniferous and deciduous species to the re-establishment of pre-disturbance cover types on the FMA.*

♦ *TDA money is to be managed through the Silviculture Working Group.*

Strategy 12.2.2 ♦ *Evaluate recently burned areas of the FMA to determine where potential exists to convert potentially productive ground to productive ground through the establishment of commercial tree species.*

♦ *Work within the Silviculture Working Group to identify tactics designed to place the burned over areas in the FMA into productive capacity. This plan is to be completed by November 2005 with implementation within the time frame of this plan*

Monitoring ♦ *M18 - Annual TDA report.*

♦ *M13 - Annual Silviculture Report*

• *Reclaimed potentially productive areas.*

• *TDA expenditure Summary*

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6.3 Socioeconomic Goals



Goal # 13 - Reduce significant loss of productive forest from forest fire.

Objective 13.1 ♦ *Reduce the susceptibility of the FMA to forest fire.*

Although there have been several significant fires on the FMA since 1998, a significant threat still exists. Large, contiguous areas of volatile fuel types exist in the southern portion of the FMA. Several tactics will be employed to reduce the susceptibility of the FMA area to forest fire and reduce the probability of the occurrence of catastrophic fires. A significant portion of the FMA is dominated with pure coniferous stand types without any effective fuel breaks. In addition, many danger trees pose a threat of blowing down onto active power lines. Undertaking pro-active measures to reduce known risks should reduce the impact of future forest fires.

- Strategy 13.1.1 ♦ *Design harvest areas with the intent to follow natural landscape patterns. This would include the broad range of stand types, ages and sizes. As a result, maximum cutblock size limitations are not required.*
- Strategy 13.1.2 ♦ *Target highly volatile and high intensity fuel types for harvest scheduling early in the harvest sequence.*
- Strategy 13.1.3 ♦ *Reduce the amount of area lost to the productive landbase due to slash accumulation. The tactics used will include pile and burn, spreading, tight piling (without burning) or delimbing at the stump. The specific tactic employed will reflect the risk for wildfire and benefit to other forest values such as down and woody debris and wildlife habitat. Up to 5% of the slash piles will be retained for wildlife habitat and other forest values.*
- Strategy 13.1.4 ♦ *Retain borrow pits exceeding 0.1 hectares in size which are created as a result of road construction activities to increase the amount of wetland areas. Portions of the borrow pits should contain shallow areas less than 1 meter in depth to create wetlands which are of value to wildlife. In addition, these wetlands will contribute to the fires protection efforts as they will be available for suppression activities.*
- Strategy 13.1.5 ♦ *Create landscape level fire breaks along Highway 33 and along Highway 2. Complete a fuel management plan for conifer stand types within 2 kilometres on either side of highway 33 and near south shore communities within five years of the plan approval.*
- Strategy 13.1.6 ♦ *Minimize losses to the productive landbase by working with utility disposition holders to reduce hazard trees along power lines.*
- Strategy 13.1.7 ♦ *When burning prescriptions occur, monitoring programs will be implemented to ensure that the fires are extinguished.*

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- Strategy 13.1.8 ♦ *Evaluate recently burned areas of the FMA to determine where potential exists to convert potentially productive ground to productive ground through the establishment of commercial tree species.*
- ♦ *Work within the Silviculture Working Group to identify tactics designed to place the burned over areas in the FMA into productive capacity. This plan is to be completed by December 2004 with implementation within the time frame of this plan.*

- Monitoring ♦ *M15 - Follow spatial harvest sequence*
- ♦ *M35 - Annual Forest Protection Plan*
- ♦ *M33 - Develop plan to introduce fire breaks along Highway 33 and Highway 2*

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- Objective 13.2 ♦ *Develop strategies for the training and preparedness for fire suppression of the forest industry.*

The recognition, and elimination, of potential fire ignition risks is a key factor in reducing the probability of fire occurrence. The majority of human caused fires are preventable, with the proper equipment in the hands of appropriately trained woodlands staff and a proactive public education program.

- Strategy 13.2.1 ♦ *Undertake fire suppression and fire prevention training for staff and contractors.*
- Strategy 13.2.2 ♦ *In conjunction with the Forest Protection Division, participate in public education forums or seminars related to fire suppression and pre-suppression techniques.*
- Monitoring ♦ *M21 - Retain training records including the names of individuals, date and topic of discussion*
- ♦ *M32 - Document public awareness initiatives.*

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Objective 13.3 ♦ *Complete a natural disturbance study, by 2005, to develop an understanding of the historic incidence of fire on the FMA*

Natural forest disturbances on the landscape are varied in size, spatial distribution and timing of occurrence. Over time, these disturbances have created a complex mosaic of stand types and conditions in the FMA. Although natural factors such as wind, insects and disease have all contributed to the current mosaic, forest fires remain the most prevalent and damaging disturbance agent in the area. Historical fire suppression and other landuse activities on the FMA have changed what the composition of the forest would have been, therefore, the current forest condition should not be considered natural. The completion of a natural disturbance study for the FMA would provide insights into how these processes occur and will improve our understanding of the contribution of these disturbances to the health of the forest.

Strategy 13.3.1 ♦ *Complete a study of natural disturbance patterns for the FMA area, which focuses on wildfire, but will also include insect, disease and other natural disturbance agents. The objectives of the study will be to determine the size, shape, timing, and magnitude of historical disturbances, including the pattern of residual, undisturbed patches.*

Monitoring ♦ *M10 - Completion of a natural disturbance study by 2005*

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Goal # 14 – Actively participate in forest policy decision-making.

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| Objective 14.1 | ◆ <i>On an ongoing basis, work closely with the government to improve policy and regulations that contribute to forest sustainability and profitability.</i> |
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The forest companies participate in a number of organizations, which provide the opportunity to actively participate in policy and regulation decisions within the government. A direct link exists between the sustainability of the forest resource and the profitability of the timber companies. The forest companies will strive to introduce positive changes to forest policy and regulation.

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| Strategy 14.1.1 | ◆ <i>Maintain membership and actively participate in the Alberta Forest Products Association (AFPA).</i> |
| Strategy 14.1.2 | ◆ <i>Continue to develop a positive working relationship with representatives of Provincial and Federal agencies.</i> |
| Strategy 14.1.3 | ◆ <i>Develop a coordinated approach to monitoring and participating in groups which may effect policy change related to management of the FMA.</i> |
| Monitoring | ◆ <i>M27 – Forest Regulation Report – report on active participation in policy review.</i> |

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| Objective 14.2 | ◆ <i>Ensure that company personnel are aware of, and current with, all applicable laws, policies and regulations affecting forest practices.</i> |
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The laws, policies and regulations guiding the forest industry are frequently changed to adapt to new trends and information. These adaptations necessarily effect the implementation of existing and future plans and operations. The forest companies' staff are required to maintain a current understanding of these changes.

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| Strategy 14.2.1 | ◆ <i>Maintain subscription to ForestViews, or similar programs, which provide regular updates to forestry related legislation.</i> |
| Strategy 14.2.2 | ◆ <i>Ensure that changes to legislation, or new legislation, are discussed in working group meetings.</i> |
| Strategy 14.2.2 | ◆ <i>Ensure that changes to legislation, or new legislation, are discussed in monthly Woodlands staff meetings.</i> |
| Strategy 14.2.3 | ◆ <i>Ensure that Woodlands staff are aware of appropriate web sites that</i> |

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are updated to contain the most current versions of legislation.

Strategy 14.2.4 ♦ *Encourage Woodlands staff to maintain active memberships in professional organizations, such as CIF, CAPF and the CAPFT.*

- Monitoring ♦ *M27 – Forest Regulation Report*
- *Membership records and minutes from AFPA meetings indicating SLP attendance and participation.*
 - *Woodlands staff meeting agenda and minutes will be maintained that summarize discussion items, especially pertaining to changes in legislated requirements.*
 - *Maintain records of notification to Woodlands staff of relevant web sites.*

Objective 14.3 ♦ *Continuously and consistently ensure that all operations are in full compliance with, or exceed the requirements of, all applicable laws, policies and regulations*

The forest industry is required to comply with a significant number of rules, regulations and laws in the planning and implementation of all operations. The companies undergo regular compliance audits by SRD to ensure that operations are in alignment with the ground rules and planning documents. In addition, the companies conduct self-assessment audits on a periodic basis throughout the operating season to identify any outages with regard to either the ground rules or the plans.

Strategy 14.3.1 ♦ *Complete self-audits (internal, ForestCare, ISO, etc) that demonstrate that the Woodlands staffs are meeting or exceeding requirements.*

Strategy 14.3.2 ♦ *Maintain records of the results of compliance audits completed by SRD.*

Strategy 14.3.3 ♦ *Maintain records of non-compliance from self-assessments and inspections and develop procedures to reduce the probability of re-occurrence*

Monitoring ♦ *M22 – Certification Report*

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Goal # 15 – Maintain or enhance sustainable fibre supply.

Objective 15.1 ♦ Determine the net landbase available for timber production.

Determination of the net landbase available for timber production is one of the fundamental building blocks required to assess the sustainable timber supply. The analysis completed for the current DFMP has been very thorough and based on historical experience in the FMA. Opportunities to validate the current net productive landbase in the FMA will be explored. In addition, plans will be developed and implemented to convert potentially productive areas to productive, where appropriate.

- Strategy 15.1.1 ♦ *A detailed landbase evaluation was completed as part of this DFMP. Each landbase category will be reviewed to validate the landbase categories and to identify areas where the net landbase could be increased.*
- Strategy 15.1.2 ♦ *Explore opportunities to increase the utilization standard applied in the FMA. This would result in the reclassification of some marginally unproductive stands to productive. Planned activities in these areas must be consistent with the DFMP goals and objectives.*
- Strategy 15.1.3 ♦ *Work with SRD and other forest users to review reclamation standards to promote re-establishment of commercial tree species on reclaimed dispositions.*
- Strategy 15.1.4 ♦ *Reforest all seismic lines within cutblocks unless specific alternate uses have been identified.*
- Strategy 15.1.5 ♦ *Evaluate recently burned areas of the FMA to determine where potential exists to convert potentially productive ground to productive ground through the establishment of commercial tree species.*
- ♦ *Work within the Silviculture Working Group to identify tactics designed to place the burned over areas in the FMA into productive capacity. This plan is to be completed by November 2005 with implementation within the time frame of this plan*
- Strategy 15.1.6 ♦ *AVI Continuous Forest Inventory – On an annual basis, complete a re-inventory of approximately ten percent of the FMA area to AVI version 2.1 specifications. The re-inventory program will capture changes in land use and forest condition, especially in areas recently burned.*
- Monitoring ♦ *M34 - Annual silviculture plan*

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- ◆ *M33 - Annual operating plans – (net landbase review)*
- ◆ *M2 – AVI Inventory and Inventory Updates*

Objective 15.2 ◆ *Develop a process for understanding natural and managed stand dynamics.*

Most long-term forest management plans are built on assumptions of how stands develop over time. A permanent sample plot (PSP) program will be developed and designed to provide empirical measurements that demonstrate how specific forest stands grow over time. Several research initiatives are also underway that are intended to provide further insights into stand development patterns.

- Strategy 15.2.1 ◆ *By November 2005, develop a growth and yield program, which encompasses natural and managed stands.*
- Strategy 15.2.2 ◆ *Promote research programs that strive to increase the understanding of stand dynamics.*
- Monitoring ◆ *M23 - Development of PSP program*
- ◆ *M36 - Growth and yield research*

Objective 15.3 ◆ *Mitigate the loss of productive forest landbase*

Maintaining productive forest landbase is critical for the sustainability of forest values. Several strategies will be employed to mitigate losses which will occur to the productive forest landbase. These strategies range from improving the potential of the site to grow trees and, where possible, to prevent the withdrawal of forest land from the FMA.

- Strategy 15.3.1 ◆ *Work with SRD and applicants of new dispositions to utilize existing disturbances or unproductive forest types for the establishment of new dispositions.*
- Strategy 15.3.2 ◆ *Promote the full utilization of the productive landbase for forest production. This would include:*
- *Managing the densities of stands to promote fast growth and reduce inter-tree competition.*
 - *Prompt and effective reforestation activities employing the full range of treatment techniques.*
 - *Conversion of low density stands to full stocking*
- Strategy 15.3.3 ◆ *Continue to maintain a fair and equitable purchase wood program to fully utilize the timber that is available on the open market, or from*

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private land.

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| Strategy 15.3.4 | ◆ <i>Continue to promote the creation of forest woodlots within the vicinity of the FMA and participate in the development of white area forest development strategies.</i> |
| Strategy 15.3.5 | ◆ <i>Explore opportunities to increase fibre utilization.</i> |
| | ◆ <i>Provide opportunity for thinning with the understanding that additional volumes will be chargeable until such time as volume recovery estimates are developed and validated.</i> |
| Strategy 15.3.6 | ◆ <i>Minimize losses to the productive landbase by working with utility disposition holders to reduce hazard trees along power lines.</i> |
| Monitoring | ◆ <i>M18 - Land Use Report</i>
◆ <i>M34 - Annual Silviculture Report – reforest seismic lines</i>
◆ <i>M13 - Annual Reclamation Report</i>
◆ <i>M33 - Annual Operating Plans – (e.g. hazard tree reduction plans etc.)</i>
◆ <i>M36 - Research – utilization of non-commercial species, util. standards</i>
◆ <i>M31 - Woodlot Summary</i> |

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| Objective 15.4 | ◆ <i>Maintain or increase sustainable harvest levels for both coniferous and deciduous species.</i> |
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The Slave Lake Pulp FMA agreement states that the DFMP shall “provide for the maintenance of the annual allowable cut for both the coniferous and deciduous species subject to the occurrence of natural disasters” (section 10(7a)). The strategies employed in the timber supply analysis provided in this DFMP are consistent with this intent.

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| Strategy 15.4.1 | ◆ <i>Develop growth and yield programs to create new, and validate existing, yield curves by November 2010.</i> |
| Strategy 15.4.2 | ◆ <i>On a landscape basis, maintain approximately the same relative proportions of pre-harvest cover groups (C, CD, DC & D)..</i> |
| Strategy 15.4.3 | ◆ <i>Promote the full utilization of the productive landbase for forest production. This would include:</i> <ul style="list-style-type: none"> • <i>Managing the densities of stands to promote fast growth and reduce inter-tree competition.</i> |

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- *Prompt and effective reforestation activities employing the full range of treatment techniques.*
 - *Conversion of low density stands to fully stocking*
- Strategy 15.4.4 ♦ *Identify areas containing conifer and/or deciduous understories in annual harvest plans and employ harvesting methods that will strive to minimize damage to those understories.*
- Strategy 15.4.5 ♦ *Designate areas within the FMA as stand density management zones. The primary management strategy for these areas would be to increase stand yields beyond that of similar areas that are managed to meet current forest management expectations. The intent is to practice SDM on 50% of the good and medium pure conifer pine dominant sites within the FMA.*
- Strategy 15.4.6 ♦ *Plant stock that is best suited to the site.*
- Strategy 15.4.7 ♦ *Identify and prioritize areas of damaged or threatened timber for harvest. The strategy in these areas is to improve overall forest health without diminishing other forest values. These areas are to be considered as necessary deviations from the harvest sequence.*
- ♦ *Salvage of areas lost to fire is important for maintaining the productive capacity of the forest. Fire salvage plans shall be developed such that the opportunity for harvest is shared in proportion to the individual companies' percentage of AAC. All fire salvage is chargeable unless the timber supply has been reevaluated to determine AAC effect. Fire salvage plans must contain mitigation strategies for other forest values.*
- Monitoring ♦ *M23 - Validation of the yield curves using additional TSP data*
- ♦ *M23 - PSP program*
- ♦ *M34 - Annual silviculture report*

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Objective 15.5 ♦ *Maintain relative proportions of coniferous and deciduous species within an acceptable range*

One of the cornerstones of single landbase management is the recognition that forestry operations must be designed and completed in a manner that recognizes the value of both coniferous and deciduous species. There will not be an intentional bias of one species over another, unless agreed to by the forestry stakeholders.

Strategy 15.5.1 ♦ *On a landscape basis, maintain approximately the same relative proportions of pre-harvest cover groups (C, CD, DC & D).*

Strategy 15.5.2 ♦ *Ensure that treatments applied to potentially productive ground are designed to maintain the same relative proportion of deciduous to coniferous annual allowable cut.*

Monitoring ♦ *M34 - Annual silviculture report*

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Goal # 16 – Maintain or enhance the long-term competitiveness of the forest industry.

Slave Lake Pulp competes upon the open market for sales of its product. The pulp sales market is product quality driven, as well as price competitive. Slave Lake Pulp strives to be the low cost producer in pulp production to maintain or enhance the long-term competitiveness of the company. This ability to remain competitive provides long-term stability for the local and regional economies and provides a stable base upon which communities can build and enhance their socio-economic goals.

Objective 16.1 ♦ *Be efficient and effective at all phases of operations.*

Efficiency in all phases of operation is crucial in the industry's desire to be cost competitive. The forest companies have committed to integrated planning and silviculture coordination through joint working groups. Synergies of operation are expected as a result of the larger scale of operations and the increased level of expertise brought forward by all the parties. The companies have agreed to manage the FMA as a single sustainable supply unit and a single landbase. Both of these initiatives will provide greater flexibility in all phases of operations.

- Strategy 16.1.1 ♦ *Operate the FMA as a single sustainable timber supply unit as identified in the Timber Supply Analysis (TSA).*
- Strategy 16.1.2 ♦ *Operate the FMA under a single landbase concept under the mandate of the DFMP.*
- Strategy 16.1.3 ♦ *Coordinate planning and silviculture activities through the Silviculture and Planning Working Groups.*
- Strategy 16.1.4 ♦ *Coordinate research within the FMA.*
- Strategy 16.1.5 ♦ *Develop a fully spatial sequence for the first twenty years of harvest. Efficiency dictates that the spatial sequence allow some degree of variability. The companies propose to track the variation on an annual basis and undertake thorough analysis when the approved harvest plan varies from the sequence by more than 10% (area and volume basis). Deviations exceeding 20% will require verification that the sustainability of the harvest sequence is not in jeopardy.*
- Strategy 16.1.6 ♦ *Allocate the harvest sequence to the forest industry stakeholders in a fair and equitable manner while striving to keep traditional spheres of interest.*
- Strategy 16.1.7 ♦ *West Fraser Mills will maintain a rigorous log quality control program, which follows legislated requirements but strives to minimize the delivery of fibre that can not be used. West Fraser Mills will continue to explore opportunities to optimize the desired log quality through log sorts and log trades.*

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| Strategy 16.1.8 | ◆ <i>The companies will actively pursue and support programs, which test and evaluate operations and processes. Support of FERIC and other research institutions will continue.</i> |
| Strategy 16.1.9 | ◆ <i>The companies will submit an integrated General Development Plan on an annual basis to address timing and location of harvesting and silviculture operations on the FMA.</i> |
| Strategy 16.1.10 | ◆ <i>Slave Lake Pulp will continue to upgrade and maintain its pulp mill to meet market demands.</i> |
| Monitoring | ◆ <i>M28 – Integrated Harvest Report of the General Development Plan</i>
◆ <i>M15/M33 - Spatial Sequence- Annual Variations</i>
◆ <i>M36 - Annual Research Report</i>
◆ <i>M24 – Working Group Reports– Minutes and Plans</i>
◆ <i>M7 – Technology transfer between Working Groups</i> |

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| Objective 16.2 | ◆ <i>Improve competitiveness by adopting the philosophy of adaptive management.</i> |
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The FMA forest industries will continue to improve the efficiency and competitiveness of their operations to keep pace with the technological advances being made in all aspects of our operations. These efforts will reflect the philosophy of continued improvement. These improvements are not limited to the mill facilities or field operations but also include systems, processes and marketing strategies.

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|-----------------|---|
| Strategy 16.2.1 | ◆ <i>Continual participation in research initiatives and organizations, which investigate processes and operations linked to the forest industry's core business.</i> |
| Strategy 16.2.2 | ◆ <i>Annually assess the harvest and reforestation efforts within the FMA Silviculture and Planning Working Groups.</i> |
| Strategy 16.2.3 | ◆ <i>Remain committed to certification programs which strive for improvement and enhancement of the industry's competitiveness.</i> |
| Monitoring | ◆ <i>M36 - Annual Research Report – review opportunities for improvement</i>
◆ <i>M34 - Annual Silviculture Report – review opportunities for improvement</i>
◆ <i>M33/M28 - Annual AOP and GDP – review opportunities for improvement.</i> |

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♦ *M22 - Certification Review*

Objective 16.3	♦ <i>Effectively collaborate with other forest resource users and Alberta Sustainable Resource Development.</i>
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Slave Lake Pulp has committed to an open and consultative planning process in the development and implementation of the Detailed Forest Management Plan. This continual commitment extends to inclusion of other forest resource users in both the short and long term planning process.

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| Strategy 16.3.1 | ♦ <i>Develop a Public Involvement Plan for the FMA.</i> |
| Strategy 16.3.2 | ♦ <i>Minimize losses to the productive landbase by working with utility disposition holders to reduce hazard trees along power lines.</i> |
| Strategy 16.3.3 | ♦ <i>Where possible, integrate harvest and silviculture activities with other identified users.</i> |
| Strategy 16.3.4 | ♦ <i>Work with trappers to coordinate access and access management strategies.</i> |
| Strategy 16.3.5 | ♦ <i>Create and maintain a land use GIS data layer for approved dispositions on the FMA.</i> |
| Strategy 16.3.6 | ♦ <i>Create a coordinated long-term forest industry access management plan by November 2005.</i> |
| Monitoring | ♦ <i>M18 - Land Use Updates</i> |
| | ♦ <i>M33/M28 - Annual AOP – coordination of activities</i> |
| | ♦ <i>M9 - Trapper referrals and GIS database.</i> |
| | ♦ <i>M26/M29 -Access Management Plan</i> |
| | ♦ <i>M32 - Public Involvement Program</i> |

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Objective 16.4 ♦ *Ensure that forest practices are environmentally sound and economically viable.*

Sound environmental practices will promote the long term viability of the industry through assurance that the industry supports sustainable management practices. The forest companies are all committed members to Forest Care and other certification programs. These certifications are indicators of compliance to accepted practices and are measures of economically viable and environmentally responsible organizations.

Strategy 16.4.1 ♦ *Continue to support the protocols of accepted certification programs*

Strategy 16.4.2 ♦ *Maintain records of non-compliance from self-assessments and inspections and develop procedures to reduce the probability of reoccurrence.*

Monitoring ♦ *M22 - Certification Status Reports*

Objective 16.5 ♦ *Ensure that the forest industry commitment to sustainable forest management is recognized and accepted.*

The forest companies have committed to sustainable forest management and use a variety of vehicles to achieve acceptance in this regard. All companies will communicate openly with the public, using local public advisory committees and other forums, regarding the management of the FMA forest area.

Strategy 16.5.1 ♦ *Communicate results of forest management activities to local advisory committees and seek public input into the planning process.*

Strategy 16.5.2 ♦ *Continue to participate in certification programs which promote sound forest management.*

Strategy 16.5.3 ♦ *Operate under an approved DFMP with periodic updates.*

Monitoring ♦ *M22 - Certification Status Reports*

♦ *M32 Public Involvement Report*

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Goal # 17 – Mitigate the impacts of forestry practices on known commercial and non-commercial non-timber values.

The following is a preliminary listing of the types of commercial and non-commercial non-timber users on the Slave Lake Pulp FMA area. Developing relationships with, and understanding the needs of, these users is essential in mitigating our forestry activities on their values.

Non-Timber Commercial Use

Oil and Gas
Utilities
Trappers
Eco-Tours
Guiding and Outfitting

Non-Timber Non-Commercial Use

Hunting and Fishing
Recreation, Skiing, Wildlife Viewing
All Terrain Vehicles
Back Country Travel
Canoe\Kayak
Historical Site Seeing
Youth Groups

Objective 17.1 ♦ *Develop an understanding of the values of the identified (above) commercial and non-commercial non-timber users on the FMA.*

An assessment of the non-timber users on FMA area is required before management strategies can be designed to mitigate the impacts of forestry practices on them. Several strategies have been developed to fill in this knowledge gap.

Strategy 17.1.1 ♦ *Maintain an updated stakeholders list of forest users. This list will be updated periodically, and will be readily available to all forest industry staff.*

Strategy 17.1.2 ♦ *Implementation and annual revision of the Public Involvement Plan with attention to the stakeholder list.*

Monitoring ♦ *M32 - Public Involvement Report*

Objective 17.2 ♦ *Develop strategies for mitigating the impacts of timber harvesting on known commercial and non-commercial, non-timber values*

Forestry operations can and will have varying impacts on the other users of the FMA. Slave Lake Pulp and the forest industry recognize the need to develop strategies to mitigate the impact of forestry operations on those forest users.

Strategy 17.2.1 ♦ *Work with the petroleum industry to ensure infrastructure use agreements are developed and followed.*

Strategy 17.2.2 ♦ *Work with utility companies to identify their hazard-tree reduction requirements. Wherever feasible, integrate hazard-tree reduction procedures in conjunction with forest harvest plans.*

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- Strategy 17.2.3 ♦ *Contact trapline owners during preparation of each preliminary plan as outlined in the ground rules. Specific factors to be addressed may include:*
- Map special, unique and important features (such as cabins, mineral licks, large nests, etc).*
 - Complete detailed block plans for identified special, unique, and important features.*
 - Maintain traditional access and ensure trapper has opportunity to have input in access control and road deactivation plans*
 - Maintain trapper communication links through all phases of the forestry operations including planning, harvesting and silviculture.*
 - Monitor forest composition on each trap line. Work with the trapper to identify deviations from the harvest sequence which will mitigate the impacts of harvesting on the trapline.*
- Strategy 17.2.4 ♦ *Develop a process for working with commercial outfitting and eco-tour companies that are active in the FMA. The process should address:*
- The notification of commercial outfitting and eco-tour companies of forestry activities in the FMA.*
 - The need for commercial outfitting and eco-tour companies to contact the forest industry regarding proposed use of infrastructure.*
 - Identification of main routes, and areas that individual guiding, eco-tour, and outfitting companies use in, and adjacent to, the FMA.*
 - Ensure outfitting companies are considered in the development of access management plans.*
- Strategy 17.2.5 ♦ *Identify high use all-terrain-vehicle (ATV) areas on the Slave Lake Pulp FMA by November 2005 and complete access management plans for identified high use trails in the annual operating plan.*
- Strategy 17.2.6 ♦ *Identify navigable water and high use recreational watercourses and waterbodies on the FMA by November 2005.*
- Strategy 17.2.7 ♦ *Manage buffers around major waterbodies to maintain or enhance the aesthetic value.*
- Strategy 17.2.8 ♦ *Maintain 100 meter managed vegetative buffers on harvest areas adjacent to existing subdivisions.*
- Strategy 17.2.9 ♦ *Work with the public to identify main viewsheds within the FMA and*

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incorporate aesthetic values in the development of harvest plans in these areas.

