Detailed Forest Management Plan

Ref.: I-001

DFMP

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1.0

Introduction

1.0 INTRODUCTION

1.1 PLAN PURPOSE

As defined in the Forests Act, the Minister of Sustainable Resource Development has the right to allocate timber resources through the use of long term tenure arrangements. On May 13, 1997, the Government entered into a Forest Management Agreement in the Province of Alberta with Tolko Industries Ltd. High Prairie OSB Division (Tolko).

The Forest Management Agreement 9700033 contains provisions in Section 7(1) for the Company to "establish, grow, harvest and remove deciduous timber thereon on a perpetual sustained yield basis" from approximately 273 425 hectares of Crown Land. In return, the companies have agreed to:

- Follow sound forestry practices;
- Develop a Detailed Forest Management Plan;
- Provide opportunities for public involvement;
- Integrate operations with other forest industry operators;
- Create and maintain a forest inventory;
- Develop a growth and yield program;
- Develop ground rules to guide harvesting and reforestation operations;
- Reforest all lands harvested by Tolko Industries Ltd.

The Interim Forest Management Planning Guidelines – Version: April 1998 were utilized as a guide to aid in the formation of the Original Detailed Forest Management Plan. This planning version represents a significant paradigm shift from sustained timber management to sustainable forest management.

1.2 TOLKO INDUSTRIES LTD.: CORPORATE PROFILE

1.2.1 The Company

Founded in 1961, Tolko Industries Ltd. is a privately owned forest products company employing over 2,400 people across Western Canada. The Company is based in Vernon, British Columbia, and led by sons of the founder, Harold Thorlakson. Tolko's nine manufacturing divisions produce lumber, specialty kraft paper, and engineered wood products for world markets with sales reaching approximately 899 million dollars in 2003. The Company's Woodlands departments sustainably manage almost 14.8 million gross hectares of productive forestland in British Columbia, Alberta, Saskatchewan and Manitoba.

1.2.2 The OSB Processing Facility

Tolko Industries Ltd. - High Prairie OSB Division, Tolko's first oriented strand board (OSB) mill, is a modern manufacturing facility located ten (10) kilometres west of High Prairie, Alberta. The mill has a twelve (12) foot wide forming line feeding a twelve (12) opening, twelve (12) foot by twenty-

four (24) foot press, with a rated capacity of 525 million square feet on a 3/8 inch basis. The mill consumes approximately 850 000m^3 per year of deciduous fiber from public and private land.

The High Prairie Woodlands operating area extends in a radius of approximately two hundred fifty (250) kilometres from the mill and provides an annual harvest of up to 850 000 m^3 of Trembling Aspen (*Populus tremuloides* Michx.), Balsam Poplar (*Populus balsamifera* L.) and a small component of White Birch (*Betula papyrifera*).

In addition to the Original Forest Management Agreement Area, Tolko operates in the Joint Forest Management Agreement Area, two quota licenses in Canfor's Forest Management Agreement Area, and a quota license in a portion of Weyerhaeuser's Forest Management Agreement Area. A summary of the existing allocations is provided in the table below.

TABLE 1-1: TOLKO ANNUAL ALLOWABLE CUT SUMMARY

Allocation	Type	Volume (m^3)
Joint FMA0200039	Deciduous Annual Allowable Cut	167 413
Original FMA9700033	Deciduous Annual Allowable Cut	299 875
DTAG150001	Deciduous Annual Allowable Cut	114 172
DTAG150002	Deciduous Annual Allowable Cut	167 817
DTAG010001	Deciduous Annual Allowable Cut	80 000

1.3 APPROACH TO PLANNING

Tolko Industries Ltd. is committed to following the principles of sound, carefully planned, sustainable forest management practices. This will ensure the integrity of all forest resources, the viability of the timber resource-based investment in High Prairie and the economic well-being of the local communities associated with this investment. To protect the forests, the interests of Tolko employees, and the local communities, Tolko strives to maximize product recoveries and end values, while managing forest lands in a responsible manner.

Initial work on the timber supply analysis started in 1997 with the collection of data and the creation of the Alberta Vegetation Inventory. Tolko Industries Ltd. assembled a planning team in January 2001 to develop the initial Detailed Forest Management Plan for the Original Forest Management Agreement Area. In 2002, during negotiations for the Joint Forest Management Area, the companies, with approval from the Provincial Government, agreed to combine the Detailed Forest Management Planning processes for the Joint Forest Management Area and the Original Forest Management Area.

Tolko Industries Ltd. is committed to responsible stewardship of the environment throughout their operations. The Forest Management Agreement holder has tenure rights to harvest and reforest trees on their Forest Management Area. They are also responsible for the mitigation of any adverse impacts of their activities on other forest resource values. They are not responsible for the management of these other forest resource. This responsibility rests with the crown.[1] Tolko Industries Ltd., pursuant with the above statement taken from the Interim Forest Planning Management Version – 1998, will achieve optimization of the fibre resource within the Forest Management Area while mitigating impacts on other forest resource values. The company must work towards maintaining a balance between being economically viable and incorporating other non-fiber forest values into the Original Detailed Forest Management Plan.