Strategy 17.2.10 ♦ *Continue to support local education programs in the vicinity of the FMA.*

Monitoring ♦ *M33 - Annual Operating Plans*
♦ *M32 - Public Involvement Report*

Objective 17.3 ♦ *Implement a system to identify the potential for historical resource values on the FMA within five years of the approval of this DFMP.*

A historical resources potential model has been developed for the FMA area. The model identifies areas where proposed forestry operations coincide with sites that have the potential to have significant historical value.

Strategy 17.3.1 ♦ *Implement the Historical Resources Potential Model on all harvest plans within the FMA and address identified conflict areas. Develop and maintain a historical resources information base for the FMA.*

Monitoring ♦ *M33 – Annual Operating Plan's*
♦ *M20 – Historical Resources Report*

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Goal # 18 – Develop and maintain long-term relationships with local aboriginal and Metis organizations.

- Objective 18.1 ♦ *Ensure that forest management planning activities are designed to minimize impact on identified unique or significant aboriginal sites*

Aboriginal communities have existed in proximity to the FMA area for centuries. The forest companies recognize that many significant and unique aboriginal sites may exist within the operating areas of the FMA. Any identified locations will require a degree of protection commensurate with the significance of the site. These sites will become a part of the existing Historical Resource Monitoring Program.

- Strategy 18.1.1 ♦ *Include the aboriginal community as an entity in the public involvement process with regards to planning activities which effect identified aboriginal sites.*
- Strategy 18.1.2 ♦ *Work with aboriginal communities to identify any known significant sites and incorporate them into the Historical Resources Potential Model.*
- Monitoring ♦ *M33 - Annual Operating Plans*
- ♦ *M32 - Public Involvement Report*

- Objective 18.2 ♦ *Mitigate the impacts of forestry practices on existing opportunities for subsistence purposes.*

The forest companies recognize the aboriginal use of the land for subsistence purposes. Traditional uses include subsistence activities such as berry picking, herb collection and cultural training. The DFMP planning team commits to creation of a mechanism to identify these values and mitigate the impact of operations on those values.

- Strategy 18.2.1 ♦ *Work with the aboriginal community and the trapping community to identify access routes and trails.*
- Strategy 18.2.2 ♦ *Maintain known traditional access routes used by the forest industry.*
- Strategy 18.2.3 ♦ *Create a GIS layer identifying key subsistence use areas for herbs, medicinal plants and berries.*
- Strategy 18.2.4 ♦ *Create a trapper information layer in conjunction with the aboriginal community.*

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- Monitoring
- ◆ *M8 - Traditional Access Routes Map*
 - ◆ *M9 - Trapper GIS information Layer*

Objective 18.3 ◆ *Develop a process for meaningful communication with local aboriginal and Metis organizations.*

The FMA area has had traditional use of a number aboriginal groups located along the southshore of Lesser Slave Lake. These include the Sawridge, Swan River, Driftpile, Assineau River and Sucker Creek Indian Reserves as well as the East Prairie Metis Colony. Traditional use generally extended into the FMA up the major river valleys and was primarily accessed for hunting, fishing, trapping and subsistence gathering of berries and medicinal plants. This DFMP recognizes the need for meaningful communication between the forest industry and these communities.

Strategy 18.3.1 ◆ *Designate a company Aboriginal Liaison to address aboriginal concerns on the FMA.*

Strategy 18.3.2 ◆ *Maintain direct communication with the aboriginal community through open houses.*

- Monitoring
- ◆ *M32 - Public Involvement Report*
 - ◆ *M33 - Annual Operating Plans*

Objective 18.4 ◆ *On an ongoing basis, work with aboriginal groups towards the development of economic opportunities.*

The forest companies have adopted the principles of the Government of Alberta Aboriginal Policy Framework and recognize the importance of providing economic growth opportunities to qualified aboriginal groups and agencies.

Strategy 18.4.1 ◆ *Recognize the aboriginal community as an integral part of the local employment opportunity spectrum and provide opportunity for the inclusion of aboriginal peoples in that spectrum.*

Strategy 18.4.2 ◆ *Work with local aboriginal groups to provide training and employment opportunities within the forest industry.*

- Monitoring
- ◆ *M32 – Public Involvement Report - Aboriginal liaison summary*
 - ◆ *M21 - Training and Employment Reports*

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Goal # 19 - Contribute to the economic stability of local communities.

Slave Lake Pulp and the forest companies operating within the FMA combine to create a significant portion of the economic base for the communities in and around the FMA. Communities such as High Prairie, Sucker Creek, East Prairie, Grouard, Joussard, Kinuso, Canyon Creek, Assineau, Widewater, Wagner, Slave Lake, Smith, Hondo, Swan Hills, Whitecourt and Fort Assiniboine all have strong economic ties to the forest resource based industry on the FMA. The goal to create economic stability in all those communities is paramount to the DFMP.

Objective 19.1	◆ <i>On an ongoing basis, provide economic opportunities to local communities</i>
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The communities adjacent to the FMA area and located near the respective mill facilities of the forest industries are the direct beneficiaries of the economic activity created by the forest resource. These communities expect to continue to receive these benefits. Maintenance of existing jobs and creation of new opportunity for the local population is the mechanism for sustainable communities and growth.

- | | |
|-----------------|---|
| Strategy 19.1.1 | ◆ <i>Continue to promote the employment of qualified, individuals within the local community.</i> |
| Strategy 19.1.2 | ◆ <i>Continue to provide 2% of the deciduous allowable cut to the local community timber program (MTU) for harvesting.</i> |
| Strategy 19.1.3 | ◆ <i>Allocate the harvest sequence to the forest industry stakeholders in a fair and equitable manner while striving to keep traditional spheres of interest.</i> |
| Strategy 19.1.4 | ◆ <i>Continue to explore the development of qualified small contractors throughout all phases of forestry operations.</i> |
| Monitoring | ◆ <i>M15- Spatial Sequence Report – indicating spheres of operation.</i>
◆ <i>M33 – Annual Harvest Reports</i> |

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Objective 19.2 ♦ *Develop and maintain a stable employee and contractor base in local communities*

A stable employee and contractor base in the local community provides the forest industry with reliable, well-trained personnel to supply a first class work force required by the companies. Economic efficiency and improved production is best achieved through a stable and well-trained work force. The human resource, combined with the forest resource creates the opportunity for the forest companies in the FMA to excel and prosper.

Strategy 19.2.1 ♦ *Maintain a diverse and well-trained local contractor base.*

Strategy 19.2.2 ♦ *Maintain a well-trained local employee base.*

Strategy 19.2.3 ♦ *Work with local groups to provide training and employment opportunities within the forest industry.*

Monitoring ♦ *M21 - Training and Employment Report*

♦ *M28 - General Development Plan – Projected production records.*

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Goal # 20 - Encourage and support fair, effective and informed public participation and provide the opportunity for effective communication.

Objective 20.1 ♦ *Develop a public involvement process that provides opportunities for fair, effective and informed communication and information exchange.*

Slave Lake Pulp is committed to soliciting input from the public regarding the management of the FMA area. The input will be obtained through formal regular meetings with interested stakeholders and, upon request, through informal meetings with individuals.

Strategy 20.1.1 ♦ *Maintain and encourage active participation in the Slave Lake Forest Public Advisory Committee.*

Strategy 20.1.2 ♦ *Maintain a current, effective public involvement plan.*

Monitoring ♦ *M32 - Annual review of the Public Involvement Plan.*

- *Maintain minutes of SLFPAC meetings*

Objective 20.2 ♦ *Increase public knowledge and awareness of forestry*

The forest industry is committed to educating the public in the field of forestry to promote informed decision making and discussion.

Strategy 20.2.1 ♦ *Provide opportunities for forestry experts to meet with the SLFPAC.*

Strategy 20.2.2 ♦ *Continue to support the Lesser Slave Forest Education Society (LSFES).*

Strategy 20.2.3 ♦ *Maintain participation in the public affairs program of the AFPA.*

Strategy 20.2.4 ♦ *Notify the public of significant forest management activities planned for the FMA area through the local media.*

Monitoring ♦ *M32 – Public Involvement Report - Maintain a record of SLFPAC agenda and minutes*

- *Maintain a record of LSLFES and AFPA public education activities*
- *Maintain a record of local media announcements*

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Objective 20.3 ♦ *Ensure that public views are considered in forest management planning and operations.*

Slave Lake Pulp will take all reasonable opportunities to address public views and concerns with forest management activities. An active stakeholders issue list will be maintained and periodically updated. Where possible, known issues will be addressed in the planning stage, prior to implementation of operations.

Strategy 20.3.1 ♦ *Maintain an active stakeholders issue list in the Public Involvement Plan.*

Strategy 20.3.2 ♦ *Maintain a record of all requests made by the public regarding forest management planning and operations.*

Monitoring ♦ *M32 – Public Involvement Report -Annual reviews of the stakeholders issue list.*

- *Record of requests*

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7.0 Plan Implementation and Monitoring

7.1 Implementation

This section describes the approach that will be taken to implement the DFMP, including:

- ◆ *The creation of three working groups, each with its own mandate.*
- ◆ *The introduction of a dispute resolution mechanism.*
- ◆ *A strategy for the issuance of timber dispositions*
- ◆ *An outline of some expected issues related to the “phase-in” of harvest sequence*

7.1.1 Detailed Forest Management Plan Revisions

The Slave Lake Pulp Detailed Forest Management Plan (DFMP) is scheduled for resubmission on November 15, 2010. Slave Lake Pulp and the FMA forestry companies are committed to revising the plan under mutual agreement with the government in the event of a major alteration in the harvest sequence due to fire or other unforeseen circumstances. The commitment to adaptive management principles ensures that any significant deviations identified in the Stewardship Report (submitted at year five) will be addressed as expediently as possible.

7.1.2 Operating Ground Rules

The FMA agreement states that the operating ground rules must be negotiated within six months of the approval of the DFMP. Slave Lake Pulp and the FMA forestry companies will jointly develop these ground rules in consultation with Sustainable Resource Development for submission within the appointed timeframe. All forestry operations conducted on the FMA will adhere to these guidelines unless specifically approved by the Area Manager of the Marten Hills Forest Area. Some flexibility is required from SRD to allow for the implementation of the spatial harvest sequence while the DFMP approval process is underway and the new ground rules are being developed.

7.1.3 Working Groups

7.1.3.1 Planning Working Group

The Planning Working Group membership, mission statement, issues list and work plan are described in this section.

The following stakeholders will have representation on the planning working group:

- ◆ *Slave Lake Pulp*
- ◆ *Alberta Plywood Ltd.*
- ◆ *Buchanan Lumber*
- ◆ *Millar Western Forest Products Ltd.*

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- ♦ *Vanderwell Contractors (1971) Ltd.*
- ♦ *Land and Forest Division (LFD will also represent the MTU program)*

Planning Working Group Mission Statement (mandate)

To establish fair and equitable policies and processes to promote low-cost approaches for distribution and implementation of the DFMP harvest schedule while:

- ♦ *Recognizing the value of all commercial species*
- ♦ *Maintaining a link to the DFMP assumptions*
- ♦ *Exploring opportunities to enhance the forest resource*
- ♦ *Effectively transferring technology and information*

Table 7-1: Planning Working Group Issues List

The following issues list was derived by the members of the planning working group. The list is intended to identify concerns that the working group members have expressed regarding implementation of the DFMP. Although some suggestions for resolving the issues have been discussed, none of the potential solutions have been adopted by the group at this time. The working group has developed a work plan that will guide the activities of the group and will facilitate the resolution of the identified issues by agreed upon timelines.

Issue	Discussion
Balancing opportunities and costs	In concept, the members of the DFMP planning team have agreed that the costs and benefits of forestry operations should be balanced between all forestry companies, relative to AAC percentage, by species (conifer vs. deciduous). The method and frequency of this balancing task is yet to be defined. Two possible methods to achieve this goal include proportional (AAC percentage) allocation of the forest profile to each company and/or the use of monetary compensation.
Contractor work balancing	All companies have the right to employ their own contractors to conduct forestry operations. The integration of harvest operations will allow the companies to coordinate their activities and ensure that their contractors have the opportunity to undertake their fair share of the work.
Implementation of harvest sequence	How will the harvest sequence be allocated? A work plan has been developed to deal with this issue. What are acceptable deviations from the harvest sequence? The ground rules will define what a deviation is and how it will be measured and recorded.
Dispute resolution	Although all group members have agreed to participate in an open and cooperative manner, differences of opinion may occur. When these differences can not be resolved by the team members, a dispute resolution process may have to be implemented. This process should be designed as soon as possible, to ensure that it is agreed to by all members before disputes arise. (The dispute resolution process has been developed and is included in section 7.1.6).
Timing of operations	Timber harvesting operations must be coordinated between all of the operators on the FMA. Some companies have already disclosed that they do not intend to harvest their AAC each year. Their preference is to

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Issue	Discussion
	conduct operations every two or three years. Now that the FMA is managed as a single landbase, each company can expect to receive their AAC each year. Given that secondary species volumes are part of the AAC, timber harvesting activities must be coordinated to ensure that volume flows to each company are managed.
Harvest plan development	Which company will develop harvest plans? What should be included in the harvest plan? Currently, the team members have agreed that harvest planning should be led by the company with the most volume. However, all plans must be integrated and developed in a joint, cooperative manner.
Historical resources	As outlined in the Historical Resources Act, the potential for harvesting activities to impact historical resource features on the landscape must be assessed. SLP has developed a historical resource assessment model for the FMA area – implementation methods are yet to be determined.
Public participation	The level, and method of obtaining, public input is still an individual company responsibility. However, opportunities also exist to obtain input for all operations on the FMA in a unified manner (for all companies). The working group will work on defining how public input will be obtained in the future.
Monitoring programs	Several monitoring strategies have been developed for the DFMP that relate to harvest planning and operations. Standard methods of acquiring this information will have to be developed to demonstrate that the commitments are being achieved (stewardship report).
Group function	Development of a work plan will help to guide the function of the group.
Data sharing	Technical advancements should be obtained by sharing information, experience and technology. Several data sets will also be required by SLP to demonstrate that the group is meeting the expectations outlined in the DFMP.

Table 7-2: Planning Working Group Work Plan

Activity	Timeline
Create dispute resolution process (included in DFMP)	May 15, 2002
SLP to provide final harvest sequence information	June 1, 2002
Identify areas of interest for operations	June 30, 2002
Initial allocation of the harvest sequence to each company	August 31, 2002
Final allocation of the harvest sequence to each company	October 1, 2002
Develop a cost-sharing framework	Process – May 2003 Operations – May 2004 Implement – May 2007
Develop data exchange protocols	December 2003

7.1.3.2 Silviculture Working Group

The Silviculture Working Group membership, mission statement, issues list and work plan are described in this section.

The following stakeholders will have representation on the silviculture working group:

- ◆ *Slave Lake Pulp*
- ◆ *Alberta Plywood Ltd.*

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- ♦ *Buchanan Lumber*
- ♦ *Millar Western Forest Products Ltd.*
- ♦ *Vanderwell Contractors (1971) Ltd.*
- ♦ *Land and Forest Division (LFD will also represent the MTU program)*

Silviculture Working Group Mission Statement (mandate)

To establish fair and equitable policies and processes to ensure that harvest areas are regenerated as soon as possible after harvest at the lowest possible cost while:

- ♦ *Recognizing the value of all commercial species*
- ♦ *Maintaining a link to the DFMP assumptions*
- ♦ *Exploring opportunities to enhance the forest resource*
- ♦ *Effectively transferring technology and information*

Table 7-3: Silviculture Working Group Issues List

The following issues list was derived by the members of the silviculture working group. The list is intended to identify concerns that the working group members have expressed regarding implementation of the DFMP. Although some suggestions for resolving the issues have been discussed, none of the potential solutions have been adopted by the group at this time. The working group has developed a work plan that will guide the activities of the group and will facilitate the resolution of the identified issues by agreed upon timelines.

Issue	Discussion
Cost balancing	In concept, the members of the DFMP planning team have agreed that the costs of reforestation should be balanced between all forestry companies, relative to AAC percentage, by species (conifer vs. deciduous). The method and frequency of this balancing task is yet to be defined. Other operational costs (logging, road building...) will also form part of the process. One alternative to transferring money is to ensure that all companies are allocated their proportionate share of the forest profile.
Reforestation liability	Method for the assignment of reforestation liability is not yet determined. Should liability rest with each company, or for the group as a whole. General consensus was that, in the short term, each individual company would have to maintain liability for blocks that they were assigned in the harvest sequence. The process for the assignment of harvest sequence stands will have to consider silvicultural implications.
Reporting	Each company will collect and maintain its own information for reporting to the government. However, this data will have to be provided to Slave Lake Pulp (the FMA holder) as well. SLP will use the data for stewardship reporting on DFMP implementation. The pooled information will also be distributed to the working group members.
Dispute resolution	Although all group members have agreed to participate in an open and cooperative manner, differences of opinion may occur. When these differences can not be resolved by the team members, a dispute

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Issue	Discussion
	resolution process may have to be implemented. This process should be designed as soon as possible, to ensure that it is agreed to by all members before disputes arise. (The dispute resolution process has been developed and is included in section 7.1.6).
Regeneration standards	The current DFMP regeneration assumptions are consistent with the provincial 2000 regeneration standards. The group has agreed that until FMA specific standards are developed, these standards would be used.
SDM / EFM	SDM (stand density management), EFM (enhanced forest management) and conversion of potentially productive ground, are all strategies that the companies have committed to pursue. All companies have agreed (as a requirement of FMA amalgamation) to participating in SDM/EFM activities. Contribution of resources is expected to be based on AAC percentage by species (conifer vs. deciduous). The location and timing of activities would be decided by the group as a whole.
Historical resources	As outlined in the Historical Resources Act, the potential for silvicultural activities to impact historical resource features on the landscape must be assessed. SLP has developed a historical resource assessment model for the FMA area – implementation methods are yet to be determined.
Treatment / cost matrix	A treatment matrix should be developed that would outline typical silvicultural treatments for a variety of stand types. These treatments would essentially be a summary of the current treatments, which will promote discussion of the treatments and their effectiveness. A cost matrix would then be developed around these treatments.
Survey data requirements	A minimum set of data collection protocols will be established to facilitate data transfer and ensure that minimum expectations regarding data collection are met.
Group function	Development of a work plan will help to guide the function of the group.
Data sharing	Technical advancements should be obtained by sharing information, experience and technology. Several data sets will also be required by SLP to demonstrate that the group is meeting the expectations outlined in the DFMP.

Table 7-4: Silviculture Working Group Work Plan

Activity	Timeline
Develop issues list to be addressed in the business agreement	April 5, 2002
Create dispute resolution process (included in DFMP)	May 15, 2002
Develop treatment / cost matrix	January 2003
Determine minimum survey data requirements	March 2003
Develop a cost-sharing framework	Process – May 2003 Operations – May 2004 Implement – May 2007
Develop secondary species maintenance policy	June 2003
Develop data exchange protocols	December 2003
Develop standard operating procedures	March 2004
Develop site productivity (SDM/EFM/PP ground) framework	June 2004
Determine research priorities	December 2005
Create Model II regeneration standards	November 2010

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7.1.3.3 Fish and Wildlife Working Group

The Fish and Wildlife Working Group membership and mission are provided in this section.

The following stakeholders will have representation on the fish and wildlife working group:

- ◆ *Slave Lake Pulp*
- ◆ *Millar Western Forest Products Ltd. (representing all quota holders)*
- ◆ *Land and Forest Division (LFD will also represent the MTU program)*
- ◆ *Fish and Wildlife Service (SRD)*

Fish and Wildlife Working Group Mission Statement (mandate)

To facilitate the integration of fish and wildlife concerns into forest management and operating plans (1998 SLP DFMP).

7.1.4 Allocation of New Timber Dispositions

In lieu of the development of new policies for the issuance of timber dispositions that are more compatible with single landbase management of the FMA, we anticipate that coniferous timber dispositions will be coincident with the FMA operating units. This strategy will work in the short term. However, in some situations this approach may be ineffective or unfair, for example:

- ◆ *The fair allocation of the forest profile may be difficult to achieve (some operating units may be proportionately better or worse than the FMA profile). This is especially true if some quota holders have a low percentage of the conifer AAC.*
- ◆ *The complete allocation of the AAC to each company (quota percentage) may not be possible using only operating units.*

7.1.5 Harvest Sequence “Phase-In”

Significant efforts have been made throughout the planning process to ensure that the developed harvest sequence is as current as possible. Where feasible, the spatial planning layer was updated to reflect harvesting that occurred up to May 1, 2001. However, due to the fact that several events have resulted in extensions of the DFMP not all activities that have occurred on the FMA have been incorporated into the analysis for example:

- ◆ *S2 MTU harvesting for 2001/02 has occurred however the location of the planned block boundaries were not available at the time that the spatial planning layer was created. Forest inventory stands were selected and identified as harvested to attempt to account for this discrepancy.*
- ◆ *Salvage (blowdown) operations in Unit 55 have also been completed and the location of the salvage areas were not available at the time that the spatial planning layer was created. Once again, forest inventory stands were selected and identified as harvested to attempt to account for this discrepancy.*

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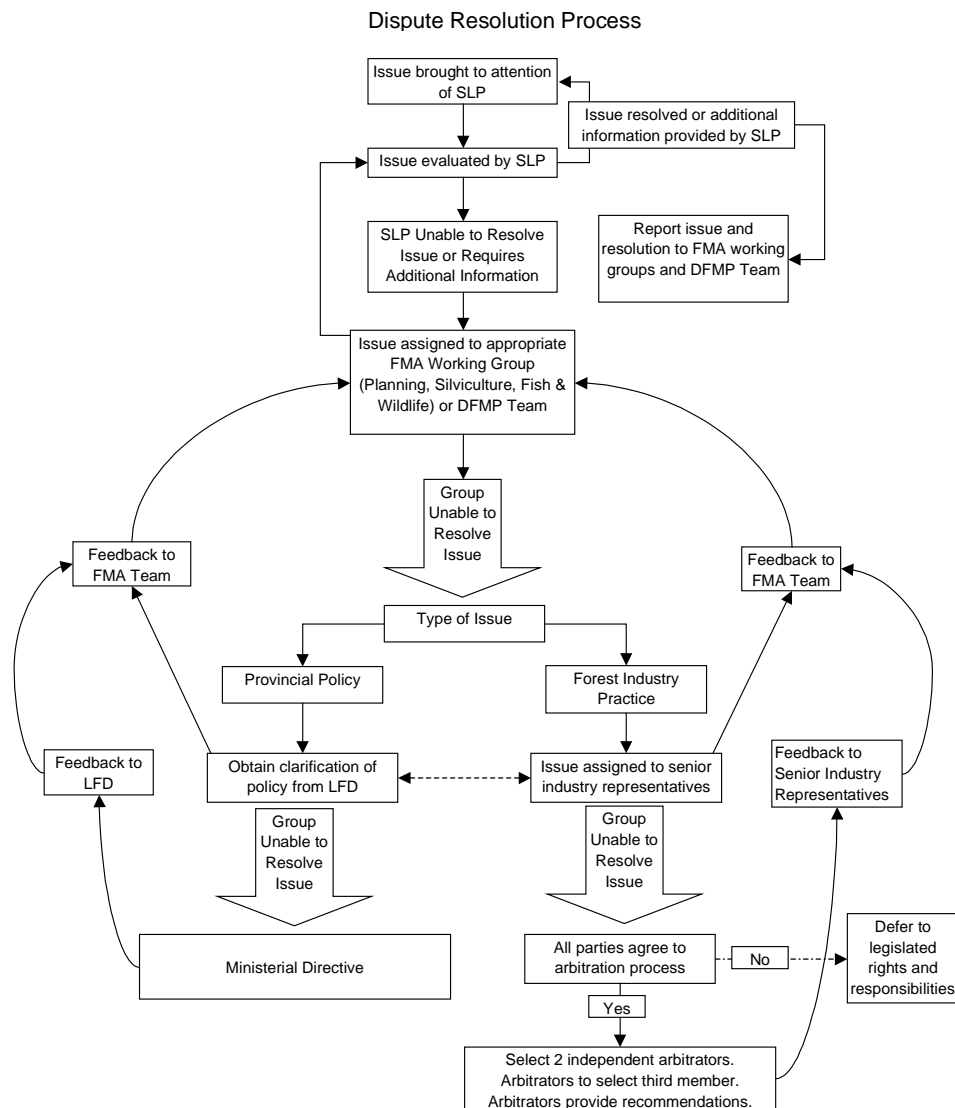
- ♦ Harvest plans for 2002/03 have been developed and submitted for approval which may not be entirely consistent with the final harvest sequence.

To address this issue, existing harvest plans will be identified as “pre-DFMP submission” or “post-DFMP submission”. All plans will be reported against the final harvest sequence. Only the “post-DFMP submission” plans will contribute to the determination of harvest sequence deviation levels.

7.1.6 Dispute Resolution

The following figure describes the dispute resolution process for any issues that may come to the attention of the FMA stakeholders.

Figure 7-1: Dispute Resolution Process



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7.2 Monitoring

The Detailed Forest Management Plan has been structured such that the Goals, Objectives, Strategies and Tactics are all linked throughout the plan. This linkage is further enhanced with a direct tie to an implementation and monitoring strategy that identifies the specific measures with which the DFMP will be evaluated. This monitoring program has been referenced throughout the previous chapter (Chapter Six). The intent is to:

- ◆ *Fully describe each monitoring strategy;*
- ◆ *Indicate the timing and frequency of each measure; and*
- ◆ *Assemble the complete strategy into several larger and recognizable reports.*

These reports include; and the Detailed Forest Management Plan, the Stewardship Report, the General Development Plan and the Annual Operating Plan. Each report represents a progressively lower level of plan (i.e. more operational) and will demonstrate adherence to the DFMP. Each increasingly higher plan will include a large number of the attributes described in the lower level documents as well as specific plan related reports. The defined planning hierarchy is:

Detailed Forest Management Plan

Stewardship Report

General Development Plan

Annual Operating Plan and Reports

7.2.1 Detailed Forest Management Plan

Many of the monitoring protocols identified within the strategies in the previous chapter are specific to the term of the DFMP and as such are described at this higher level. These represent commitments made to meet objectives and goals described in the plan. Also included in this section are monitoring commitments which are not necessarily slotted into the time frames of the other parts of the hierarchy.

7.2.1.1 M1 - Landscape Assessment

A preliminary landscape assessment has been included in this detailed forest management plan (Chapter 4).

The sections of the report are as follows:

- ◆ *General Description*
- ◆ *Description of Landscape Pattern and Structure*
 - *Physiographic Setting, Glacial History, Surficial Geology, and Soils*
 - *Hydrologic Description and Assessment*
 - *Ecological Land Classification / Natural Subregion Characteristics*
- ◆ *The Forest Resource*
 - *Forested vs. Non-Forested Land, Cover Group Distribution, Forest Age Class Distribution, Amount and Distribution of Seral Stages, Patch Characteristics, Connectivity and Juxtaposition, Fragmentation, Disturbance and Succession Patterns, Timber*

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Harvesting and Access, Access Patterns, Other Resource Extraction Industries, Historical Land Use, Hazard Assessments

- ♦ *Landscape Use and Function*
 - *Land Use and Allocation, Forest Productivity, Timber Resource, Fish and Wildlife Resources, Water Resources, Recreational Resources, Historical Resources, Other Cultural Resources, Access, Visual Resources / Aesthetics*
- ♦ *Landscape Use Interdependence*
 - *Fish & Wildlife, Hydrology, Soil, Tourism/Recreation, Visual Resources, Timber, Other forest resources*
- ♦ *Watershed Profiles*

The landscape assessment was completed in May 2002 and is included in Chapter 4 of this Detailed Forest Management Plan.

7.2.1.2 M2 - AVI Inventory and Inventory Updates

Slave Lake Pulp completed the AVI inventory of the original FMA for the 1998 submission. The expansion area in the S1 FMU was photographed in 1997 and submitted for approval in 2000. This inventory was approved by SRD and is the basis for the timber supply analysis submitted in this plan.

Slave Lake Pulp has in place a continuous inventory update program whereby 6-8 townships are re-inventoried on an annual basis. This update program will continue as needed to incorporate landscape changes within the FMA.

7.2.1.3 M3 - Ground Rule Development

The forestry companies and SRD will jointly develop the operating ground rules for the FMA within six months of plan approval. These guidelines will apply to all forestry operations on the FMA and operations may only deviate from them under authority of the Area Manager.

7.2.1.4 M4 - Watershed Delineation

The FMA has been partitioned into 95 watersheds and 5 major basins as described in the landscape assessment in chapter 4. The watersheds have been delineated to provide a vehicle for reporting impacts of operations on watersheds and major basins. These impacts are identified and documented in Chapter 8 as they apply to the selected harvest sequence.

7.2.1.5 M5 - Buffer Management

The forest industry plans to investigate the potential for initiating buffer management trials within the FMA. The location and types of treatments will be developed in conjunction with SRD and DFO. The intent of the trials will be to evaluate the effect of different buffer management treatments as they pertain to maintaining or enhancing the objectives of buffer placement. The plan will be submitted within two years of approval of the DFMP and initiated by February 2005.

7.2.1.6 M6 – Soils Assessment

A soils classification does not exist for the FMA other than the Canada Land Inventory classification system which indicates the productive capacity to grow timber on a broad basis. The forest companies within the FMA wish to improve this database over the term of the DFMP. This will be accomplished through the gradual build up of a digital GIS layer fed from field data

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collected in conjunction with the FMA Permanent Sample Plot program. This PSP program and its associated soil collection information will begin in 2002 with implementation of a soil assessment plan within two years of implementation of the DFMP. It is expected that the entire soils assessment work will not be complete within the term of this plan but will be greatly expanded from current information available on soils.

7.2.1.7 M7 – Information Exchange

The FMA is to be managed using joint working groups in fish and wildlife, planning and silviculture. To facilitate the exchange of information between these groups and improve the exchange of operational feedback from each company, Slave Lake Pulp intends to establish procedures to facilitate information exchange.

7.2.1.8 M8 – Traditional Access

Traditional access has always been cited when attempts have been made to restrict access for wildlife and other forest protection reasons. The forest companies need to determine the traditional access routes throughout the FMA to facilitate the road corridor development plan. A large number of wildlife objectives hinge upon controlling or restricting access on non-traditional access routes. Consequently, within three years, the FMA planning team will develop an information layer within the FMA GIS environment, which will identify the location of traditional access routes within the FMA. The group will work in conjunction with SRD and local user groups to build this information layer.

7.2.1.9 M9 – Trapper Information System

Slave Lake Pulp intends to develop a trapper information layer within the GIS database, which can be used by a restricted group for planning purposes. This layer will include pertinent information to the trapline such as: owner, junior partner, phone numbers, addresses, cabin locations, main set corridors if possible, main access routes within the trapline, etc. which may prove useful in integrating forestry operations with the trapping community.

7.2.2 Stewardship Report

The Stewardship Report is designed as a mid-term report on the implementation of the DFMP. Within this framework, a number of the monitoring protocols and commitments detailed within the strategies fall within the timeframe of the Stewardship Report. In essence, all commitments scheduled for completion within five years are itemized and described in this section.

7.2.2.1 M10 – Natural Disturbance Study

A study of natural disturbance patterns for the FMA area, which focuses on wildfire, but will include insect, disease and other natural disturbance agents, will be completed. The objectives of the study will be to determine the size and shape of historical fires, including the “within fire” pattern of unburned patches, which were not influenced by human suppression activities. The scheduled completion date for this monitoring program is November 2005.

7.2.2.2 M11 – Landscape Assessment Gap Analysis

The landscape assessment completed for the DFMP, although thorough, is in all likelihood incomplete. Gaps in this information will be identified for the Stewardship Report in November of

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2005. In addition, any further information acquired in the interim will be reported as an update to the landscape assessment.

7.2.2.3 M12 –Landscape Structure Report

♦ Seral Stage Report

Seral stage reporting is necessary in a number of the strategies, especially those pertaining to biodiversity and wildlife habitat retention. The Stewardship Report will report on the relative proportion of each seral stage (as defined in the landscape assessment) after five years of harvest. The measurable criteria for this monitoring protocol will be the presence or absence of seral stages across the landscape and their relative proportions. The information will be summarized by Landscape Management Unit. The plan recognizes that natural disturbances may completely eliminate one or more seral stages from any particular unit. The seral stage section of the Stewardship Report will highlight shifts in seral stages and identify areas which may become a concern for other forest values and which may have to be addressed within the context of the next DFMP.

♦ Patch Size, Connectivity and Fragmentation Report

Integral to the landscape structure is the fragmentation and patch size summaries. Patch size and fragmentation have been summarized in the landscape assessment. Within the Stewardship Report, this analysis will be redone to determine if the size and distribution of patches have changed due to harvest activities. Fragmentation, the artificial breaking up of natural stand boundaries, has been viewed as undesirable. Fragmentation and connectivity will be assessed through the use of nearest neighbor patch analysis and patch size distribution statistics.

7.2.2.4 M13 – Reclamation Report

A need to maintain or increase the productive forest landbase was identified in the DFMP. One method of accomplishing this is to return reclaimed land use dispositions to a productive capacity. The strategy to reforest abandoned or cancelled dispositions will be included within each Annual Report and will be summarized within the Stewardship Report. This will simply be a measure of the total hectares of reclaimed sites treated within the time frame of the report. Any sites approved for sludge trials will also be reported.

7.2.2.5 M14 – Understorey Inventory

Slave Lake Pulp and the FMA forest companies have committed to completion of an understorey inventory within five years of the plan approval. The primary objective is to identify significant understories of conifer and deciduous species located in deciduous dominant stands. This inventory will be done to assist in the implementation of the mixedwood strategies and to support the conifer and deciduous allowable cuts. This inventory will be jointly developed and executed within the working groups set up for the FMA.

7.2.2.6 M15 – Spatial Sequence Evaluation

The DFMP submission includes a twenty-year spatial sequence. It is recognized that the spatial sequence is intended to be operational but the AVI and volume sampling were undertaken as a broad landscape level analysis. This transition to operational level planning will result in some deviation from the sequence for a variety of reasons. It is the intent of the forest companies to annually monitor the deviations from the selected sequence as indicated in the Annual Report.

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These deviations may be too variable to reconcile on an annual basis and will thus be analyzed on the longer five-year term. Deviations from the submitted sequence which average out to be over 10% in either area or volume within a five year framework will require investigation to determine if the deviations are justifiable and explainable. If in any five-year period, the deviations surpass 20%, the DFMP planning team may be required to revisit the AAC and the cut sequence.

7.2.2.7 M16 – Landscape Level Wildlife and Plant Monitoring Report

The forest industry companies recognize that monitoring of wildlife is a provincial mandate. In light of the approach to management of the FMA area that is proposed in this DFMP, the companies are willing to participate in some additional wildlife monitoring programs. The new programs will be used to strengthen and support current SRD monitoring programs. A traditional approach (i.e. two-pass harvest) to forest management would not have triggered the development of these additional programs.

◆ *Coarse Filter Monitoring Program*

A commitment was made within the DFMP to initiate a wildlife monitoring program. Slave Lake Pulp intends to implement wildlife monitoring programs featuring songbirds and fur-bearers. These monitoring programs will be in place by 2005 and will be described in the Stewardship Report.

◆ *Canadian Fish Inventory Program*

Slave Lake Pulp is participating in an extensive fish inventory program in the FMA. The company intends to incorporate the results of the program into a fish predictability model. The continued commitment to this program is dependent upon the participation of regional partners. The program has generated significant amounts of base data and provides a basis upon which the evaluation of the effect of forestry operations on fish and fish habitat is possible. A species list will be provided in the Stewardship Report.

◆ *Wildlife Species List*

This list is to be completed for the Stewardship Report.

◆ *Endangered and Threatened Species List*

This list is to be completed for the Stewardship Report.

◆ *Plant Species List*

This list is to be completed for the Stewardship Report

◆ *Patch Retention Analysis*

A commitment has been made to maintain between 1% and 3% (by landscape management unit) of the annual area of harvest on the landscape in unharvested patches to address wildlife and aesthetic values. The intent is to provide for line of sight, thermal cover and connectivity objectives in blocks exceeding 100 hectares in size. The accumulated variance over five years is to be reported in the Stewardship Report. The amount and location of patches and leave areas will be assessed using the as-built cutblock update information acquired annually.

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7.2.2.8 M17 - Forest Health Report

◆ *Insects and Diseases*

Insect and disease outbreaks are reported annually and will be summarized in the Stewardship Report. Any significant occurrences or potential for epidemic conditions will be identified and addressed. Progress regarding the development of the forest health database (known pest locations) and related monitoring and control activities will be reported.

◆ *Forest Fire Report*

The number, size and effect of fires on the net landbase will be reported.

◆ *Prevention*

The annual Forest Protection Plan details Slave Lake Pulp's action plan with regards to forest protection and fire prevention. The Stewardship Report will describe the status of the prevention programs, which are intended to reduce the risk of fire. The programs include hazard tree reduction, corridor development and training programs.

Fire risk was a major contributing factor to the development of the preferred forest management strategy. To mitigate the potential negative effects of fire, certain areas of high-risk timber were allowed to be sequenced in the harvest plan. The change of these stands to less dangerous fuel types will be a significant measure of the plan's success. The change in fuel types over the five years will be analyzed to evaluate the effectiveness of the strategy.

7.2.2.9 M18 - Land Use Summary Report

This report will be a compilation of the Annual Land Use Reports with an evaluation of potential net landbase changes. Included in this report will be a summary of the areas that have been either reclaimed or reforested which were not included in the original net landbase. Significant changes in these areas would have to be evaluated for potential changes to the approved AAC. A summary of the Timber Damage Assessment charges collected for both conifer and deciduous will also be included.

7.2.2.10 M19 - Watershed Analyses Reports

Slave Lake Pulp will undertake a number of watershed analyses in areas where it is perceived that the forest harvesting operations may have significant effects on water quantity and timing of flows. The company has undertaken a number of WRENS analyses in the past and anticipates that additional studies may be required. A summary of these studies will be described and reported in the Stewardship Report.

7.2.2.11 M20 - Historical Resources Report

The FMA area is currently covered by a historical resources potential model to determine the effect of forestry operations on the below ground historical resources as defined by Alberta Community Development. This model is run annually on the Annual Operating Plan. This report will summarize the results of the runs and the subsequent findings, if any, of the program.

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7.2.2.12 M21 - Training and Employment Report

This part of the Stewardship Report will describe the training programs employed by the forest companies for the purposes of health, safety, environmental awareness, and awareness of all aspects of the planning hierarchy as it pertains to their position.

In addition, the report will contain a summary of forest industry employment statistics.

7.2.2.13 M22 - Certification Report

The forest companies belong to a number of outside certification programs. These will be listed along with the current certification status. Any non-conformances with certification program requirements will also be reported.

7.2.2.14 M23 – Growth and Yield Report (PSP/TSP)

Slave Lake Pulp, in cooperation with the FMA forest companies have committed to development of a Growth and Yield Program which will provide stand and tree level information aimed at better understanding the growth dynamics of the forests within the FMA. This program will include both Permanent and Temporary Sample Plots. In addition to the standard data collection, these plots will also include a measure of soils and their classification.

7.2.2.15 M24 – Working Group Reports

Summary reports of the activities and records of meetings will be provided in this report. The resolution of issues and the work plan implementation status will be itemized.

7.2.2.16 M25 – Weed Management Plan

The development of the Weed Management Plan will be completed by May 2003. The plan will include education, prevention, detection, monitoring, and control strategies pertaining to restricted and noxious weeds. The plan will contain the following sections:

- ♦ *Education and prevention will describe awareness training requirements for staff and contractors. Training will include prevention methods including cleaning equipment and reclamation procedures.*
- ♦ *The approach and schedule for detection and monitoring will be described.*
- ♦ *Strategies for weed control will be outlined. The treatments may include mowing, cutting, hand pulling, and herbicides.*

7.2.2.17 M26 – Road Development Plan

A coordinated long-term forest industry access management plan will be developed by November 2005. This plan will identify long-term access corridor development and access control and reclamation strategies.

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7.2.2.18 M27 – Forest Regulation Report

Summaries of tasks completed to ensure that all forest industry stakeholders are aware of changes to legislation of will be presented. The report will also identify stakeholder efforts pertaining to the development of new, or enhancement of existing, legislation.

7.2.2.19 M30 - Road Use Agreement Summary

A large number of road use agreements are issued within the FMA each year. This summary will be provided to demonstrate the level commitment to working cooperatively with other industry users while minimizing the development of new access routes on the FMA.

7.2.3 General Development Plan

The General Development Plan (GDP) is an annually updated five-year forecast, which addresses the operational integration aspects of the Annual Operating Plan (AOP). Consequently, the majority of the reporting attached to this level of planning is also part of the Annual Reports and Annual Operating Plans. A few specific reports are particular to the GDP.

7.2.3.1 M28 - Integrated Harvest Report

The main purpose of the GDP is to integrate the activities of several forestry companies to ensure a smooth flow of fibre to the various mills, reduce the costs of operations and maintain and mitigate the effect on other forest values. The annual integration of operations through joint GDP development permits individual companies to assess their yearly operations and mesh the activities of their operations on the FMA with their operations outside the FMA. The harvest schedule reported annually in the GDP indicates the level of integration on the AOP.

7.2.3.2 M29 - Road Maintenance and Abandonment Report

The Road Maintenance and Abandonment schedule attached to the GDP indicates the degree of integration required to access the fibre supply. Included in this report are the Forest Access Management System (FAMS) (or other such programs) reports, which indicate the status and condition of all Licenses of Occupation or Easements within the FMA under forest industry ownership.

7.2.3.3 M31 - Salvage Report

The inclusion of all stands into the calculation of AAC requires that all salvage be tracked as chargeable to the timber operators. Annual reporting of these volumes will permit scheduling of salvage operations between operators and provide lead-time for adjustments to the timber flow. The salvage report will also indicate the amount of non-FMA wood used by Slave Lake Pulp and status of the woodlot program. All timber disposition stakeholders are responsible for obtaining their relative proportion (quota percentage) of salvage volume. These levels will be balanced every five years.

♦ Annual Landuse Summary

The salvage report will also contain a landuse summary which will itemize:

- *Deletions from the FMA area due to other dispositions*

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- *Additions to the total land area of the FMA*
- *Timber Damage Assessment charges collected for both conifer and deciduous species on the entire FMA area.*

7.2.3.4 M32 - Public Involvement and Public Education Report

An assessment of the level of public involvement in the development of annual forest industry plans will provide for the opportunity to gauge public perceptions and values over the long term. A summary of forest industry efforts to provide opportunities for members of the public, including the aboriginal community, to learn more about the practice of forestry will be provided. This report will provide a summary of the annual meeting schedules and minutes.

7.2.4 Annual Operating Plan and Report

The Annual Operating Plan (AOP) is the most current and detailed report within the monitoring strategies of this DFMP and encompasses a significant number of measurable criteria. These criteria are focused on both stand level and landscape level aspects of the DFMP. The AOP, in combination with the GDP, contains reports on harvesting, silviculture, land use, research, forest protection, reclamation and integration of operations.

7.2.4.1 M33 - Annual Harvest Reports

The annual harvest reports indicate the post harvest results of the previous season. The indicators include:

- *Area and volume summaries by stratum*
- *Deviations from the harvest design*
- *Green retention targets and results*
- *Block summaries including verification of coarse woody debris, snag retention, slash disposal*

♦ *Annual Harvest Plans*

The annual harvest plans will include the harvest prescription and layout map with detailed block plans as required and complete watercourse crossing descriptions. Unique features, sensitive sites and areas to be left unharvested will be indicated within these plans. Watercourses will be classified and protected with the required buffers as described in the ground rules. Each AOP will include a report for historical resources as determined by the historical resources potential model.

The harvest plans will include the appropriate maps in hardcopy or digital formats. Annual harvest plans will be developed in alignment with DFMP harvest schedule.

7.2.4.2 M34 - Annual Silviculture Report

♦ *Fiscal Silviculture Activity Reports and Strategies*

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The information required in the Alberta Regeneration Information System will be included in this report. The DFMP has moved the forest companies into an arrangement that addresses the silviculture planning and coordination through the Silviculture Working Group. The Working Group will be responsible for development of the reforestation treatment strategy. This will include: area to be treated, type of treatment, and liability assignment to each block or collection of blocks.

♦ *Pre-Harvest Assessments*

Where assessments are completed they will be geared towards collecting sufficient site information to permit development of sound harvesting and reforestation strategies. Joint development of a standard assessment protocol will be the responsibility of the Silviculture Working Group.

♦ *Block Declarations*

The single landbase concept allows flexibility in the declarations of target cover group assignments. Each block will be assigned a cover group to balance the requirements for maintenance of the AAC and DFMP objectives. In general, the mixedwood stands will be retained as mixedwood and the proportion of pure to mixedwood will be retained on a landscape level.

♦ *Annual Silviculture Activity Schedule*

Areas proposed for treatments for the next year will be described. The schedule will include an allocation of resources and associated responsibility

♦ *Stand Density Management Report (SDM)*

SDM has been incorporated into the DFMP timber supply analysis. The silviculture efforts to support this commitment will be indicated in this report. The SDM harvest levels will be achieved through the active participation and contribution of all the timber stakeholders.

♦ *Afforestation Report*

The potentially productive ground within the FMA may be reforested to a productive capacity at any time during the plan under the direction of the Silviculture Working Group. All work done towards inclusion of these areas into the productive landbase will be reported annually.

7.2.4.3 M35 - Forest Protection Plan

The Forest Protection Plan is submitted annually with the AOP and will be company specific. Joint endeavors to address fire prevention and forest protection will be indicated. The forest protection plan will reflect the requirements stipulated under the ground rules and legislation.

7.2.4.4 M36 - Annual Research Report

A complete report of the research being conducted by Slave Lake Pulp and the forest companies within the FMA.

7.2.4.5 M36 – Annual Caribou Plan

The Annual Caribou Plan will be developed as per the requirements of the Boreal Caribou Committee.

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7.3 Implementation and Monitoring Summary

The following table summarizes the Reporting Commitments within the DFMP.

Table 7-5: Monitoring Program Matrix

	Goal Number																				Responsible Agency	Timeline
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
DFMP	X																				SLP	Completed
M1-Landscape Assessment																						
M2-Inventory and Inventory Updates	X														X						SLP	Completed Ongoing
M3-Ground Rule Development					X	X	X														DFMP Team	6 Mo. After Approval
M4-Watershed Delineation							X														SLP	Completed
M5-Buffer Management							X														Planning Working Group	Nov 2005
M6-Soils Assessment						X			X												SLP	Nov 2005
M7-Technology Exchange																X					DFMP Team	Ongoing
M8-Traditional Access																		X			SLP	Nov 2005
M9-Trapper Information System																X		X			SLP	Nov 2005
Stewardship Report	X			X									X								SLP	Nov 2005
M10-Natural Disturbance Study																						
M11-Landscape Assessment Gap Analysis	X																				SLP	Nov 2005
M12-Landscape Structure Report		X																			Planning Working Group	Annual/Nov 2005

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	Goal Number																				Responsible Agency	Timeline
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
M13-Reclamation Report	X				X							X			X						Silviculture Working Group	Annual/Nov 2005
M14-Understorey Inventory	X																				Planning Working Group	Nov 2005
M15-Spatial Sequence	X									X			X			X			X		Planning Working Group	Annual/Nov 2005
M16-Landscape Fish & Wildlife	X	X								X											Industry	Nov 2005
M17-Forest Health Report	X			X																	Silviculture Working Group	Annual/Nov 2005
M18-Land Use Summary Report												X		X		X					SLP	Annual/Nov 2005
M19-Watershed Analysis Report									X	X											SLP	Nov 2005
M20-Historical Resources Report								X									X				Planning Working Group	Annual/Nov 2005
M21-Training Report	X								X		X		X					X	X		Industry	Annual
M22-Certification Report														X		X					Industry	Annual
M23-Growth and Yield Report						X									X						SLP	Annual/Nov 2005
M24 – Working Group Reports	X															X					Industry	Nov 2005
M25 Weed Management Plan	X																				Industry	May 2003
M26 Road Development Plan		X														X					Industry	Nov 2005
M27 Forest Regulation Report										X				X							Industry	Nov 2005
GDP/AOP M28-Integrated Harvest Plan																X			X		Planning Working Group	Annual
M29-Road Abandonment Plan		X					X		X	X						X					DFMP Team	Annual

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	Goal Number																				Responsible Agency	Timeline
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
M30-Road Use Agreements							X														Planning Working Group	Annual
M31-Salvage Report															X						Planning Working Group	Annual
M32-Public Involvement Report													X			X	X	X		X	SLP	Annual
AOP M33-Annual Harvest Report	X	X	X		X	X	X	X	X		X	X	X		X	X	X	X	X		Planning Working Group	Annual
M34-Annual Silviculture Report	X		X		X		X					X			X						Silviculture Working Group	Annual
M35-Forest Protection Plan													X								SLP	Annual
M36-Annual Research Report			X		X	X					X				X	X					SLP	Annual
M37-Annual Caribou Plan		X																			SLP	Annual

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8.0 Preferred Forest Management Strategy (PFMS)

In this chapter the preferred forest management strategy (PFMS) is described and linked to the goals, objectives and strategies. Detailed summaries of the landbase changes that are projected to occur (over time) in the PFMS are also included. The process used to assess the sustainable harvest level for the FMA is described in Appendix H.

The PFMS is the strategy that best achieves the goals and objectives identified by the planning team for the management of the FMA area. The constraints applied in the PFMS are designed to achieve the FMA goals. The essential elements of the PFMS include:

- ♦ *Amalgamation of the FMU's in the FMA*
- ♦ *Management of the FMA as a single landbase*
- ♦ *Implementation of a single pass harvest system*
- ♦ *An intent to maintain important fish and wildlife values*
- ♦ *Mitigation of impacts on biological diversity*
- ♦ *A desire to achieve and maintain a landscape pattern that is more consistent with the natural forest structure*
- ♦ *Mitigation of impacts on water quality and quantity*
- ♦ *A reduction in the susceptibility of the FMA to catastrophic fire events*
- ♦ *Mitigation of impacts on non-timber users*
- ♦ *Achieving a balance in the pros and cons related to access management objectives*
- ♦ *Management of the FMA based on sound, scientifically-based principles*
- ♦ *Improved efficiency and enhancement of the long-term competitiveness of the forest industry.*
- ♦ *Maintain the economic stability of local communities*

The FMA goals, objectives, strategies and monitoring programs are all directly tied to the PFMS. Historical approaches to management of the FMA would not have led to the development of the same strategies and commitments.

8.1 Preferred Forest Management Strategy Description

In this section, the PFMS is described and direct links to the goals and objectives are provided. Many of the FMA strategies are operational in nature and, consequently, are not directly linked to the strategic timber supply analysis. Where appropriate, a comparison of the PFMS to alternative management scenarios is also included in this section. The following sections have been divided into several topics to guide the discussion of the PFMS.

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8.1.1 Timber Sustainability

A fundamental cornerstone of forest management policy in Alberta is sustainability. The forest industry stakeholders in the FMA understand the importance of ensuring that the forest resource is managed in a perpetual, sustainable manner. The PFMS addresses the issue of sustainability in a variety of ways:

8.1.1.1 Landbase

A complete, comprehensive analysis of the landbase was undertaken to fully classify the FMA area. The entire landscape was assigned to a number of temporary deletion or planning classes. Approximately one-third of the landbase was classified as not currently available for annual allowable cut calculations. The landbase categories will be reviewed and validated in each harvest plan (strategy 15.1.1), as the spatial harvest sequence is implemented.

8.1.1.2 Growth and Yield

A key element of sustainability is the regeneration of harvested sites. The PFMS contains a commitment to regenerate most harvested areas¹ to full stocking levels (strategy 15.3.2). Regeneration surveys will be linked to the PFMS in that all species that contribute to the current annual allowable cuts will be considered acceptable species for meeting the minimum regeneration standard (strategy 5.1.6).

Yield curves have been developed that describe the change in volume over time, for existing and regenerating stands. The volume/age relationships were derived from empirical measurements obtained on, and adjacent to, the FMA area. A commitment to initiate a permanent sample plot program (PSP) was introduced (strategy 15.2.1) which will provide additional empirical data to validate forest growth and yield projections. All yield curves were developed at the 15/10 utilization standard. This constitutes a small increase in utilization of conifer species (the previous utilization standard was the 15/11 standard).

8.1.1.3 Timber Supply

Several techniques were employed in the timber supply analysis (TSA) to ensure that the harvest levels are sustainable over time. The first of these techniques is the selection of the planning horizon length. The planning horizon is the total time period that the tested harvest levels must be sustained. Current policy in Alberta dictates that the planning horizon must be equal to a period of approximately two times the average stand rotation age. The planning horizon employed for the PFMS is 160 years. Harvest flow constraints also serve to demonstrate sustainability. The relatively even harvest flow (some variance is allowed) of both coniferous and deciduous species over the entire planning horizon demonstrates the sustainability of the PFMS. A minimum harvest age and an average target harvest age constraint was introduced to ensure that any stands scheduled for harvest are mature.

Several timber supply scenarios were evaluated to determine the potential risk associated with the assumptions in the preferred forest management strategy. The results of the analysis indicate that, from a timber supply perspective, there is marginal long-term risk to the sustainable harvest levels.

¹ Low density, wet site deciduous stands with an identified non-forested understorey are assumed to regenerate to the pre-harvest forest condition.

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One key output of the PFMS is a twenty-year harvest sequence map. The harvest sequence identifies the stands that are scheduled for harvest over time. Implementation of the harvest sequence, in a manner that is consistent with the TSA assumptions, is an important indicator of sustainability. Strategy 16.1.5 was designed to set threshold levels that, if exceeded, will initiate a review of the harvest sequence, and possibly a re-evaluation of the sustainability of the PFMS. The PFMS is a strategic analysis of the long-term timber supply for the FMA. Some detailed operational factors may not be known, or may be of too fine of scale, to be considered in the strategic approach. Consequently, some deviations from the harvest sequence are expected. The reason for each deviation will be identified and reported. Where possible, each forest industry stakeholder will be allocated their proportion of the harvest sequence in traditional operating areas (strategy 16.1.6). This approach will minimize implications on each company's traditional operating costs. As a result, any potential negative impacts on forest industry contractors and employees should be mitigated (strategy 19.1.1, 19.1.3, 19.2.1 and 19.2.2)

8.1.2 FMU Amalgamation

The selected management strategy satisfies the desire to remove administrative features which would arbitrarily restrict forestry operations. The removal of FMU boundaries (strategy 1.7.4 and strategy 16.1.1), within the FMA area, will provide more flexibility for the companies to follow natural landscape features when conducting forest management planning.

In addition, the long-term stability of the processing facilities, and the communities which are dependent on them, is better protected from natural catastrophes like wildfire by:

- ◆ *Spreading the impact of any such disturbances between all of the companies*
- ◆ *Providing synergies by pooling resources and coordinating activities between companies*
- ◆ *Creating a larger landbase, with a more even age class distribution. A more balanced age class distribution results in few critical age classes existing on the FMA. As a result, catastrophic fires are less likely to create significant impacts on the sustainable fibre supply. An additional result of filling in age class gaps is increased harvest scheduling flexibility which results in an increase in the annual allowable cut.*

An alternative strategy would be to maintain the current forest management units in the FMA. However, this would restrict forestry operations to occur within these administrative features and increase the risk exposure of each company to natural catastrophes.

8.1.3 Single Landbase Management

Slave Lake Pulp and the stakeholders have agreed to operate the FMA under a single landbase concept (strategy 16.1.2). In this process, a landbase designation is no longer necessarily maintained. Instead, the companies will plan, harvest and reforest all areas with the intent of maintaining a flow of coniferous and deciduous timber from the landscape. One goal will be to identify opportunities to increase the fibre supply while reducing costs and maintaining (or enhancing) other forest values. The major fibre supply shift in this proposal entails assigning all secondary species as a portion of the AAC.

This strategy will allow all forestry companies to work in a coordinated manner to ensure that the AAC is attained in each quadrant. All companies are dependent on each other to obtain the full AAC. The development of integrated harvest plans (strategy 7.3.1) will identify areas to create synergies by operating in a cooperative manner. Access management strategies will also be

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achieved by reducing the number of entries into operating areas (strategy 2.3.2) through the coordination of harvest planning activities.

An alternative strategy would be to maintain two discrete landbase designations, conifer and deciduous. There are several reasons why this strategy was not pursued:

- ♦ *Designation of distinct landbase areas creates an adversarial relationship between coniferous and deciduous timber operators.*
- ♦ *Long-term optimization of the resource will be more difficult to achieve.*
- ♦ *Synergies between companies will be more difficult to create given the conflicting goals and objectives. This would result in more frequent entries into operating units and higher operational costs.*
- ♦ *Silvicultural prescriptions may not be optimal for certain sites however, less flexibility would exist to allow for alternative treatments.*
- ♦ *Incidental volume flows are erratic and difficult to manage on an annual basis.*

8.1.4 Prioritization of Stands for Harvest

The stand prioritization rules were introduced to achieve a number of goals. Following is a brief description of the sorting rules:

- ♦ *Stand age – Stands were initially selected based on their age, with oldest stands receiving the highest ranking. The oldest stands were the highest priority for harvest given that they typically have passed the age of peak mean annual increment and as a result, are growing less vigorously. In addition, the mature and over-mature stand types tend to be more prone to losses from disease and insects. The oldest stands in the FMA are also some of the most dangerous fuel types that exist on the landscape (strategy 13.1.2). Consequently, the over-mature pine and spruce stands in the south portion of FMU S1S and S2S are a high priority in the harvest sequence.*
- ♦ *Modulate deciduous harvest – A secondary sorting rule was implemented to achieve the desired result of a near-even-flow-harvest of deciduous species. This resulted in the introduction of deciduous and mixedwood stands into the harvest sequence until minimum thresholds were attained. This technique was employed to achieve a balanced harvest flow of both deciduous and coniferous species.*
- ♦ *Maximize conifer harvest – The final sorting rule was to maximize the harvest of conifer volume. The objective of this rule is to ensure that the harvest level selected is a high as possible, subject to the other run control constraints that have been introduced.*

8.1.5 Regenerated Yield Transition

The regenerated yield assumptions that are applied in the preferred forest management strategy are designed to maintain the current proportion of cover groups, across the landscape (strategy 1.8.2, 3.1.7 and 15.5.1). A transition to fully stocked stands was introduced to recognize the expected results of silvicultural operations and the requirements of the legislated regeneration standards. No regeneration lag was implemented due to the expectation that all forest stands will be regenerated within two years of harvest (strategy 1.4.4).

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8.1.6 Single Pass (Harvest Opening Size, Adjacency & Green-up)

The preferred forest management strategy does not contain any restrictions for maximum cutblock size, or the related green-up and adjacency constraints which are typically associated with two-pass harvest systems. This is a significant deviation from current provincial policy. However, there are several factors which have lead to the decision to proceed with this approach.

8.1.6.1 Patch sizes

A two-pass harvest system creates a distinct pattern on the landscape that is not consistent with the natural pattern. The effect of splitting large, contiguous stand types, of approximately the same age, into smaller units would be a shift to smaller patch sizes. The effect of this pattern would be a reduction in core (non-edge) area, an increase in stand fragmentation and an increase in overall forest edge types. In addition, the two-pass harvest design also lends itself to the amalgamation of small stands (less than 10 ha) into larger harvest patches (e.g. 40 ha cutblocks). Over time, these trends will result in a significant reduction in the range of patch sizes on the landscape (i.e. fewer small patches, fewer large patches and more average size patches across the landscape). This may have important long-term effects on the overall biodiversity and characteristics of the landscape.

A single-pass harvest pattern will provide for the maintenance of the current distribution of patch sizes. This will be achieved by harvesting not only large blocks but by also harvesting the small stands that exist across the landscape (strategy 1.4.2, 1.7.2 and 13.1.1). A summary of the current, and projected future, range of patch sizes is presented in section 8.4. The maintenance of the current mosaic of large and small forest patches will provide for the full range of landscape characteristics both now and in the future.

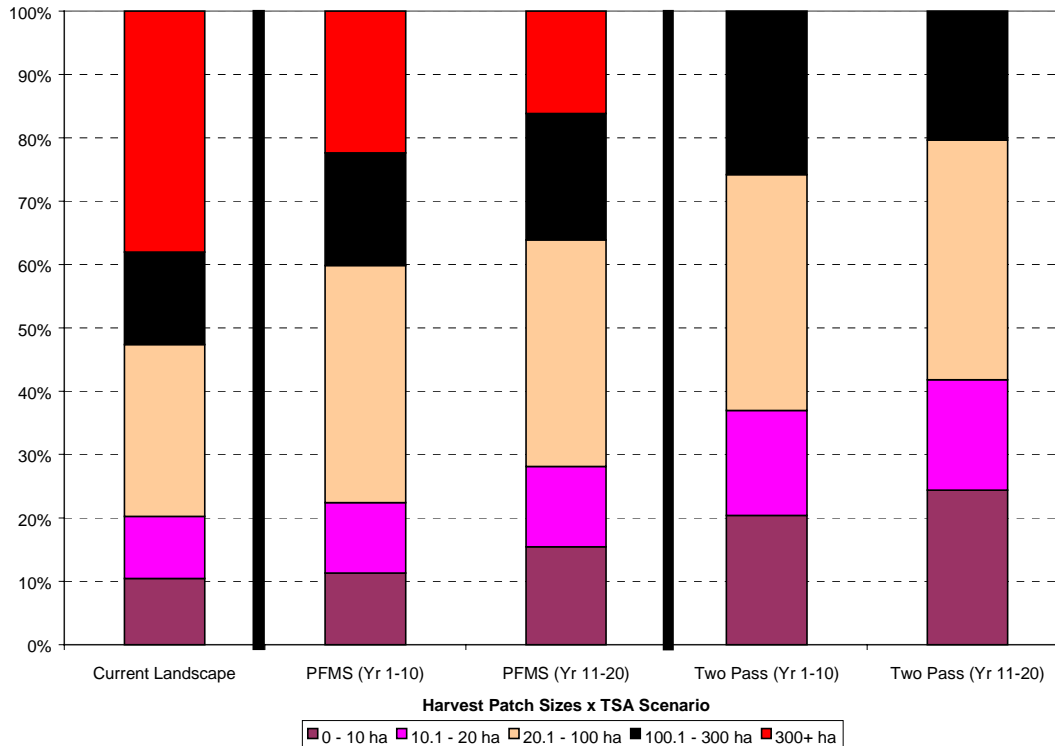
The single-pass harvest sequence will be derived from the spatial planning coverage that was constructed for this detailed forest management plan. As a result, the harvest pattern will follow the natural features and stand shapes that currently exist on the landscape (strategy 1.3.4).

Figure 8-1 provides a comparison of the harvest patch sizes for both the PFMS and the two-pass harvest schedules (year 1-10 and year 11-20) against the current gross landscape structure. The PFMS better replicates the proportion of patch sizes on a landscape basis than does the two-pass approach.

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Figure 8-1: Comparison of Current Landscape and Harvest Patch Sizes



8.1.6.2 Fragmentation & Connectivity

Landscape level connectivity attributes will be maintained by following the single-pass harvest sequence. The harvest sequence has been derived from the current landscape pattern. No strategies have been introduced into the harvest sequence that would result in a change in the connectivity of the landscape (e.g. no cover type conversion, maintenance of the range of contiguous cover type patch sizes). The goal is to maintain connectivity, by providing continuity of cover types across the landscape (Harrison and Voller, 1998). The contiguous cover type patches will provide corridors between different portions of the landscape that will allow for species movement.

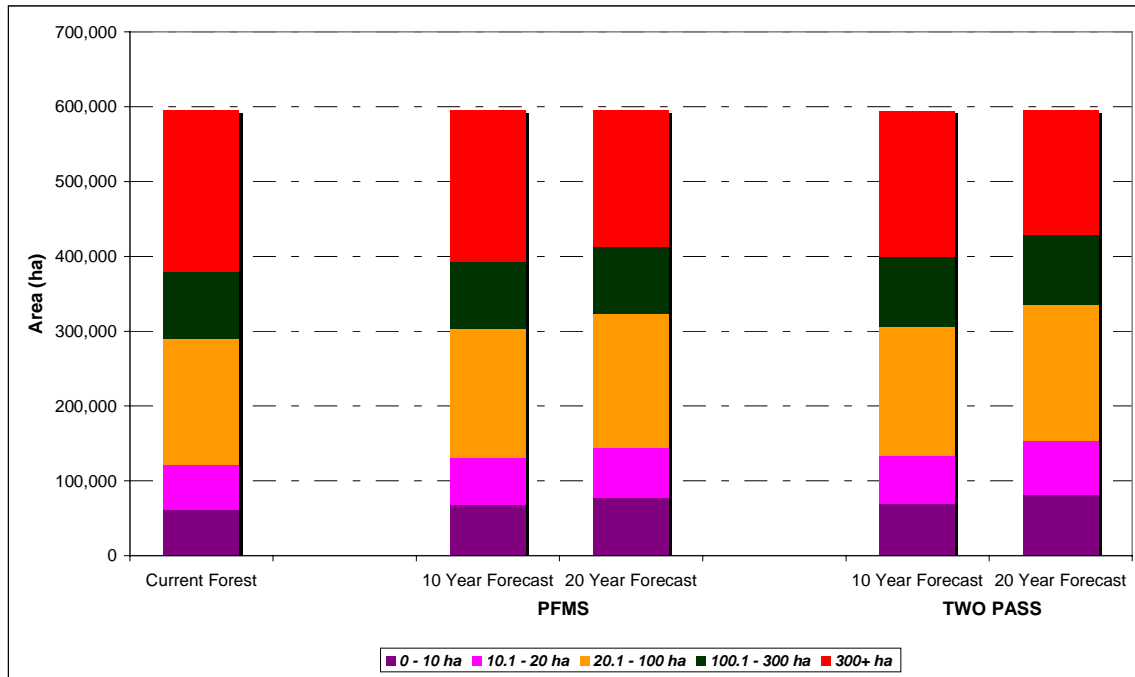
Historical two-pass harvest patterns have increased the fragmentation of the forest. The preferred forest management strategy is designed to reduce fragmentation of the forest due to forestry operations (strategy 1.7.1, 2.4.2 and 2.4.3) as compared to the two-pass system. The intent of this strategy is to minimize any negative long-term impacts on the overall integrity of the forest (pertaining to fragmentation and connectivity). To that end, the single-pass harvest pattern was allowed to follow natural landscape features (predominantly forest stands). In order to attempt to ameliorate the effect of the current cut-and-leave pattern on portions of the landscape, existing over-mature leave blocks were also allowed to be entered early in the harvest sequence. These strategies should result in a landscape pattern that is more consistent with the natural forest structure (strategy 1.7.5 & 2.4.3).

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The following figure demonstrates that the PFMS retains a greater proportion of the current patch size distribution than does a two-pass approach. Connectivity and fragmentation values on the landscape are related to the patch size distribution. Maintaining a similar distribution of patch sizes will tend to provide landscape level connectivity that is more consistent with the natural forest.

Figure 8-2: Comparison of Current Landscape Patch Sizes to Projected Landscape Pattern



Stand level connectivity values will be addressed through the retention of within stand (or block) structure (strategy 1.3.1 and 2.4.4). Unharvested patches or corridors of natural vegetation will be retained:

- ◆ *In non-forested areas*
- ◆ *In landbase categories which currently preclude forest harvesting (buffers along watercourses, inoperable areas, identified wildlife corridors, unmerchantable areas)*
- ◆ *To protect sensitive wildlife concerns (mineral licks, dens, nests)*
- ◆ *To provide connectivity to upland sites*

8.1.7 Fire

Wildfire has been the most significant natural disturbance factor effecting the FMA area. The development of strategies to reduce the risk of significant impacts of fire on the values across the landscape was one important goal of the DFMP. Many of these strategies are operational in nature and not directly tied to the PFMS. However, some strategies were designed at the landscape level and are therefore addressed in the PFMS:

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- ♦ *Harvest areas will be designed with the intent of following natural landscape patterns (strategy 13.1.1). These patterns consist of combinations of broad range of stand types, ages and sizes that currently exist on the landscape. Adherence to the harvest sequence will, over time, reduce fuel continuity while maintaining a similar mosaic of stand types and sizes.*
- ♦ *Highly volatile and high intensity fuel types were allowed to be scheduled early in the harvest sequence (strategy 13.1.2). The species composition of the FMA consists of large contiguous areas of over-mature black spruce and pine types in the south. The introduction of larger, landscape level breaks in these fuels should increase the effectiveness of suppression activities.*
- ♦ *Landscape level fire breaks will be created along Highway 33 and near the south shore communities of Lesser Slave Lake (strategy 13.1.5). A fuel management plan for conifer stand types will be designed to reduce fuel loading and continuity in specific areas. The possible benefits of stand type conversion (from conifer/mixedwood types to deciduous types) will also be evaluated. The single landbase approach of the PFMS will facilitate the implementation of these strategies, especially as they pertain to stand type conversions.*

8.1.8 Access

Access development and management is an important issue for the FMA given that it has implications on several timber and non-timber values.

- ♦ *Forestry operations – roads are required to conduct forest harvesting and silvicultural operations.*
- ♦ *Water quality and fish – improperly constructed road stream crossings may increase the sedimentation and have negative effects on fish habitat.*
- ♦ *Fire – a strategically developed road system will facilitate fire suppression efforts.*
- ♦ *Wildlife and fragmentation – increased access will increase the fragmentation of the forest, which may have implications on species habitats and movement (refer to section 8.1.6.2). Increased access also results in greater hunting pressure on wildlife species.*

A series of strategies were adopted for the PFMS to balance these conflicting values:

- ♦ *The single pass harvest system will result in the development of fewer long-term roads. Additional opportunities exist to return secondary and tertiary roads to a productive state sooner than would normally occur in a two-pass system. Forest harvesting and silvicultural operations will be completed over a shorter time period than if access had to be maintained to account for future operations in leave blocks.*
- ♦ *Single landbase management of the entire FMA area will provide opportunities for the forest industry to coordinate the number and timing of entries into each operating area (strategy 2.3.2 and 7.3.1).*
- ♦ *The forest industry has also committed to completing a long-term access management plan for the FMA (strategy 2.3.5 and 16.3.6). The spatial harvest sequence provides the information required to make informed decisions about where and when road development and reclamation activities should be conducted.*

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8.1.9 Water and Fish

One of the considerations of the single pass harvest strategy is the potential impact on water quality and flow. These values are difficult to assess quantitatively in a manner that addresses all needs. A series of strategies were developed to address these issues at both site specific and landscape levels. Implementation of the strategies developed for both planning levels should mitigate impacts on water values.

Landscape level

A significant level of research, discussion and analysis was undertaken to assess potential water flow implications in the development of the PFMS. The end result was the introduction of a constraint to the PFMS. The constraint limits the level of harvest in individual watersheds such that no more than 50% of any watershed was below species specific threshold ages² (see Table 8-1). These threshold values correspond with recovery of leaf area index (LAI) to pre-harvest levels and were selected in consultation with provincial forest hydrology experts. The pine LAI recovery values are supported by published research studies (Long and Smith, 1991). Professional opinion was used to select estimates of LAI recovery where research was not available (deciduous and spruce types).

Table 8-1: Species Specific Watershed Threshold Ages

Species Group	Threshold Age
Deciduous	10 years
Mixedwood – Deciduous Dominant	15 years
Conifer – Pine Dominant	25 years
Mixedwood – Conifer Dominant	40 years
Conifer – White Spruce Dominant	40 years
Conifer – Black Spruce Dominant	40 years

A summary of the percent of watershed area that is below the threshold ages is presented in Table 8-2.

Table 8-2: Watershed Threshold Assessment

Watershed Name	Gross Area (ha)	Percent of Watershed Effected by Recent Wildfire	Percent of Area Below Threshold at Year 10	Percent of Area Below Threshold at Year 20
Adams Creek	12,980	0%	10%	31%
Akuinu River	9,560	0%	36%	35%
Allan River	16,995	54%	67%	63%
Arcadia Creek	4,626	0%	20%	43%
Assineau River	14,026	0%	12%	28%
Boulder Creek	6,821	0%	18%	38%
Bruce Creek	10,496	0%	21%	30%
Chalmers Creek	7,818	0%	31%	44%
Chrystina Lake Drainage	404	0%	44%	39%
Deer Mountain Drainage	5,571	0%	48%	40%

² This constraint was not applied to any watersheds that have been significantly impacted by fire.

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Watershed Name	Gross Area (ha)	Percent of Watershed Effected by Recent Wildfire	Percent of Area Below Threshold at Year 10	Percent of Area Below Threshold at Year 20
Donnelly Creek	9,671	5%	49%	48%
East Arcadia Creek	2,056	0%	20%	21%
East Lower Driftpile River	2,123	0%	25%	12%
East Prairie River	4,467	0%	28%	26%
Eating Creek	3,540	0%	50%	40%
Ethel Creek	7,975	35%	60%	54%
Eula Creek	3,546	0%	13%	33%
Faust Drainage	6,069	0%	22%	20%
Florida Creek	7,144	30%	51%	48%
Foley Creek	7,738	0%	24%	25%
Freeman River	490	4%	11%	53%
Frost Hills Drainage	3,857	0%	7%	7%
Goose River	822	67%	86%	86%
Henry Creek	6,256	0%	20%	27%
Island Creek	7,964	0%	11%	22%
Jerry Creek	9,140	0%	23%	27%
Lesser Slave Lake	4,189	0%	23%	24%
Lesser Slave River	8,707	42%	57%	56%
Little Driftpile River	12,383	0%	28%	33%
Little Prairie Creek	6,772	0%	4%	4%
Lost Hope Creek	6,807	0%	5%	6%
Lower Coutts River	14,508	0%	31%	30%
Lower East Prairie River	4,438	0%	12%	4%
Lower Inverness River	3,517	0%	29%	44%
Lower Middle Driftpile River	8,871	0%	21%	20%
Lower Moosehorn River	10,933	0%	27%	33%
Lower Otauwau River	22,785	84%	55%	48%
Lower Saulteaux River	29,589	89%	73%	67%
Lower Wallace River	11,017	0%	13%	12%
McGowan Creek	917	0%	6%	6%
McKinley Creek	5,596	0%	4%	4%
Middle Driftpile River	11,422	0%	26%	25%
Middle East Prairie River	9,701	6%	20%	21%
Middle Inverness River	10,376	0%	20%	20%
Middle Otauwau River	5,749	98%	98%	97%
Middle Saulteaux River	9,942	16%	34%	36%
Middle Swan River	10,734	0%	50%	45%
Middle West Prairie River	5,054	0%	11%	11%
Mooney Creek	12,277	0%	28%	35%
Nine Mile Creek	6,136	0%	22%	38%
Otauwau River	330	93%	94%	93%
Parker Creek	10,625	93%	82%	78%

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Watershed Name	Gross Area (ha)	Percent of Watershed Effected by Recent Wildfire	Percent of Area Below Threshold at Year 10	Percent of Area Below Threshold at Year 20
Pipe Creek	6,357	0%	10%	9%
Redbeaver Creek	6,918	0%	29%	23%
Roche Lake Drainage	7,324	16%	39%	41%
Saulteaux River	4,281	2%	25%	25%
Sawridge Creek	20,051	30%	49%	42%
Shannon Creek	12,477	0%	18%	19%
Sidney Creek	12,575	7%	42%	38%
Sloan Creek	10,593	0%	19%	21%
Strawberry Creek	5,994	0%	18%	17%
Swan River	9,128	0%	49%	36%
Upper Coutts River	10,866	0%	37%	29%
Upper Driftpile River	10,830	0%	16%	28%
Upper East Prairie River	12,188	29%	42%	45%
Upper Inverness River	10,568	0%	16%	20%
Upper Little Driftpile River	5,771	0%	31%	39%
Upper Middle Driftpile River	10,361	0%	23%	45%
Upper Moosehorn River	12,295	0%	21%	27%
Upper Otawau River	12,794	84%	87%	87%
Upper Saulteaux River	10,446	6%	46%	35%
Upper Swan River	12,246	0%	38%	45%
Upper Wallace River	9,137	37%	60%	52%
Upper West Prairie River	571	0%	28%	13%
West Arcadia Creek	5,827	0%	31%	27%
West Lower Driftpile River	8,640	0%	13%	21%
West Wallace River	5,601	14%	32%	28%
Yellowstone River	6,417	0%	38%	45%

Harvest sequencing constraints were applied to the following watersheds to meet the threshold constraints:

- ◆ *Swan River*
- ◆ *Middle Swan River*
- ◆ *Upper Saulteaux River*
- ◆ *Donnelly Creek*
- ◆ *Eating Creek*
- ◆ *Deer Mountain*

Computer simulation models (such as WRENSS) will continue to be used to evaluate the potential impacts of forestry practices on water flows (strategy 9.1.1). An initial version of the PFMS was analyzed for the Swan River basin using WRENSS. The results indicated that, over the full twenty year harvest sequence, five watersheds (of a total of 22) were identified as having potentially significant effects on water flow³. In order to address this issue, the threshold levels previously discussed were introduced.

As discussed in section 8.1.7, harvest areas will be designed with the intent of following natural landscape patterns (strategy 13.1.1). Adherence to the harvest sequence will, over time, reduce

³ Greater than 15% increase in 2-yr instantaneous flows.

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fuel continuity while maintaining a similar mosaic of stand types and sizes. The majority of the highly intense and volatile fuel types are concentrated in the south portion of the FMA. This area also corresponds to the headwaters of several of the tributaries to the Swan River. A catastrophic fire event in these areas is likely to have significant negative impacts on short-term water flow. These stand types were allowed to be scheduled early in the harvest sequence (strategy 13.1.2) to reduce the likelihood of the occurrence of a significant fire event.

Site specific level

The following strategies were developed to address block level approaches to mitigating impacts on water quality and flow.

- ◆ *Vegetated buffers will be maintained along waterbody edges (strategy 9.3.1).*
- ◆ *Forestry activities near buffers will be designed in a manner that does not compromise the objectives of buffers (Strategy 7.2.2 and 9.1.2).*
- ◆ *Buffer management trials will be undertaken to determine the implications of various treatments on buffer objectives (strategy 9.3.3 & 7.5.2). The intent of the trials will be to improve water quality and fish habitat values through the management of buffer areas (i.e. to build more effective buffers).*

8.1.10 Wildlife

In addition to the fragmentation, connectivity and patch size objectives described section 8.1.6, this section will describe how the preferred forest management strategy will achieve additional wildlife objectives.

Within the context of the management plan, wildlife objectives will be addressed on a landscape basis. The PFMS is designed with the intent to maintain the current proportion of cover types (C-PL, C-SW, C-SB, MX, D) that exist on the FMA over time (strategy 1.8.2, 3.1.7 and 15.5.1). However, the full range of habitat types will not necessarily be maintained in the smaller units of the landscape (i.e. watersheds, traplines).

Another strategy of the PFMS is to ensure that a representation of all seral stages is maintained on the landscape over time. The current distribution of seral stages has been significantly impacted by forest management activities, particularly fire suppression. Despite the recent catastrophic fires on the FMA, approximately half of the forested landscape area is classified as mature or over-mature. The current seral stage distribution of the FMA is bimodal. Significant area is classified as either mature/over-mature or as establishment. The map on page 8-12 provides an illustration of the projected seral stage distribution after ten years of implementation of the PFMS. A map of the current seral stage distribution is provided in Chapter 4.

The maintenance of a range of habitat types across the landscape is another important objective of the DFMP. In order to achieve that objective, the seral stage distribution will be predicted and evaluated over time. Population distribution and abundance of wildlife will change as seral stages evolve over time. The specific strategies (1.4.5 and 2.4.1) state that the range of the combined representation of mature and over-mature seral stages on the FMA will not vary (as a result of forest management activities) from the current range by more than 20 percent during the term of this plan.

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A commitment to retain between 1% and 3% of the annual harvest area of the spectrum of stand types (deciduous and coniferous) was also made. Representative patches retention will be introduced to the following levels, over the term of the DFMP:

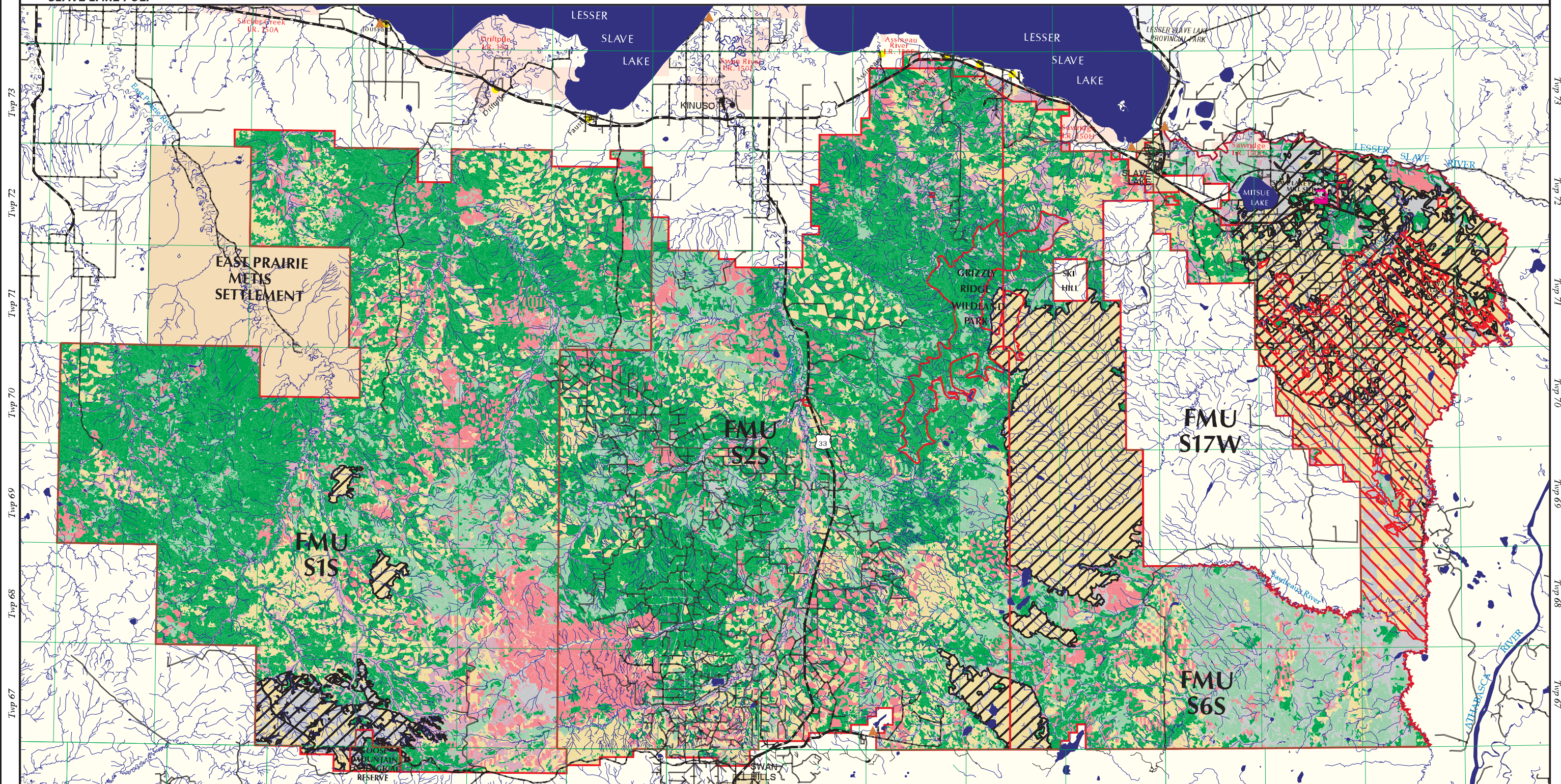
- ♦ *To a minimum level of 1% of the scheduled harvest area within each operating unit*
- ♦ *Up to an average level of 3% of the scheduled harvest area across individual Landscape Management Units (LMU's).*

Strategies intended to ensure that coarse woody debris (CWD) is maintained across the landscape have also been developed. Over the short term, CWD will be retained through the use of slash piles and by leaving some woody debris scattered across harvest areas (strategy 1.3.2). Over the longer term, CWD will be maintained through natural mortality of individual trees in regenerating stands and in the retention areas that will be left across the landscape (strategy 1.3.1, 1.3.3 and 2.4.4).

The development of roads is essential for forestry operations in most parts of the FMA. More access may result in increased activity by other forest users thereby increasing the potential for harassment of wildlife species. In addition, increased access creates linear disturbances that may effect species movement, habitat selection and use, as well as predator/prey relationships. The PFMS single pass harvest strategy will serve to minimize the number of entries into a harvest plan area through the coordination of forestry operations. The concentration of harvesting operations will also result in the development of fewer roads across the FMA. The reduction in the number of entries and the development of fewer roads, should mitigate impacts on wildlife.

Several additional strategies have been introduced into the harvest sequence to address the wildlife concerns. A portion of township 71-5-5 (sections 28 and 33), which falls within the Eating Creek watershed, was identified as an important thermal cover area. The magnitude of the burns within the area (Chisholm, Mitsue, Agnes and the 1968 burn) have had significant impacts on thermal cover. To address this concern, timber harvest scheduling for this area has been deferred for the next twenty years. By that time the 1968 burn will be over 50 years old and should be capable of providing thermal cover in the region. Another strategy that was created to address biodiversity and wildlife habitat issues, was the deferral of timber harvesting in unburned islands within the Chisholm, Mitsue and Agnes Lake fires for a minimum of 20 years (strategy 1.4.7).

SERAL STAGE DISTRIBUTION AFTER 10 YEARS OF HARVEST - PFMS



PLANIMETRIC LEGEND

- | | | |
|------------------|-----------------------|--------------------------|
| ● Village/Hamlet | — Perennial Stream | ▨ Towns |
| ▲ Campgrounds | — Intermittent Stream | ▨ Parks |
| — Paved Roads | — Indefinite Stream | ▨ First Nations Reserves |
| — Gravel Roads | — Lakes/Major Rivers | ▨ Metis Settlements |
| — Tertiary Roads | | ▨ 1998 Burn Boundary |
| | | ▨ Chisholm Burn Boundary |

SERAL STAGES

- | |
|-----------------|
| ▨ Establishment |
| ▨ Juvenile |
| ▨ Immature |
| ▨ Mature |
| ▨ Over Mature |
| ▨ Non Forested |

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8.1.11 Trappers

The detailed forest management plan is a landscape level plan. Maintaining the integrity and health of the forest at a broad level is an important objective. However, achieving those landscape level goals may not be consistent with smaller landscape unit objectives (e.g. traplines). Across the landscape, the health of the fur bearer population should not be negatively impacted by forestry operations. The following table provides a summary of the current and future (after ten years) seral stage distribution on each trapline in the FMA.

Table 8-3: Trapline Seral Stage Area Summary (ha)

Trapline	Total Area	Non-Forested	Current Seral Stage Distribution					Seral Stage Distribution After Ten Years				
			EST.	JUV.	IMM.	MAT.	OM	EST.	JUV.	IMM.	MAT.	OM
5	14,716	611	9,558	221	1,277	3,041	7	10,063	111	1,098	2,819	13
8	4,979	331	101	871	1,347	1,581	749	968	754	907	1,899	121
15	10,297	494	65	864	2,906	5,693	276	278	723	1,671	7,033	97
42	25,027	2,659	1,671	1,489	3,823	13,408	1,977	3,455	2,198	3,677	11,524	1,514
52	5,015	149	3,934	40	286	559	47	3,972	20	172	676	27
101	14,627	467	189	1,014	1,438	10,585	934	285	379	1,529	11,115	852
131	9,232	424	227	45	315	5,001	3,219	2,300	237	100	4,796	1,374
142	3,428	110	166	23	114	2,254	761	663	140	91	2,114	310
153	265	4	-	-	6	172	83	76	-	6	172	7
155	14,239	197	1,577	1,237	3,777	5,220	2,231	1,588	2,585	3,805	4,530	1,534
156	8,562	164	314	1,968	1,036	4,418	662	1,428	1,919	1,277	3,196	578
157	18,240	3,228	3,222	78	320	6,267	5,125	7,053	325	207	5,623	1,804
175	11,309	2,337	6,842	77	127	1,313	613	6,855	40	151	1,328	597
309	9,529	163	1,844	654	578	4,872	1,418	2,617	1,353	403	4,303	690
310	9,743	447	1,065	938	1,141	5,744	408	829	586	1,387	6,088	406
328	26,765	3,322	2,711	3,765	2,028	7,110	7,830	5,272	3,333	2,723	6,285	5,831
330	11,108	622	876	667	859	6,697	1,389	1,359	1,383	807	5,992	945
332	7,256	95	452	107	398	4,903	1,301	951	359	409	4,930	513
333	3,697	284	160	73	188	1,732	1,260	774	209	53	1,755	622
337	3,697	154	270	195	210	1,924	944	839	402	106	2,003	193
340	7,686	97	1,223	226	116	5,379	645	976	545	85	5,370	613
460	2,930	127	70	294	66	762	1,612	691	361	44	758	948
642	15,849	935	133	6,532	1,389	6,318	542	781	6,594	1,162	5,813	565
705	9,501	402	1,081	914	734	5,333	1,035	3,052	772	344	4,607	324
712	14,221	599	622	484	549	11,033	933	596	300	646	11,214	866
718	10,371	501	224	610	2,006	6,483	547	1,136	528	911	7,053	242
816	10,535	184	2,098	345	2,314	4,675	919	2,028	1,084	1,606	4,981	651
832	1,037	431	254	-	5	105	241	418	3	5	99	80
1073	10,027	4,332	2,298	772	1,992	441	191	2,341	446	2,391	406	111
1259	12,610	601	3,598	190	984	6,707	530	3,441	2,896	1,003	4,172	497
1286	4,877	362	225	536	999	2,251	504	550	627	963	2,285	90
1385	6,196	143	224	328	263	5,222	16	23	508	161	5,194	168
1442	100	96	4	-	-	-	-	4	-	-	-	-
1479	4,319	131	281	151	166	3,419	173	102	428	146	3,350	163
1496	8,746	677	414	1,018	1,392	5,102	143	1,661	776	338	5,172	123
1537	9,754	592	2,872	92	1,306	4,575	316	3,100	22	686	4,942	412
1623	10,550	1,901	826	1,117	3,224	2,500	983	1,953	964	3,539	1,950	243
1681	12,595	1,173	77	860	3,492	6,498	495	395	556	2,057	8,122	292
1718	783	165	164	48	9	283	113	336	77	49	151	4
1722	6,336	556	5,780	0	-	-	-	5,780	-	0	-	-
1738	7,132	1,627	578	718	3,367	603	238	354	539	3,826	674	111
1832	9,110	415	430	2,458	2,081	3,370	355	1,420	1,105	3,116	3,019	36
1856	4,891	326	16	1,086	2,597	820	46	99	774	2,691	996	5
1862	15,797	1,800	757	788	2,964	8,870	618	1,734	1,113	2,509	8,153	488
1892	72	65	7	-	-	-	-	7	-	-	-	-
1901	14,450	2,072	1,519	1,947	522	6,334	2,056	3,774	2,122	1,216	3,933	1,333
1912	5,351	399	857	421	254	2,020	1,400	3,204	587	296	618	246
1917	16,353	6,052	5,631	897	1,069	2,060	645	5,642	768	725	2,357	809

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Trapline	Total Area	Non-Forested	Current Seral Stage Distribution					Seral Stage Distribution After Ten Years				
			EST.	JUV.	IMM.	MAT.	OM	EST.	JUV.	IMM.	MAT.	OM
1940	8,028	365	589	1,821	1,332	3,070	851	789	2,094	1,466	2,463	851
1949	10,907	372	659	148	646	7,483	1,598	844	632	488	7,409	1,162
2002	6,856	196	466	297	520	4,735	642	434	244	361	4,968	653
2050	29,759	2,431	15,600	1,614	6,770	2,905	439	16,183	1,309	7,129	2,418	289
2086	6,604	753	5,492	-	250	109	-	5,492	-	154	205	-
2182	11,846	2,974	8,468	5	370	26	3	8,468	5	351	45	3
2200	7,785	481	6,564	19	158	167	396	6,572	18	3	311	400
2376	9,532	553	-	109	914	7,914	42	744	57	789	7,350	39
2392	9,451	602	1,184	126	60	4,325	3,154	2,688	407	140	4,177	1,438
2410	6,851	2,092	544	221	2,803	716	475	824	286	2,791	750	108
2413	8,579	204	750	17	348	5,695	1,566	1,391	760	139	5,177	908
2446	37,205	3,107	8,791	3,187	5,252	14,832	2,036	13,559	3,995	4,795	11,031	718
2466	15,068	622	1,386	1,888	3,346	7,602	225	1,116	1,749	2,907	8,494	180
2499	7,438	485	2,526	189	842	2,129	1,268	3,880	264	138	2,279	391
2534	280	212	21	-	45	1	-	21	-	44	2	-
2765	5,485	176	1,360	469	538	2,674	268	1,679	390	223	2,926	90
2839	8,711	490	7,893	24	67	212	24	7,890	19	73	219	20
2844	10,378	314	367	465	443	6,225	2,562	1,429	339	382	5,892	2,022
2941	8,967	309	1,305	782	588	5,652	330	1,337	774	339	5,903	306
0*	2,152	1,065	61	-	10	754	262	51	10	-	752	273
Total	655,789	60,826	131,532	48,539	81,338	270,884	62,669	172,613	54,904	73,803	256,342	37,300

Several additional strategies have been developed to improve the integration of trapper issues in forest management operations:

- ◆ *Communication with the trapper will be more effective through the development of a trapper information layer (strategy 18.2.4) and involvement of the trapper early in the planning process (strategy 17.2.3). All available information will be used in the development of harvesting and silviculture plans. The forest industry will work with effected trappers to identify concerns with the strategic harvest sequence. Some deviations from the harvest sequence will be considered to mitigate impacts on the trapline.*
- ◆ *Trappers will be involved in the assessment of wildlife presence on the FMA (strategy 2.5.2) and the identification of locations of features such as mineral licks, large nests, and cabins. (strategy 8.1.1 and 8.1.2).*
- ◆ *Access management plans will be developed in consultation with effected trappers (strategy 16.3.4 and 17.2.3).*

8.2 Evaluation of PFMS by DFMP Team (goals and objectives matrix)

The DFMP planning team evaluated the differences in two harvest schedules (single pass vs. two pass) against the goals and objectives developed for the FMA. Each individual was asked to review the two harvest sequence maps and assign a value to the strategies for each goal (shaded in grey) in the following manner:

- ◆ *If the team member believed that the harvest schedule achieved or positively contributed to the intent of the strategy, a score of positive one was assigned.*
- ◆ *If the team member believed that the harvest schedule would not achieve (or conflicted with) the strategy, a score of negative one was assigned.*
- ◆ *If the team member believed that the harvest schedule was not effected by the strategy, a score of zero was assigned.*

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A summary of the results of the evaluation is provided in the following table. The results indicate support for the single-pass harvest strategy is high (+73 for single pass vs. -51 for two-pass).

Table 8-4: DFMP Team Evaluation of Single Pass vs. Two Pass Harvest Systems⁴

Goals and Objectives	Harvest Strategy	
	Single Pass	Two Pass
Mitigate the impacts of forestry practices on biological diversity		
Complete a landscape assessment for the determination of an acceptable range of forest conditions	0	0
Develop an understanding of the natural range of forest conditions by completing a natural disturbance study by November 2005	0	0
Develop stand level management strategies	1	-1
Develop landscape level management strategies	2	-1
Develop and maintain a government approved forest inventory of the FMA	0	0
Evaluate and make provisions for the maintenance of commercial tree understories on a landscape basis.	2	-1
Mitigate the impacts of timber harvesting on forest fragmentation	9	-7
Make provisions for the maintenance of mixedwood and pure cover types on a landscape basis	1	-1
Identify plant species on the FMA by 2005	0	0
Monitor and control the spread of noxious and restricted weeds on forest industry dispositions.	4	-4
Mitigate the impacts of forestry practices on wildlife		
Identify known wildlife species on the FMA by 2005.	0	0
Identify the known forest dependent wildlife species classified as threatened, rare or endangered by 2005	0	0
Work cooperatively with Sustainable Resource Development and other forest users to coordinate the quality, quantity and duration of access.	9	-6
Support a process for the assessment of wildlife presence on the FMA	0	0
Maintain an acceptable range of native commercial tree species and their genetic diversity on the FMA		
Replace harvested forest stands with trees that most closely resemble the natural gene pool.	-1	1
Reduce significant loss of productive forest from insect and disease		
Complete a natural disturbance study, by 2005, to develop an understanding of the historic incidence of insect and disease on the FMA	1	0
Work collaboratively with other forest resource users and research organizations to stay abreast of current research and technology which will aid in the development of strategies for timely identification and mitigation of insect and disease infestations.	0	0
Detect and monitor the occurrence of forest insect and disease pests.	-1	1
Minimize the impact of forest insect and disease pests.	4	-2
Maintain or enhance site productivity		
To meet, or exceed, government regulated regeneration standards.	0	0
Develop a strategy for the mitigation of forestry practices on site productivity.	0	0
Develop a process for understanding the impacts of forestry practices on site productivity.	0	0

⁴ Evaluation by some SRD staff members is included. Evaluation by Slave Lake Pulp is not included. Total score by SLP staff resulted in +15 for single pass and -10 for two-pass.

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Goals and Objectives	Harvest Strategy	
	Single Pass	Two Pass
Develop a strategy for the inclusion of site productivity issues in the FMA ground rules	0	0
Mitigate the impacts of forestry practices on forest soils		
Develop collaborative FMA ground rules within six months of the approval of this plan; and, make allowances for the inclusion of measures to mitigate the impacts of forestry practices on forest soils	0	0
Operate in full compliance with all applicable soil conservation guidelines	1	-1
Increase understanding of the impacts of forestry practices on forest soils with the intent to apply knowledge gained	0	0
Mitigate the impacts of forestry practices on water quality and quantity		
Identify watersheds on an FMA basis within the term of this plan	0	0
Develop strategies to mitigate the impacts of forestry practices on riparian areas	2	0
Work collaboratively with other resource users to minimize the amount of roads, stream crossings and general site disturbance	8	-6
Meet or exceed government requirements for road construction, maintenance and abandonment by ensuring that all FMA forest industry operations are within government guidelines	2	-2
Work cooperatively with Alberta Sustainable Resource Development and interested industry partners to develop an understanding of the impacts of forestry practices on water quality and quantity	-1	-1
Protect sensitive sites		
Develop a process for the identification and incorporation of sensitive sites into forest management planning and operations within one year following the approval of this plan	0	0
In collaboration with Sustainable Resource Development, develop site specific plans for identified sensitive sites as required	0	0
Mitigate the impacts of forestry practices on hydrological cycles		
Mitigate the impacts of forestry practices on water flows.	-2	0
Develop a process for the identification of sensitive sites and key watersheds	0	0
Mitigate the impacts of forestry practices on standing water	1	-1
Mitigate the impacts of forestry practices on fish and fish habitat		
Identify known fish species on the FMA by 2005	0	0
Identify the known fish species classified as threatened, rare or endangered by 2005	0	0
Develop strategies for the mitigation of forest practices on fish and fish habitat	3	-1
Manage the FMA based on sound scientific principles		
Develop and maintain a staff of competent professionals dedicated to the practice of forestry	0	0
On an ongoing basis, improve our understanding of the impacts of forest practices on the forest ecosystem	1	1
Maintain or increase the productive forest landbase		
On an ongoing basis, minimize the amount of productive forested lands converted to non-forested land use	1	0
Continuously explore opportunities to increase the productive forest landbase	0	0
Reduce significant loss of productive forest from forest fire		
Reduce the susceptibility of the FMA to forest fire.	11	-8
Develop strategies for the training and preparedness for fire suppression of the forest industry.	3	-2
Complete a natural disturbance study, by 2005, to develop and understanding of	0	0

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Goals and Objectives	Harvest Strategy	
	Single Pass	Two Pass
the historic incidence of fire on the FMA		
Actively participate in forest policy decision-making		
On an ongoing basis, work closely with the government to improve policy and regulations that contribute to forest sustainability and profitability	1	0
Ensure that company personnel are aware of, and current with, all applicable laws, policies and regulations affecting forest practices	0	0
Continuously and consistently ensure that all operations are in full compliance with, or exceed the requirements of, all applicable laws, policies and regulations	0	-1
Maintain or enhance sustainable fiber supply		
Determine the net landbase available for timber production	0	0
Develop a process for understanding natural and managed stand dynamics	0	0
Mitigate the loss of productive forest landbase	1	-1
Maintain or increase sustainable harvest levels for both coniferous and deciduous species	4	-2
Maintain relative proportions of coniferous and deciduous species within an acceptable range	-1	-1
Maintain or enhance the long-term competitiveness of the forest industry		
Be efficient and effective at all phases of operations	3	-1
Improve competitiveness by adopting the philosophy of adaptive management	0	0
Effectively collaborate with other forest resource users and Alberta Sustainable Resource Development	0	0
Ensure that forest practices are environmentally sound and economically viable	1	0
Ensure that our commitment to sustainable forest management is recognized and accepted	0	0
Mitigate the impacts of forestry practices on known commercial and non-commercial non-timber values		
Develop an understanding of the identified commercial and non-commercial non-timber users on the FMA	0	0
Develop strategies for mitigating the impacts of timber harvesting on known commercial and non-commercial, non-timber values	1	-1
Implement a system to identify the potential for historical resource values on the FMA within five years of the approval of this DFMP	0	0
Develop and maintain long-term relationships with local aboriginal and Metis organizations		
Ensure that forest management planning activities are designed to minimize impact on identified unique or significant aboriginal sites	0	0
Mitigate the impacts of forestry practices on existing opportunities for subsistence purposes	-1	0
Develop a process for meaningful communication with local aboriginal and Metis organizations	0	0
On an ongoing basis, work with aboriginal groups towards the development of economic opportunities	0	0
Contribute to the economic stability of local communities		
On an ongoing basis, provide economic opportunities to local communities	2	-1
Develop and maintain a stable employee and contractor base in local communities	1	-1
Encourage and support fair, effective and informed public participation and provide the opportunity for effective communication		
Develop a public involvement process that provides opportunities for fair,	0	0

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Goals and Objectives	Harvest Strategy	
	Single Pass	Two Pass
effective and informed communication and information exchange.		
Increase public knowledge and awareness of forestry	0	0
Ensure that public views are considered in forest management planning and operations	0	0
Total	73	-51

8.3 Resolution of Issues

The following sections summarize how the DFMP planning team issues have been addressed in the PFMS.

8.3.1 Issues Identified in Terms of Reference

When developing the Terms of Reference for the DMFP, the members of stakeholder team were requested to provide a list of the specific issues they would like to see resolved in the management plan. The following is a list of the issues (also presented in Chapter 2) and a summary of how the issues were addressed in the DFMP.

Table 8-5: Terms of Reference Issue Resolution

ISSUE	RESOLUTION
Slave Lake Pulp issues:	
Roles, rights and responsibilities of stakeholders	The roles, rights and responsibilities of the DFMP stakeholder team has been identified in the DFMP strategies and monitoring programs.
Loss of productive forest landbase	Strategies have been developed to address this concern: Strategy 1.4.6, 2.3.3, 5.2.5, 12.1.1 & 12.1.4).
Vanderwell Contractors Ltd. issues:	
Pre-1991 cutblocks: <ul style="list-style-type: none"> - Updates show more deciduous due to suckering, - historically these were conifer landbase, - must go back to the 1986 phase III cover type 	These cutblocks were assigned to cover types based on regeneration surveys and field inspections. The AVI type was not necessarily used for these blocks. Now that the FMA will be managed as a single landbase the cover type assignment is not as critical of an issue.
Incidental conifer: <ul style="list-style-type: none"> - What is Slave Lake Pulp's incidental conifer replacement strategy? - Strategy to be developed for this plan. - Need annual monitoring and reporting strategy 	Incidental conifer is no longer an issue with the move to single landbase management. All conifer volume generated is AAC and must be replaced to be sustainable. The newly formed Silviculture Working Group now has the mandate of developing and/or validating regeneration treatments and success.
Conifer understorey: <ul style="list-style-type: none"> - Require identification, protection and monitoring strategies - Require conifer understorey inventory to be completed by 2002 - Assign to yield curves and incorporate into the TSA 	An analysis of the conifer understorey was completed. A summary of the information presented is included in section 8.3.2. A commitment was made by the members of the DFMP team to undertake a conifer understorey inventory during the term of this plan (Strategy 1.5.2). Strategies 1.6.1, 1.6.2 and 15.4.4 make allowance for the protection of coniferous and

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ISSUE	RESOLUTION
	deciduous understories.
<p>Merchantability deletions:</p> <ul style="list-style-type: none"> - Want opportunity to harvest – if feasible 	<p>Strategies 15.1.2 and 15.3.5 make the provision for the industry stakeholders to harvest timber in areas that were classified as a temporary landbase deletion. However, all timber harvested in these areas is chargeable against the AAC until such time as the growth response is verified. The operations must be consistent with the goals and objectives of the DFMP.</p>
<p>Single landbase:</p> <ul style="list-style-type: none"> - Do not agree with single landbase concept and deciduous normalization 	<p>All planning team members are now in favour of the single landbase approach. Deciduous normalization has not been pursued.</p>
<p>Shadow analysis:</p> <ul style="list-style-type: none"> - Wants opportunity to review yield curves and TSA for S6 FMU 	<p>Slave Lake Pulp agreed to make any data that would be required to complete an independent review of the analysis available to the planning team. The only stipulation was that all methods and results had to be shared with the entire planning team.</p>
<p>AVI re-inventory:</p> <ul style="list-style-type: none"> - The inventory is 10 years old and has not been updated. It should be done on a systematic basis, beginning immediately, with involvement with the quota holders 	<p>Strategy 1.5.1 outlines a commitment to, on an annual basis, complete a re-inventory of approximately ten percent of the FMA area to AVI version 2.1 specifications. Quota holder involvement in the re-inventory process is expected.</p>
Buchanan Lumber's issues:	
<p>Primarily interested in coniferous AAC. Not necessarily interested in all aspects of the forest management plan;</p>	<p>All planning team members are now in favour of the single landbase approach. The integrated management philosophy dictates that all industry stakeholders are linked to all parts of the DFMP.</p>
<p>An AAC calculation on the entire S1 FMU or just the East Side that is within Slave Lake Pulp's FMA? Would prefer to see the calculations done on the entire FMU for conifer;</p>	<p>A detailed analysis of the timber supply was required for FMU S1/S1S prior to the partitioning of the FMU and the subsequent amalgamation of the FMU's in the FMA. A summary of the analysis is presented in section 8.3.3.</p>
<p>Spatial analysis –</p> <p>Should also be done on the entire S1;</p>	<p>The timber supply analysis for the FMA area was completed with the use of a spatial model. The analysis of FMU S1 was completed in an aspatial manner (as directed by SRD).</p>
<p>FMU Coniferous plots</p> <ul style="list-style-type: none"> - Are there enough? Where? 	<p>Strategy 15.4.1 outlines the requirement to develop growth and yield programs to create new, and validate existing, yield curves by November 2010. This will include the analysis of existing PSP and TSP data and the possible establishment of additional plots. The current yield curves were strengthened by the incorporation of Blue Ridge Lumber FMA plot data.</p>
<p>Landbase netdown:</p> <ul style="list-style-type: none"> - Wants to have opportunity in low density or other marginal coniferous stands on an as 	<p>Strategies 15.1.2 and 15.3.5 make the provision for the industry stakeholders to harvest timber in areas that were classified as a temporary</p>

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ISSUE	RESOLUTION
encountered basis	landbase deletion. However, all timber harvested in these areas is chargeable against the AAC until such time as the growth response is verified. The operations must be consistent with the goals and objectives of the DFMP.
Coniferous understoreys: – Location, amount and condition;	An analysis of the conifer understorey was completed. A summary of the information presented is included in section 8.3.2. A commitment was made by the members of the DFMP team to undertake a conifer understorey inventory during the term of this plan (Strategy 1.5.2). Strategies 1.6.1, 1.6.2 and 15.4.4 make allowance for the protection of coniferous and deciduous understoreys.
Post 1991 cutblocks: – all blocks occurring in the mixedwood forest should be put back on regenerated mixedwood curves	The post-1991 cutblocks were assigned to yield strata by the company with the reforestation liability on the blocks.
Pre 1991 cutblocks: – go with the AVI call unless we have data to support otherwise. Suggests aerial surveys to designate blocks	These cutblocks were assigned to cover types based on regeneration surveys and field inspections. The AVI type was not necessarily used for these blocks. Now that the FMA will be managed as a single landbase the cover type assignment is not as critical of an issue.
Incidental conifer should be managed on a sustainable basis	The newly formed Silviculture Working Group now has the mandate of developing and/or validating regeneration treatments and success.
Forest dynamics: – the forests have grown and how do we deal with increase in coniferous AAC?	Strategy 15.4.1 outlines the requirement to develop growth and yield programs to create new, and validate existing, yield curves. Strategy 1.5.1 outlines a commitment to, on an annual basis, complete a re-inventory of approximately ten percent of the FMA area to AVI version 2.1 specifications. Quota holder involvement in the re-inventory process is expected.
Agree in principle with the single landbase concept	All planning team members are now in favour of the single landbase approach.
Millar Western Forest Products Ltd. issues:	
Enhanced Forest Management, including crop planning, is a priority for MWFP;	Stand density management (SDM) strategies exist in DFMP. The current TSA contains SDM yield curves.
Coniferous understoreys: – Issues defining coniferous understoreys and how it is incorporated in the TSA	An analysis of the conifer understorey was completed. A summary of the information presented is included in section 8.3.2. A commitment was made by the members of the DFMP team to undertake a conifer understorey inventory during the term of this plan (Strategy 1.5.2). Strategies 1.6.1, 1.6.2 and 15.4.4 make allowance for the protection of coniferous and

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ISSUE	RESOLUTION
Inoperable areas: – Opportunity to harvest where encountered where operationally feasible.	deciduous understories. Strategies 15.1.2 and 15.3.5 make the provision for the industry stakeholders to harvest timber in areas that were classified as a temporary landbase deletion. However, all timber harvested in these areas is chargeable against the AAC until such time as the growth response is verified. The operations must be consistent with the goals and objectives of the DFMP.
Fish and Wildlife buffers: – Strategy for management should be developed within the development of this DFMP	Strategy 7.5.2 contains provisions to complete buffer management trials over the term of the DMFP.
Merchantability test deletions: – wants the opportunity to operate in stands deemed as unmerchantable on an as encountered basis	Strategies 15.1.2 and 15.3.5 make the provision for the industry stakeholders to harvest timber in areas that were classified as a temporary landbase deletion. However, all timber harvested in these areas is chargeable against the AAC until such time as the growth response is verified. The operations must be consistent with the goals and objectives of the DFMP.
Volume sampling: – MWFP requests access to all data collected as well as inclusion in decision making regarding the design and implementation strategy for any new volume sampling program	Slave Lake Pulp agreed to make any data that would be required to complete an independent review of the analysis available to the planning team. The only stipulation was that all methods and results had to be shared with the entire planning team. Strategy 15.4.1 outlines the requirement to develop growth and yield programs to create new, and validate existing, yield curves by November 2010. This will include the analysis of existing PSP and TSP data and the possible establishment of additional plots.
Yield curve development: – MWFP requests involvement in yield curve development;	All planning team members had opportunities to review and provide input into the development of the yield curves applied in the FMA.
Recognition that the 1998 DFMP was signed subject to the understanding that some assumptions were contentious in nature and will be addressed in the 2000 DFMP;	- Provide link of issues from last plan – include in Chapter 8
Implementation of single landbase management including mixedwood management strategies, must be included in the plan	All planning team members are now in favour of the single landbase approach.
Requests that MWFP be involved in the development in FMA ground rules	All DFMP planning team members have been invited to participate in the development of the FMA ground rules.
Wants to investigate the opportunity for surge cuts in the S2 FMU.	Slave Lake Pulp agreed to make any data that would be required to complete an independent review of the analysis available to the planning team. The only stipulation was that all methods and results had to be shared with the entire planning team.

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ISSUE	RESOLUTION
	MWFP did complete this analysis and make the results available to the DFMP planning team.
Incidental coniferous will be a part of the coniferous AAC and will be allocated to coniferous disposition holders according to quota percentages.	All DMFP team members are in agreement with this concept. SRD has confirmed the intent to allocate the entire conifer AAC to the existing disposition holders. The new quota percentages provided in Appendix I were developed in a manner that is consistent with this intent.
Cutovers within companies Silviculture Information Systems will include planned activities and be included in the updated inventory for TSA.	Historical and proposed harvesting activities for each company were included in the DFMP timber supply analysis.
F&WS – Fisheries issues:	
Plan must show how harvesting operations will be conducted in a manner that minimizes the impacts on the watershed. Suggest to incorporate some of the ideas from the Oregon Plan;	Watersheds have been identified for the FMA area. The watersheds were used to analyze the potential impacts of the harvest sequence on water flows. Strategy 9.1.3 was developed to minimize the impact of timber harvesting on water flows.
Performance audit for roads and crossings;	Monitoring strategies are described in strategy 7.4.1 and 7.4.2.
Minimize the number of roads and crossings;	Strategy 7.3.1 and 7.3.2 were created to address the desire to minimize the number of roads and crossings.
Quantify crossings on a watershed basis;	A watercourse crossing inventory and monitoring strategy has been developed (strategy 7.4.2)
Detailed watershed plans that maintain biodiversity over time;	Watersheds have been identified for the FMA area. The watersheds were used to analyze the potential impacts of the harvest sequence on water flows.
Maintain water yields over time;	Watersheds have been identified for the FMA area. The watersheds were used to analyze the potential impacts of the harvest sequence on water flows.
Riparian and water source buffers – variable buffer widths with a minimum, use management guidelines similar to the 1999 Oregon Plan;	Buffers have been applied to all major watercourses and waterbodies on the FMA, in a manner that is consistent with current forest industry practices.
Cumulative effects – set limits for linear disturbance, number of crossings and percent vegetation removal on a watershed basis;	Although this is an important landscape level issue, it is not within the scope of this DFMP. Current inventory data was used in the plan development to ensure that existing landscape disturbances were included. Some strategies have been developed that are intended to minimize the impact of forestry operations (Strategy 17.2.1, 16.3.6, 16.1.3, 2.3.1, 2.3.2). No projections of the impact of future disturbances have been introduced.
Water quality and water quantity;	Several strategies (7.2.1, 7.2.2, 7.5.1, 7.5.2 and 9.1.2) were developed to mitigate the impacts

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ISSUE	RESOLUTION
	of forestry operations on water quality and quantity.
Inoperable areas;	Major inoperable areas on the FMA have been identified as a temporary landbase deletion and are not included in the current timber supply analysis.
Sensitive soils;	Strategy 9.2.1, 9.2.2, 9.2.3 and 9.2.4 were designed to identify and protect sensitive sites.
Soil erosion	Strategy 5.2.2, 9.2.3 and 9.2.4 were designed to identify and protect sites with high erosion potential.
F&WS - Wildlife issues:	
Wildlife habitat	Strategies 2.4.1, 2.4.2, 2.4.3 and 2.4.4 were all developed to mitigate the impacts for forestry operations on wildlife habitat.
Wildlife protection	Several access management strategies have been developed, which, in conjunction with the wildlife habitat strategies, will contribute to the protection of wildlife and wildlife habitat.
Access	Access management and control are prime considerations in the harvest design. Increased access to the FMA is detrimental to wildlife management efforts. The DFMP should address key access routes and a system to manage those routes. F&WS should be involved in the Road Corridor Development Plan.
Wildlife species management	Strategies 2.1.1, 2.1.2, 2.1.3, 2.5.1 and 2.5.2 were developed to identify and monitor wildlife species on the FMA.
Mineral licks	Strategies 8.1.1 and 17.2.3 state that mineral licks will be identified. Forestry operations will be designed to mitigate impacts on these sites.
Trappers	Please refer to TRAPPER ISSUES presented later in this section.
Riparian areas	Several strategies have been developed that pertain to the establishment and management of riparian buffers (strategy 1.3.1, 2.4.4, 8.1.3, 8.1.4, 9.1.2, 9.2.1, 9.3.1, 9.3.3 and 10.3.1)
Seral stages	The amount and distribution of seral stages across the landscape are important considerations. The target range to be met in each seral stage may define the success of the management system in protecting the coarse filter species. Strategy 2.4.1 describes seral stage targets.
Buffer management	Several strategies have been developed that pertain to the establishment and management of riparian buffers (strategy 1.3.1, 2.4.4, 8.1.3, 8.1.4, 9.1.2, 9.2.1, 9.3.1, 9.3.3 and 10.3.1)
Stand density management	Stand density management treatments will

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ISSUE	RESOLUTION
	contain strategies to mitigate effects on wildlife.
Key habitat	Strategy 2.4.6 was introduced to ensure that forestry operations in the identified Caribou area were consistent with the Boreal Caribou Committee guidelines.
Connectivity	Strategy 2.4.3 and 2.4.4 were created to address the need to maintain connectivity across the landscape.
Coarse Woody Debris	Two specific strategies (1.3.2, 1.3.3) were developed to recognize the need to maintain coarse woody debris on the landscape.
Fire Salvage Guidelines	Strategy 15.4.7 was developed to recognize the intent that fire salvage plans will be developed with consideration for non-timber values.
Cumulative effects	Although this is an important landscape level issue, it is not within the scope of this DFMP. Current inventory data was used in the plan development to ensure that existing landscape disturbances were included. Some strategies have been developed that are intended to minimize the impact of forestry operations (Strategy 17.2.1, 16.3.6, 16.1.3, 2.3.1, 2.3.2).
Public issues:	
Sustainable forest development	Section 8.4.1.1 contains a description of how sustainability of the forest resource is addressed in the DFMP.
Allocation of the forest resource	This is not within the scope of the DFMP.
Special Places 2000	This is not within the scope of the DFMP.
Multiple use of the forest	The strategies outlined in Goal 17 describe how the forest industry plans to work with non-timber users of the FMA.
Ecological diversity	The strategies described in Goal 1 describe how the forest industry plans to evaluate and maintain biodiversity.
Reforestation	Goal 3, 5 and 15
Logging trucks on the road	Strategy 20.2.4 states that the forest industry will notify the public of significant forest management activities planned for the FMA area.
Herbicides	Strategy 20.2.4 states that the forest industry will notify the public of significant forest management activities planned for the FMA area.
Harvesting methods	The DFMP does not contain specific strategies related to harvesting methods. Appropriate, site specific techniques will be employed.
Public input into forest planning	Public members have participated in the development of the DFMP. Several formal presentations have been made to the Slave Lake Forest Public Advisory Committee and other groups.

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ISSUE	RESOLUTION
Relationship between forestry and oil and gas	Strategy 16.3.3, 17.2.1 and 17.2.2 describe how the forest industry will work with the oil and gas industry.
Transboundary issues:	
Transboundary issues such as integrated management opportunities with other FMA holders will be addressed in the Detailed Forest Management Plan.	Several initiatives have been introduced that are transboundary in nature: Sharing of TSP data with Blue Ridge Lumber to strengthen yield curves. Sharing of data and research between companies that are active on the FMA. Integrated harvest plans will be developed for all industry parties active on the FMA.
Trapper issues:	
Notification and involvement in harvest planning.	Strategy 17.2.3 states that the forest industry will contact effected trappers early in the planning process to identify important sites and identify mitigation strategies. In addition, current trapline boundaries formed part of the spatial planning layer for the DFMP. The effect of the harvest sequence on individual traplines will be analyzed. This knowledge will provide forest industry planners with the opportunity to discuss impacts and develop strategies to work with effected trappers. Specific methods for trapper involvement and the notification protocols will be developed in the FMA ground rules.
Trapper compensation	Strategy 17.2.3 states that the forest industry will contact effected trappers early in the planning process to identify important sites and identify mitigation strategies.
Maintenance of traditional access.	Strategies 16.3.4 and 15.1.4, 18.2.1 and 18.2.2 describe the approach that the forest industry will take to work with the trapping community to identify and maintain traditional access routes.
S6 MTU issues:	
Wood supply shortfall due to the 1998 fires	The amalgamation of the FMU's has mitigated the effects of the recent fires in the FMU and reduced the risk exposure to future fires.
S2 MTU issues	
Maintenance of existing MTU boundary (planning group)	Strategy 19.1.3 makes the provision for the allocation of the harvest sequence to the forest industry stakeholders (including the MTU) in a fair and equitable manner while striving to keep traditional spheres of interest.
Open to the evaluation of a single landbase concept for possible inclusion into this DFMP	All planning team members are now in favour of the single landbase approach.
Other issues:	
Ensure opportunities exist for use of more small, local contractors in the forest industry	The following strategy was developed to address this issue: Strategy 19.2.3 - Work with local groups to

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ISSUE	RESOLUTION
	provide training and employment opportunities within the forest industry.
Identification and protection of heritage sites;	The following strategies were developed to address this issue: Strategy 8.1.5 & 17.3.1 - Provide historical resource predictability analysis for all harvest operations on the FMA and comply with the Alberta Community Development regulations as they apply to historical resources.
Klondike Trail	The following strategies were developed to address this issue: Strategy 8.1.5 & 17.3.1 - Provide historical resource potential analysis for all harvest operations on the FMA and comply with the Alberta Community Development regulations as they apply to historical resources.

8.3.2 Quota Holder Issues with 1998 DFMP

The quota holders had identified several issues that were unresolved in the 1998 DFMP. Slave Lake Pulp agreed to address these concerns in the 2000 DFMP. The following table summarizes the resolution of those issues.

Table 8-6: 1998 Quota Holder Issue Resolution

ISSUE	RESOLUTION
Mixedwood management policy definition and involvement of quota holders.	The move to single landbase management moves us beyond the intent of mixedwood management.
Development of a common set of ground rules and quota holder involvement in ground rule development.	All DFMP planning team members have been invited to participate in the development of the FMA ground rules.
Development of a coniferous and deciduous growth and yield program	Slave Lake Pulp is in favor of the development of a coordinated growth and yield program. The costs and benefits of the program should be shared by all forest industry stakeholders.
Maintenance of incidental conifer in pure deciduous stand types.	Incidental conifer is no longer an issue with the move to single landbase management. All conifer volume generated is AAC and must be replaced to be sustainable. The newly formed Silviculture Working Group now has the mandate of developing and/or validating regeneration treatments and success.
Incorporate landscape designs that better mimic natural disturbance patterns.	FMU amalgamation, single pass and single landbase management approaches address this concern.
Identification, protection and assignment of coniferous understories.	An analysis of the conifer understory was completed. A summary of the information presented is included in section 8.3.2.A A commitment was made by the members of the DFMP team to undertake a conifer understory inventory during the term of this plan (Strategy

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ISSUE	RESOLUTION
	1.5.2). Strategies 1.6.1, 1.6.2 and 15.4.4 make allowance for the protection of coniferous and deciduous understoreys.
Incorporation of Enhanced Forest Management into the TSA.	Stand density management (SDM) strategies exist in DFMP. The current TSA contains managed stand (SDM) regenerated yield curves were created and incorporated for good and medium, pine dominant stand types.
Involvement in net landbase determination (inoperable areas, merchantability tests).	All quota holders had many opportunities to review and guide the determination of the net landbase.
Management of fish and wildlife buffers	Several strategies have been developed that pertain to the establishment and management of riparian buffers (strategy 1.3.1, 2.4.4, 8.1.3, 8.1.4, 9.1.2, 9.2.1, 9.3.1, 9.3.3 and 10.3.1)
Landbase stratification methodology	The FMA will now be managed as a single landbase. Stratification methodology is no longer a concern.
Yield curve development methodology (volume sampling, plot measurement protocol, cruise compilation and regeneration strategies).	All quota holders had many opportunities to review and guide the development of yield curves.
Involvement in AAC determination (simulation control)	All quota holders had many opportunities to review results and provide input into the development of the PFMS.

8.3.3 Conifer Understorey Analysis

8.3.3.1 Conifer Understorey Presence and Identification

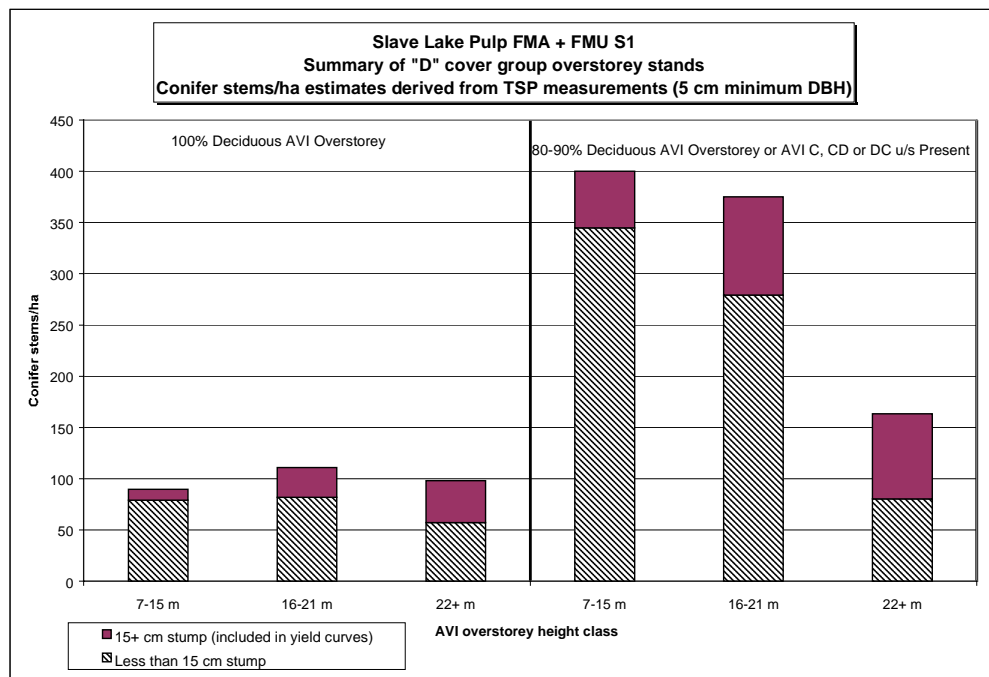
Existing inventory information was analyzed to determine the extent of the conifer understorey presence in the FMA. Aerial photography used in the completion of forest inventories is typically acquired in the summer months, when deciduous trees are in a "full leaf-out" condition. The presence or absence of understoreys is difficult to assess in stands that have full crown closure. In order to determine if significant areas of conifer understoreys were missed in the forest inventory, the temporary sample plot (TSP) data was analyzed. The TSP program was designed to identify stems down to a 5 cm DBH. The following figure was developed to evaluate if significant levels of conifer understorey were present in areas that were not identified as containing a conifer component in the inventory. Two observations are noteworthy:

- 1) 100% pure deciduous areas that were identified as not containing a coniferous component (overstorey and understorey) do not contain many coniferous stems (range from approximately 50 to 70 stems per hectare).
- 2) Deciduous stands that were identified as containing a conifer component were validated by the TSP data.

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Figure 8-3: Conifer Understorey Identification



8.3.3.2 Conifer Understorey and the Preferred Forest Management Strategy

The PFMS does not contain specific regeneration strategies for conifer understorey protection. There are several reasons for this approach:

- ♦ Analysis of the timber supply implications of an understorey regeneration strategy indicated that the increase to the conifer AAC was not significant with disruptive effects on deciduous even-flow tolerances.
- ♦ A conifer understorey inventory is scheduled to be completed in the next five years (strategy 1.5.2 and 1.6.1). The current understorey inventory does not cover the entire FMA area and is approximately ten years old.
- ♦ Conifer understorey yield curves have not been developed.
- ♦ All forestry operations will be conducted in a manner that will maximize protection of conifer understoreys (strategy 1.6.2 and 1.6.3).

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8.4 Summary of PFMS Results

The figures presented in this section summarize key information about the PFMS.

Figure 8-4: PFMS Deciduous Harvest Flow Summary

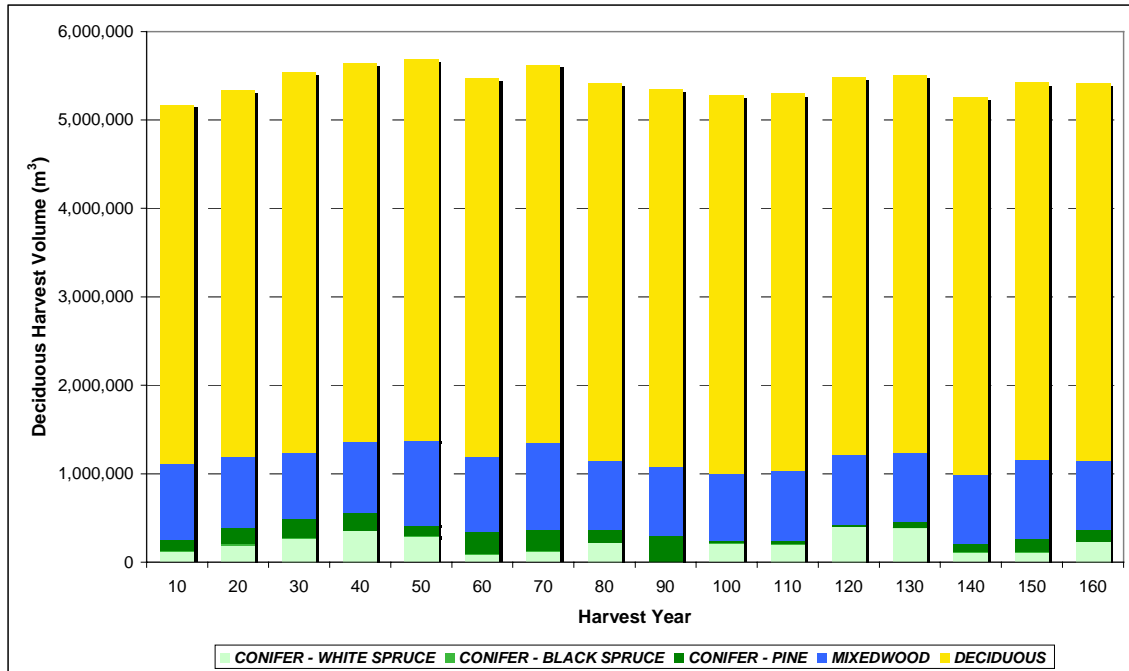
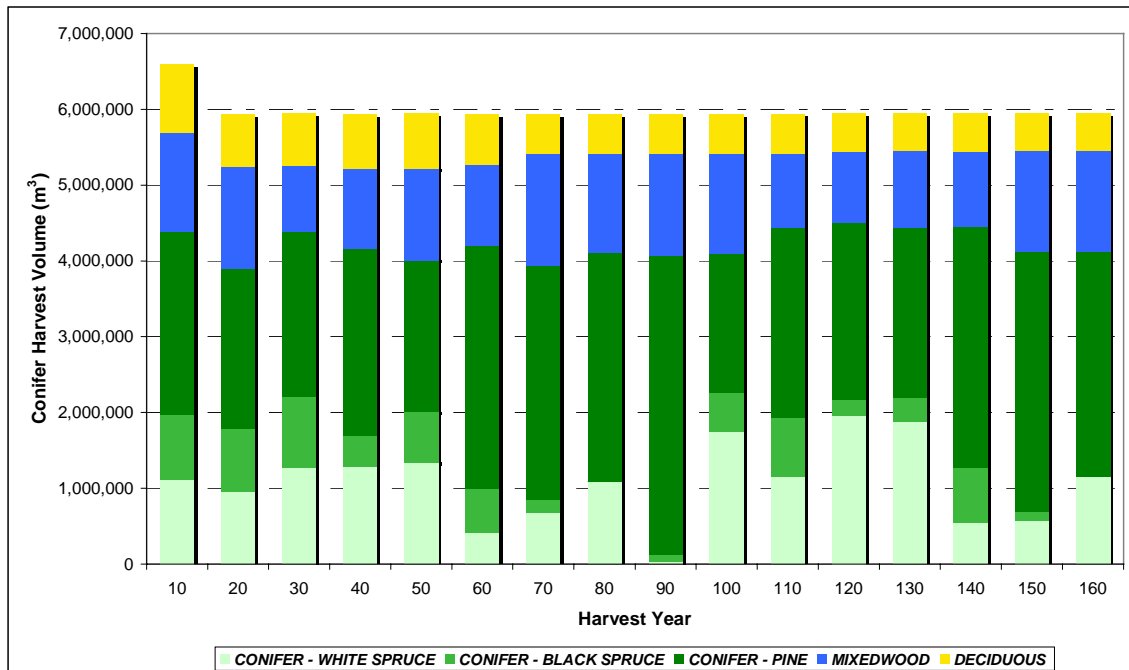


Figure 8-5: PFMS Coniferous Harvest Flow Summary



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Figure 8-6: PFMS Area Harvested

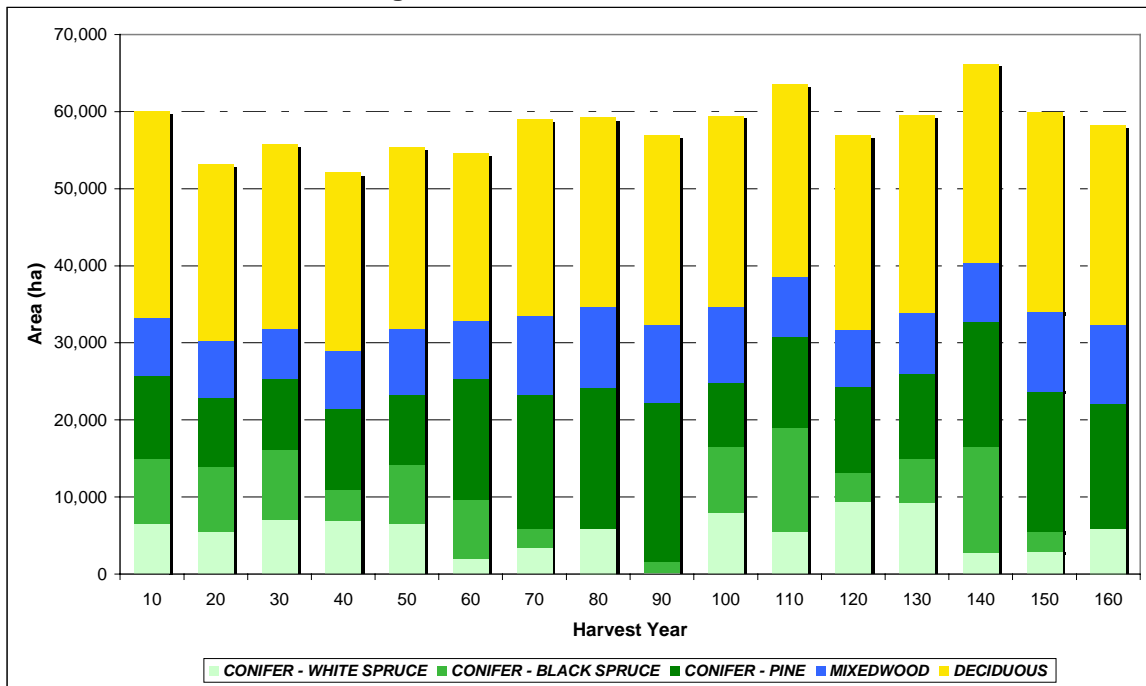
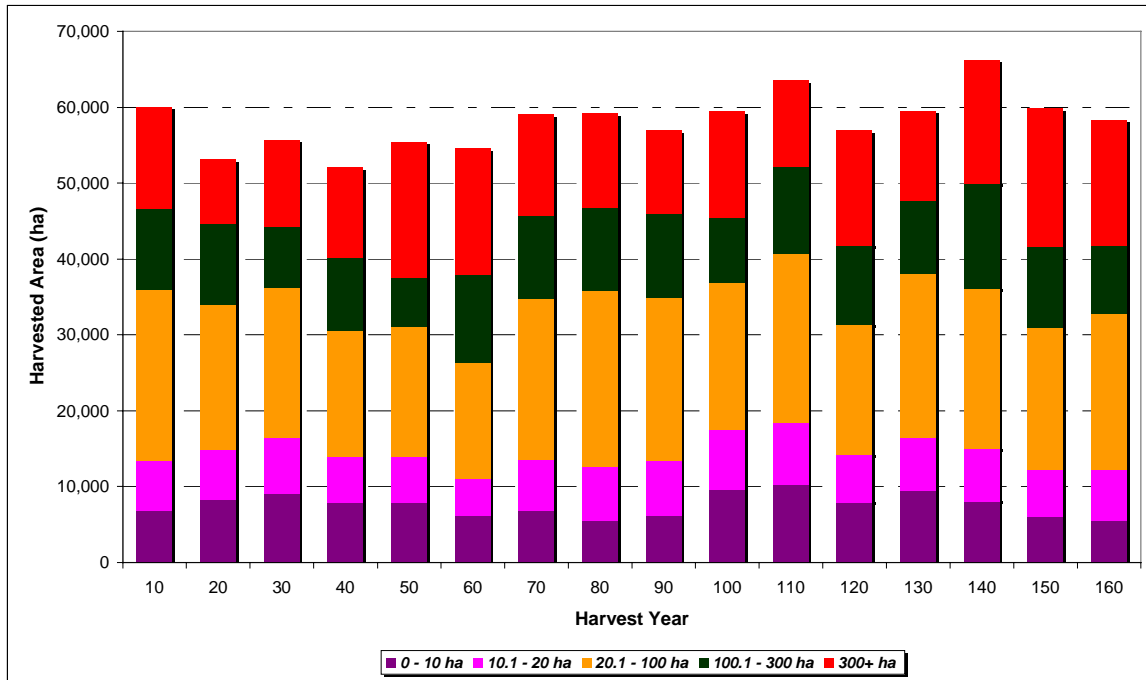


Figure 8-7: PFMS Harvest Patch Sizes



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Figure 8-8: PFMS Average Harvest Age

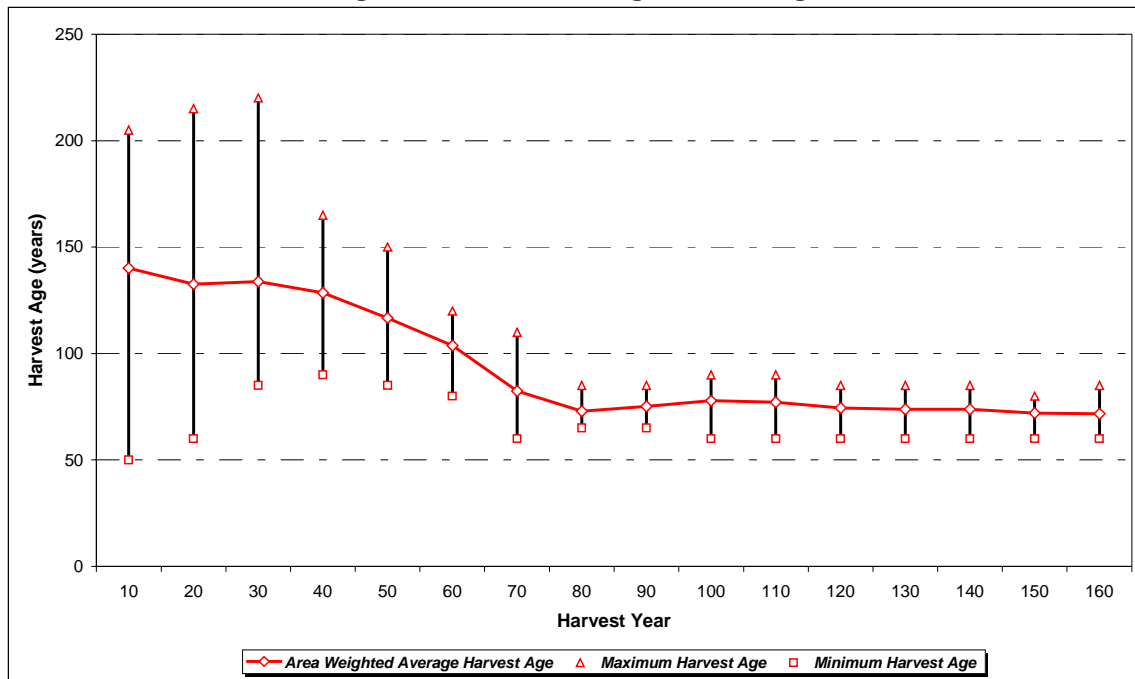
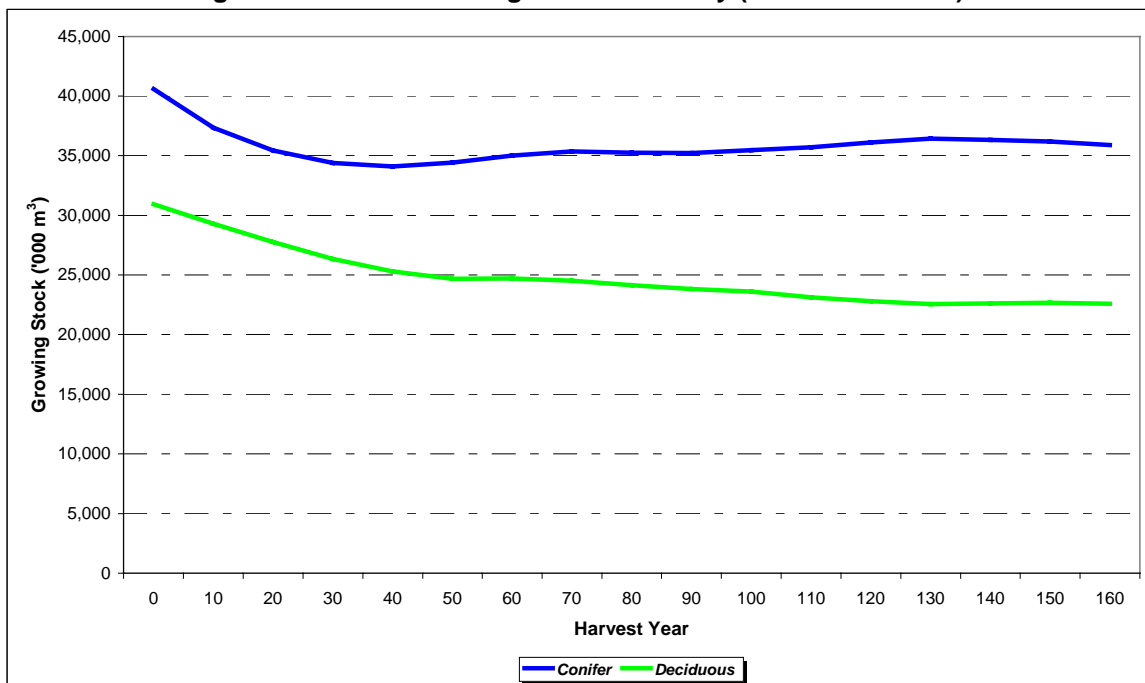


Figure 8-9: PFMS Growing Stock Summary (Gross Landbase)



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Figure 8-10: PFMS Seral Stage Summary (Gross Landbase)

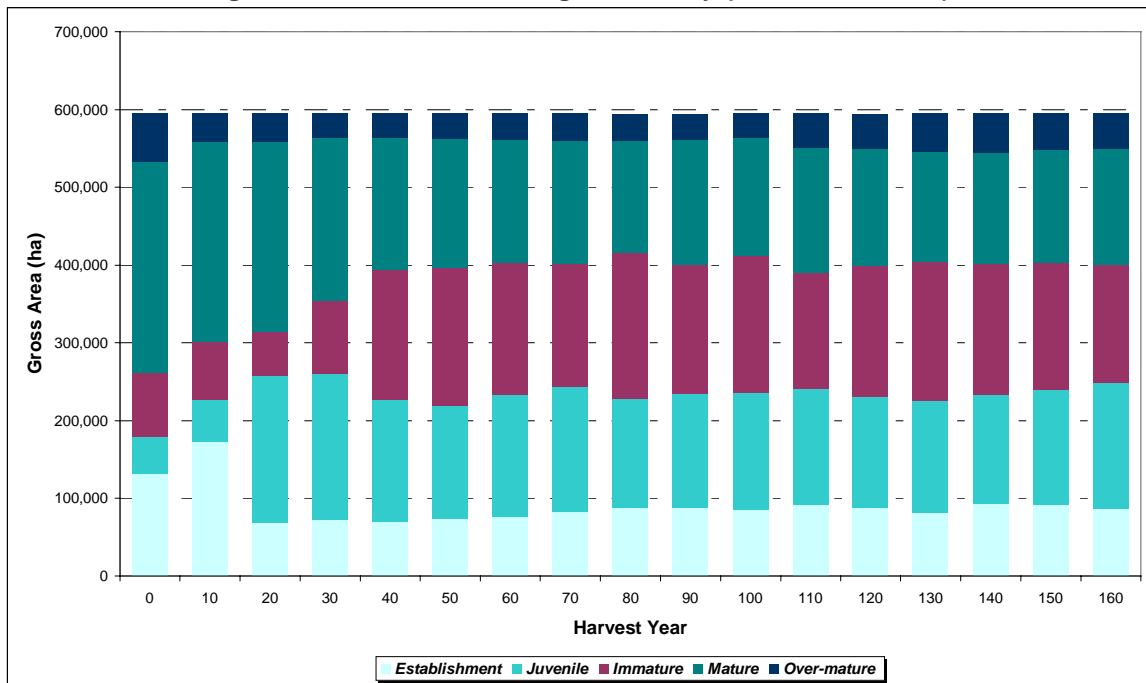
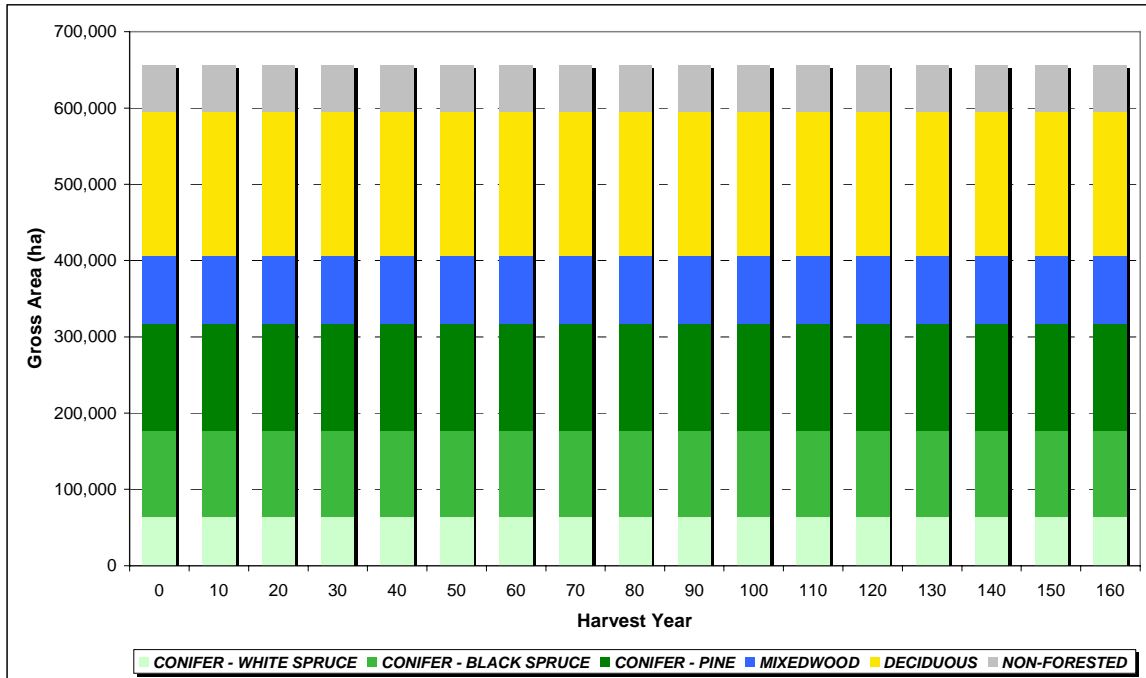
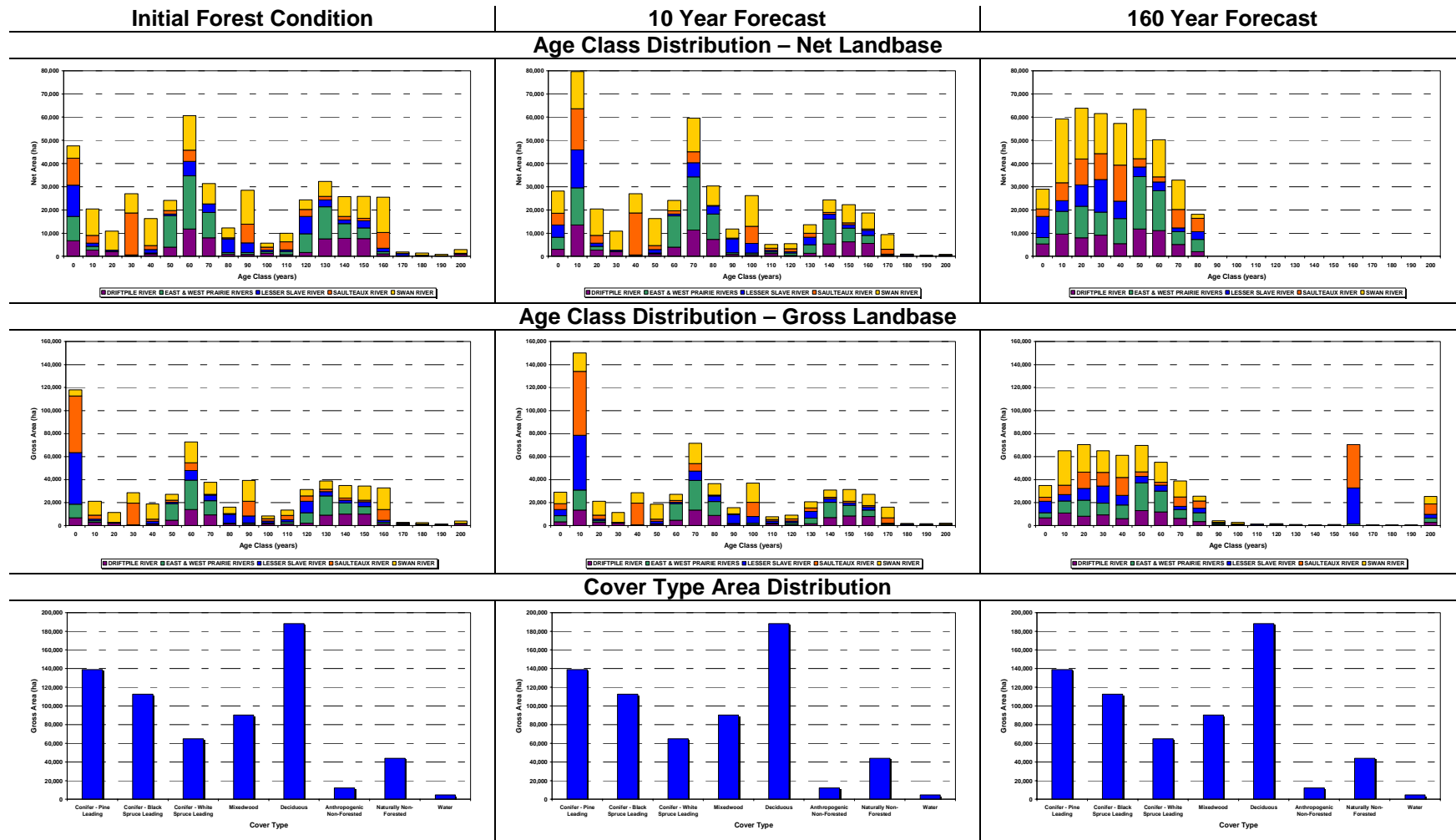


Figure 8-11: PFMS Cover Types



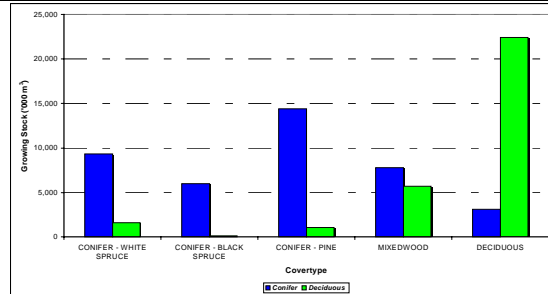
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Figure 8-12: Preferred Forest Management Strategy Forecasted Landscape Condition



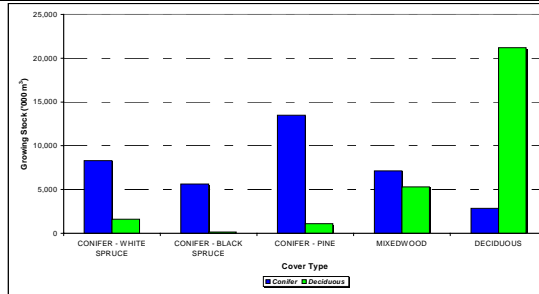
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Initial Forest Condition

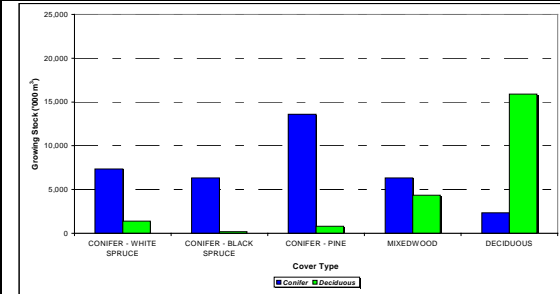


10 Year Forecast

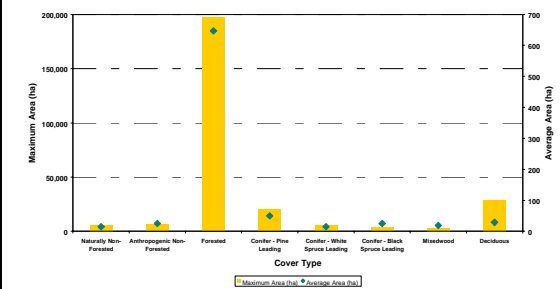
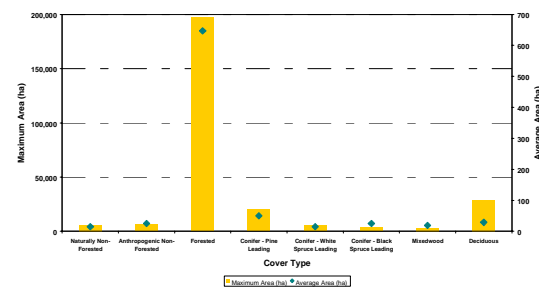
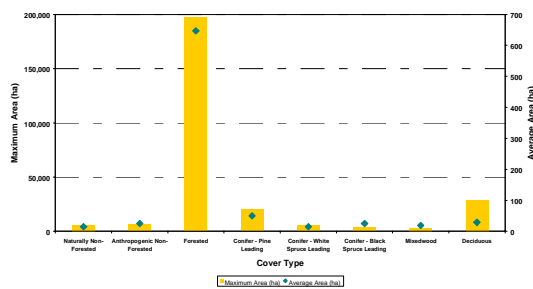
Growing Stock Summary by Cover Type



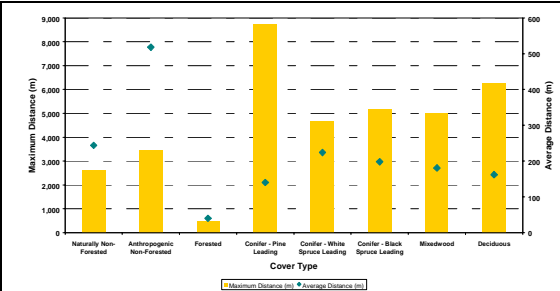
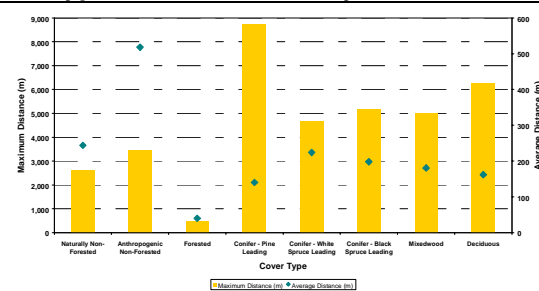
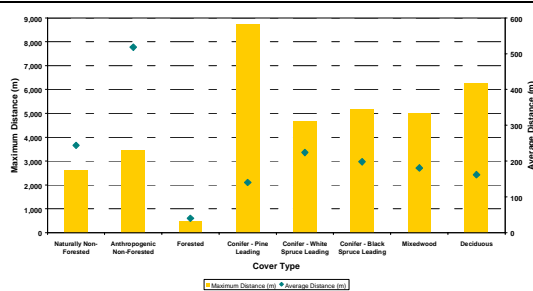
160 Year Forecast



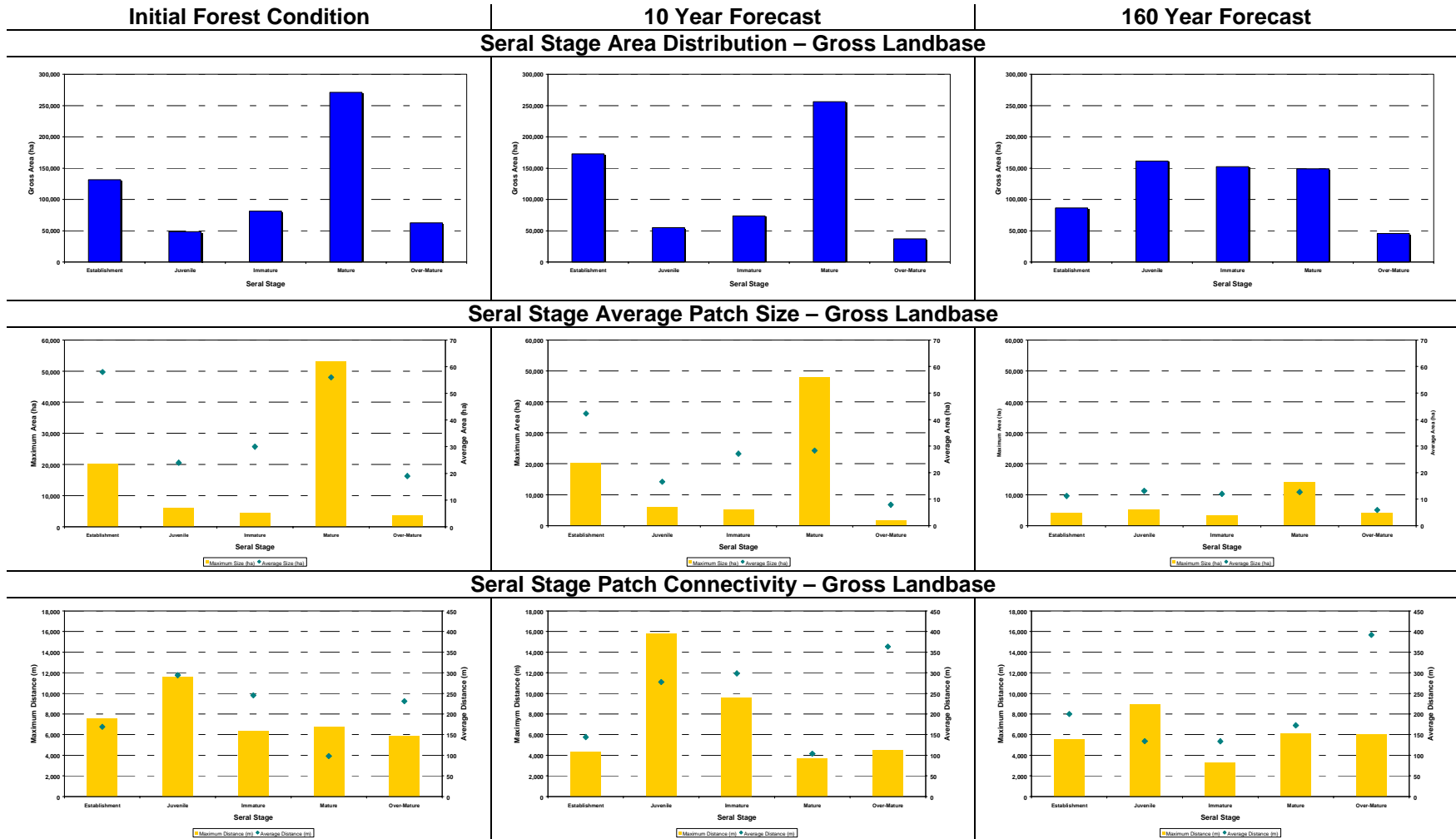
Cover Type Average Patch Size – Gross Landbase



Cover Type Patch Connectivity – Gross Landbase



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8.5 Timber Supply Allocation

The following table summarizes the allocation of the annual allowable cuts for the preferred forest management strategy each company. The method for calculation of the revised quota percentages is provided in Appendix I.

**Table 8-7: Annual Allowable Cut Allocation
(Effective May 1, 2001 - 15/10 Utilization Standard)**

Company	Deciduous AAC Percentage	Deciduous AAC (m³/yr)	Conifer AAC Percentage	Conifer AAC (m³/yr)
Slave Lake Pulp	98.00	532,330		
Deciduous MTU	2.00	10,864		
Total	100.00	543,194		
Alberta Plywood Ltd.			39.06	231,821
Buchanan Lumber			9.32	55,314
Lakeshore Local Timber Permit Association (S2 MTU)			2.45	14,541
Millar Western Forest Products Ltd.			40.01	237,459
Slave Lake (S6) MTU			.77	4,570
Vanderwell Contractors (1971) Ltd.			8.39	49,795
Total			100.00	593,500

No reductions have been applied to the annual allowable cuts to reflect stand retention targets. It is the intent of the forest industry to annually monitor and track the effect of implementation of the retention areas on the scheduled harvest volume. Total harvest areas and volumes will be reconciled with the harvest schedule every five-years.

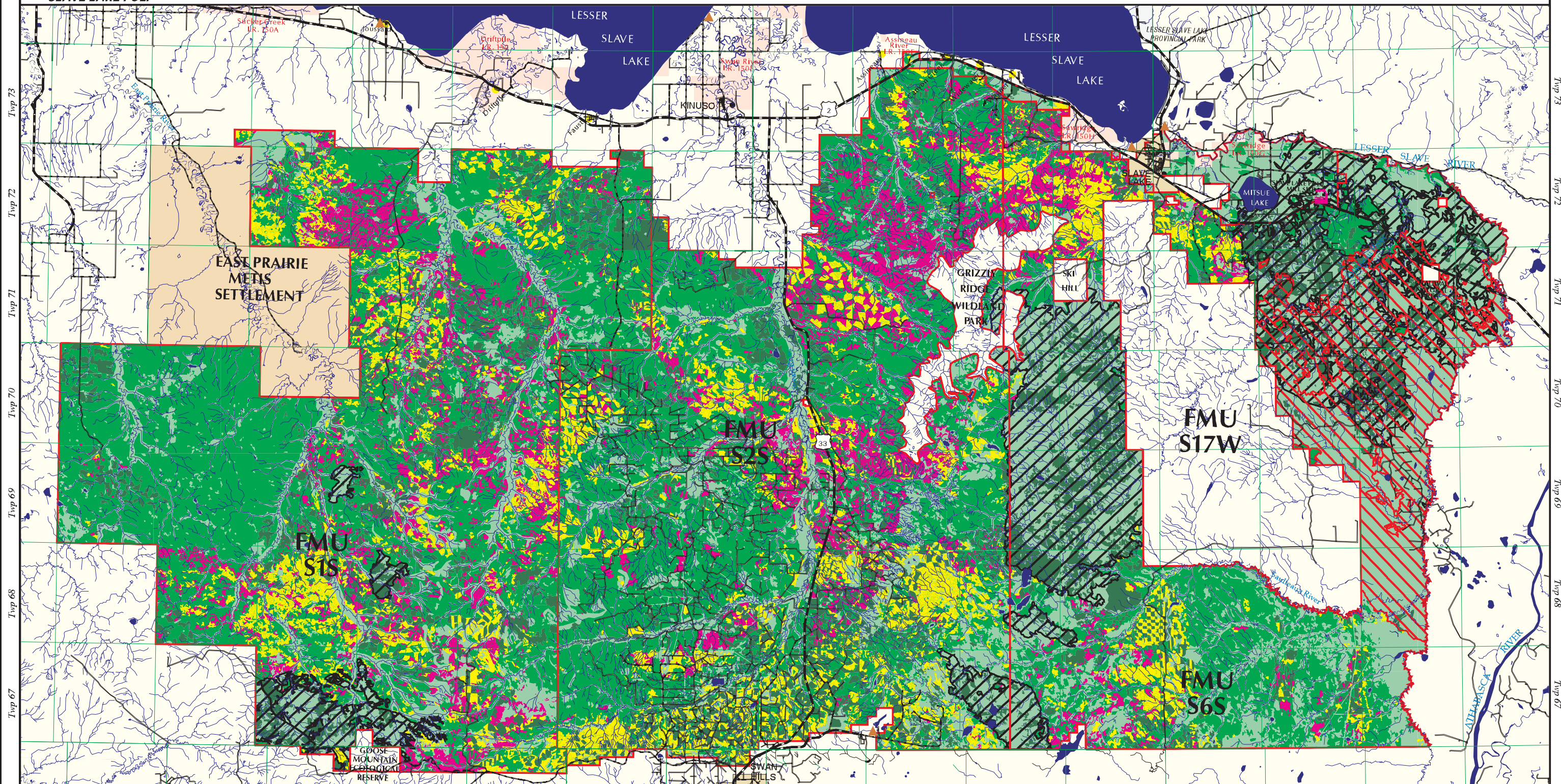
8.6 Final Harvest Sequence

As previously discussed, one key output of the PFMS is a twenty-year harvest sequence map. The harvest sequence identifies the stands that are scheduled for harvest over time. Implementation of the harvest sequence, in a manner that is consistent with the TSA assumptions, is an important indicator of sustainability.

PFMS 20 YEAR HARVEST SEQUENCE



Scale = 1:375 000



PLANIMETRIC LEGEND

- | | | | |
|----------------|---------------------|------------------------|-------------------------------------|
| Village/Hamlet | Perennial Stream | Towns | Net Landbase Deletions |
| Campgrounds | Intermittent Stream | Parks | Net Landbase - Not Selected For Cut |
| Paved Roads | Indefinite Stream | First Nations Reserves | Cutblocks |
| Gravel Roads | Lakes/Major Rivers | Metis Settlements | 1998 Burn Boundary |
| Tertiary Roads | | | Chisholm Burn Boundary |

STANDS SCHEDULED FOR HARVEST

- | |
|---------------|
| Years 1 - 10 |
| Years 11 - 20 |

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8.6.1 Description

Following is a summary of scheduled area and volume harvested by cover type and by landscape management unit.

Table 8-8: Twenty Year Harvest Schedule by Cover Type

Cover Type	Year 1-10 ⁵			Year 11-20		
	Scheduled Harvest Area (ha)	Scheduled Deciduous Harvest Volume (m3)	Scheduled Conifer Harvest Volume (m3)	Scheduled Harvest Area (ha)	Scheduled Deciduous Harvest Volume (m3)	Scheduled Conifer Harvest Volume (m3)
D	26,728	4,057,373	905,576	22,904	4,143,615	693,565
MX	7,587	856,345	1,299,076	7,316	793,404	1,350,708
C-PL	10,740	130,786	2,414,331	8,994	195,271	2,112,873
C-SW	6,513	119,446	1,110,962	5,547	179,594	958,814
C-SB	8,462	6,229	861,544	8,374	20,304	822,196
Total	60,029	5,170,179	6,591,489	53,136	5,332,187	5,938,157

Table 8-9: Twenty Year Harvest Schedule by Landscape Management Unit

Landscape Management Unit	Year 1-10 ⁶			Year 11-20		
	Scheduled Harvest Area (ha)	Scheduled Deciduous Harvest Volume (m3)	Scheduled Conifer Harvest Volume (m3)	Scheduled Harvest Area (ha)	Scheduled Deciduous Harvest Volume (m3)	Scheduled Conifer Harvest Volume (m3)
Lesser Slave	8,206	978,481	461,931	9,711	1,402,664	562,209
Saulteaux	11,112	820,989	1,451,003	3,394	508,257	271,656
Swan	20,119	1,125,261	2,829,993	19,630	1,837,359	2,215,901
Driftpile	9,742	893,349	991,127	10,742	657,839	1,556,234
East Prairie	10,850	1,352,099	857,435	9,658	926,068	1,332,156
Total	60,029	5,170,179	6,591,489	53,136	5,332,187	5,938,157

⁵ Includes conifer carry over.

⁶ Includes conifer carry over.

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8.6.2 Deviations vs. Retention Areas

The intent of the harvest sequence map is to identify the areas that are scheduled for harvest over the term of the DFMP. However, as discussed previously, due to the strategic nature of the TSA, not all operational considerations have been included in the development of the sequence. The following table provides some examples of the differences between deviations and retention patches. The refinement of this table is expected to occur in ground rule negotiations.

Table 8-10: Deviations vs. Retention Areas

Deviation	Retention Area
♦ <i>Incorrect landbase category (inoperable area, unmerchantable stand)</i>	♦ <i>Buffers along unmapped watercourses</i>
♦ <i>Incorrect forest inventory attributes</i>	♦ <i>Sensitive sites (mineral licks, dens, nests, thermal cover)</i>
♦ <i>Other user mitigation</i>	♦ <i>Areas left to provide landscape connectivity</i>
	♦ <i>Aesthetic values</i>
	♦ <i>Unmerchantable patches within merchantable stands</i>

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9.0 Research

The forest companies operating within the Slave Lake Pulp FMA acknowledge the need to practice sustainable forest management. The requirement to develop harvesting and silviculture strategies to ensure the sustainability of both the coniferous and deciduous resources has been further amplified by a commitment by all tenure holders to operating the FMA under a single landbase. Further, Slave Lake Pulp has committed towards maintenance of mixedwood stands on the FMA area. To support these objectives, Slave Lake Pulp will initiate a number of new research projects designed to further the scientific principles involved in sustainable management of the forest resource and other adaptive and progressive management initiatives identified in the DFMP. Many of these projects are joint venture programs involving embedded quota holders and other forest companies, which have common goals and interests. Slave Lake Pulp has a variety of research initiatives in place and participates in a number of joint research projects, both within the West Fraser corporate entity and within the forest industry community in Alberta. The woodlands operations are administered under Alberta Plywood Ltd. and staff coordinate the research needs of both divisions. As such, many projects serve multiple purposes and are tailored around the needs of both divisions. The company maintains a Forest Enhancement Fund, which accumulates monies, based on total harvest volume. In addition, the Forest Resource Improvement Program (FRIP) accumulates funds based on timber production and sales. Both Alberta Plywood Ltd. and Slave Lake Pulp have access to these funds for forest improvement projects approved under the third party Forest Resource Improvement Association of Alberta (FRIAA).

9.1 Current Research Initiatives

The research initiatives detailed below are those that are administered by Alberta Plywood Ltd. We recognize that the forest industry partners in the FMA have varied and often joint initiatives with Slave Lake Pulp. These are not listed but will be reported annually in the Research Reports if they have applicability to our joint FMA operations or information base.

9.1.1 Forest Resource Improvement Program Initiatives

9.1.1.1 Slave Lake Pulp Corporation Projects

- ◆ *Mixedwood Management Association – A collaborative research association initiated by several aspen and coniferous operators designed to provide support for growth and yield research in the mixedwood forest. Has a five-year commitment from the collaborators and earmarks significant funding for yield curve and mixedwood crop plan development. Term until 2005.*
 - *Crop Planning Workshop “Mapping Stand Development Trajectories”*
 - *Alberta Research Council “Meta Analysis of Release and Underplanting Treatments for Growth and Yield Predictions in the Boreal Mixedwood”*
 - *U of A – “Influence of Stand Development on Interactions between Aspen and White Spruce”*
 - *U of A – “Aspen Breakup”*

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- CFS – “Response Surface Design for Boreal Mixedwood”
- Forestry Corp – “Developing Mixedwood Regeneration Modeling Capabilities”
- ♦ CFS Research Sites – A collaborative research project aimed at re-measurement of CFS mixedwood management research sites in the Athabasca and Slave Lake Area. These sites were all initiated around 1950 and provide the opportunity to revisit actual data points at several sites after a lapse of five decades. This project is complete and was funded by both Alberta Plywood Ltd. and Slave Lake Pulp. Complete.
- ♦ Retrospective Herbicide Study – Collaborative project with several aspen users and Alberta Research Council to determine the distribution of aspen after glyphosphate application. Completion in 2002
- ♦ Woodlot Association of Alberta – Contribution to the Woodlot Association of Alberta with the other major forest companies to support and maintain their programs and initiatives. Ongoing.
- ♦ Insect and Disease Monitoring System Pilot Project - This pilot project is sponsored by several forest industries in the northwest and is aimed at testing the insect and disease monitoring system designed for the Northwest Boreal Integrated Pest Management Working Group. Completion in 2002.

9.1.1.2 Alberta Plywood Ltd. Projects.

- ♦ Glyphosphate Study – Joint study with several conifer users to determine physiological and growth responses of white spruce seedlings to glyphosphate application. Completed in 1999.
- ♦ NIVMA – As part of the Northern Interior Vegetation Management Association monitoring program, the project allows for the establishment of annual NIVMA plots for a period of five years. Completion date is in 2003.
- ♦ CEAA Class Assessment – Project involving sixteen forest companies in Alberta to complete an Environmental Assessment of forest bridge crossings in Alberta. Completion in 2000.
- ♦ CFS Research Sites – Alberta Plywood’s part of the CFS study outlined in the Slave Lake Pulp FRIAA section above.
- ♦ Lesser Slave Forest Education Association – A joint project with several local companies, education institutes and SRD which strives to increase the public awareness of the forest resource base in an unbiased manner. This project is currently a three-year commitment with a high probability for continuation after 2003.
- ♦ TREEPLANTER- A joint FRIP project creating and maintaining a treeplanting web site.

9.1.2 Slave Lake Pulp Forest Enhancement Fund Projects

- ♦ Lesser Slave Lake Canopy Study – Slave Lake Pulp and Millar Western jointly support a three dimensional canopy study for migratory birds in association with the Lesser Slave Lake Bird Observatory. The current project is a commitment for three years ending in 2003.

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- ♦ *Canadian Fish Inventory Program – Slave Lake Pulp and Weyerhaeuser have contributed towards the funding of a field crew in both 2000 and 2001, with continued support in 2002 for completing fish inventory and habitat assessments on the watersheds in the Slave Lake region. The Sawridge, Willow, Marten and Inverness Rivers have been done with commitment to work on two additional watersheds in 2002. This project is ongoing and is done in conjunction with the Alberta Conservation Association. The data collected is baseline data with the intent to create a fish predictability model.*
- ♦ *Atlas for Breeding Birds – A University of Alberta Boreal Forest Bird Management Program to “increase the knowledge base concerning the distribution and relative abundance of songbirds in the boreal forests of Alberta”.*
- ♦ *Sucker Regeneration of Aspen – Collaborative research with the U of Alberta and several aspen operators designed to investigate the sucker regeneration of aspen in the boreal forest. The study consists of 9 projects in various phases, which have been revamped since destruction of several sites in the 1998 and 2001 fire seasons. Ongoing.*

“What is the seasonal pattern of TNC movement and storage in seven different compartments of aspen trees?”

“What are the seasonal patterns of fine root growth in natural aspen stands and how do they relate to soil temperatures?”

“Which method of mechanical site preparation generates the greatest number of suckers?”

“Which type of wounding generates the greatest number of high quality suckers?”

“What is the potential loss due to fungi in the quality of crop trees related to wounding of roots of aspen from mechanical damage?”

“What is the effect of past site preparation on the regeneration and performance of aspen?”

- ♦ *FERIC Membership – Slave Lake Pulp and Alberta Plywood Ltd. have membership in the Forest Engineering Research Institute of Canada which conducts various basic and directed research products relating to wood, wood products and wood processing.*
- ♦ *WRENS Analyses – Slave Lake Pulp has already completed harvest impact analyses on several watersheds within the FMA including Sawridge Creek, Inverness River and Swan River and its tributaries. Further studies will focus on proposed timber harvest areas.*

9.1.3 Other Research Projects

- ♦ *U of A Graduate Student Research Scholarships – West Fraser Mills has committed towards funding graduate students at the University of Alberta for a five-year term. The project commits monies for regeneration and reforestation studies.*
- ♦ *Permanent Sample Plot Program – Slave Lake Pulp has implemented a permanent sample plot program on the original FMA and intends to expand the program to accommodate the data requirements which will be required to support the new initiatives set up through the DFMP.*

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- ♦ *Pulp Sludge Trials – Slave Lake Pulp in cooperation with the Alberta Research Council and the Canadian Forestry Service have completed several studies and have projects in progress regarding the spreading and incorporation of CTMP pulp sludge on both forest and private land. These are ongoing.*
- ♦ *Ungulate Surveys – Slave Lake Pulp has contributed to the periodic aerial moose survey program in wildlife management unit 350. This is being completed in the spring of 2002. Further support of this program depends upon the availability of funding from other users within the FMA and the government.*
- ♦ *Regional Volume Sampling – Project initiated in January 2002 to combine temporary volume sample data from ANC, Blue Ridge, Slave Lake Pulp and Millar Western to better improve the reliability of volume estimation in the region.*
- ♦ *Chisholm Fire Research and Dogrib Fire Research – In conjunction with SRD and the Foothills Model Forest, completing a variety of projects delving into the behavior and effects of wildfire.*
- ♦ *Fish and Wildlife Gap Analysis- A fish and wildlife gap analysis was completed in preparation of the DFMP.*
- ♦ *Historical Resources Potential Model- Slave Lake Pulp has become compliant with the historical resources requirement under the Community Development Act through creation of a Historical Potential Model which analyses the proposed forestry operations of the company and predicts conflict areas.*

9.2 Proposed Research Initiatives

- ♦ *Fur Bearer Track Counts – Monitoring program derived from the requirements and commitments in the DFMP.*
- ♦ *Songbird Surveys –Monitoring program derived from the requirements and commitments in the DFMP.*
- ♦ *Underplanting Sw in Aw Stands – Potential project from commitment for maintaining mixedwood in the DFMP.*
- ♦ *Understorey Protection Trials - Potential project from commitment for maintaining mixedwood in the DFMP.*
- ♦ *Thinning Trials - Potential project from commitment for maintaining mixedwood and the implementation of EFM in the DFMP.*
- ♦ *Stand Density Management- Potential project from commitment for inclusion of SDM potential in the DFMP.*
- ♦ *Birch Regeneration – Anticipated requirement in consideration of the need for a secure supply of white birch fibre from the FMA.*
- ♦ *Regional Timber Supply – Potential project falling out of the regional volume-sampling project.*

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- ◆ *Piece Size and Product Differentiation – Potential project for end product sorting.*
- ◆ *Soils Classification – Potential need within the DFMP.*
- ◆ *FORWARD – Forest Water Riparian Development*
- ◆ *Foothills Model Forest – Grizzly Bear Studies are currently funded through West Fraser Mills, Blue Ridge Lumber.*