[1] Interim Forest Management Planning Manual – Guidelines to Plan Development – Version: April 1998

1.4 PLANNING TEAM DESCRIPTION

The following table summarizes the planning team as it was structured at the time of submission of the Original Detailed Forest Management Plan:

TABLE 1-2: TOLKO DFMP PLANNING TEAM

PLANNING TEAM	POSITION	GENERAL RESPONSIBILITIES
Rick Alguire	Woodlands Manager Tolko Industries Ltd. (HP)	♦ Strategic; ♦ Corporate continuity; ♦ Dispute resolution.
Hilary Wait	Divisional Forester Tolko Industries Ltd. (HP)	♦ Team Leader for Tolko Industries Ltd.; ♦ Project planning and administration; ♦ Liaison with government and stakeholders.
Rick Reid Adam Marshall John Peters Carol Slomp	Silvacom Ltd.	♦ Forest inventory and management planning; ♦ Strategic timber supply analysis; ♦ GIS and analytical support (liaison, presentations).
MAJOR STAKEHOLDER PARTICIPANTS		
Terry Kristoff Alternate Sherman Horsman	Management Forester Alberta Plywood Ltd.	♦ Advisory; ♦ Strategic planning; ♦ Growth and yield analysis; ♦ Operational and sequencing issues.
Keith Branting	Woodlands Manager Gordon Buchanan Enterprises	♦ Advisory; ♦ Strategic planning; ♦ Growth and yield analysis; ♦ Operational and sequencing issues.
OTHER STAKEHOLDERS		
Doug Gladue	Whitefish Lake First Nation Logging Ltd.	♦ Advisory; ♦ Strategic planning; ♦ Timber harvest integration.
Allan Lamouche	Metis Settlements Representative	♦ Advisory; ♦ Strategic planning; ♦ Timber harvest integration.
Laurence Strebchuk Alternate Tony Sikora	LAC Representative	♦ Advisory; ♦ Timber Harvesting Integration.

TABLE 1-3: SUSTAINABLE RESOURCE DEVELOPMENT CONTACTS

CONTACT	POSITION/LOCATION	GENERAL RESPONSIBILITIES
LOCAL DISTRICT LEVEL		
Brad Pinno	Area Forester, Lakeshore Forest Area High Prairie	Team Leader for Government
Craig Brown	Area Forester Smoky Forest Area Valleyview	♦ Advisory; ♦ Advisory for MTU program in Whitemud area.
Kari White Alternate Al Benson	Area Forester East Peace Forest Area Peace River	Advisory
REGION LEVEL		
Mark Townsend	Resource Analyst Northwest Boreal Region Peace River	Technical review of Timber Supply

CONTACT	POSITION/LOCATION	GENERAL RESPONSIBILITIES
Wayne Bowles	Slave Lake	Advisory regarding Forest Protection and Fire Management
Mike Maximchuk	Forest Health Officer Sustainable Resource Development Peace River	Advisory regarding Insects & Disease
David DeRosa	Fisheries Biologist Sustainable Resource Development Slave Lake	Advisory regarding Fisheries Management
Mark Heckbert	Wildlife Biologist Sustainable Resource Development High Prairie	Advisory regarding Wildlife and Habitat Management
Andrew Wagner	Water Resource Analyst Alberta Environment High Prairie	Advisory regarding Water Management
PROVINCIAL (EDMONTON) HEAD OFFICE LEVEL		
Doug Sklar	Director Forest Management Division Edmonton	♦ Strategic; ♦ Dispute Resolution.
Daryl Price	Centre Manager Resource Information Centre Forest Management Division Edmonton	♦ Strategic; ♦ Dispute Resolution.
Robert Stokes	Section Manager Forest Management Division Edmonton	Representative for SRD Provincial Level
Brad Epp	Timber Management Forester Forest Management Division Edmonton	Representative for SRD Provincial Level

The planning team has encountered some challenges since its inception in January 2001. During the life of the team there has been a re-organization of the Alberta Sustainable Resource Department and several departmental name changes. In addition, several of the company and Government staff have left the area for other careers. Other Government personnel involved in the Tolko Original Detailed Forest Management Plan included: Jason Cottingham, Marty O'Byrne, Trisha Stubbings, Theresa Stokes and Kristofer Heemeryck.

Other Company personnel involved in the Tolko Original Detailed Forest Management Plan included: Hudson Foley, Dave Knight, and Allan Bell. Other stakeholders involved in the Tolko Original Detailed Forest Management Plan included: Eddy Tallman and Geoff Chalifoux.

1.5 PUBLIC INVOLVEMENT PROCESS

The aim is to have an open and transparent planning process.

Through the following initiatives, further detailed within the Public Involvement Plan, the companies will achieve a meaningful public involvement process for the Original Detailed Forest Management Plan development and other associated forest management activities.

- Forest Resource Advisory Committee (FRAC);
- Open House Meetings;
- Stakeholders represented on the Original DFMP planning team.

This DFMP is an open and transparent process, if stakeholders have questions or concerns prior to the submission and approval of these plans they were invited to contact company woodlands staff to open a dialogue and communicate their issues, comments, questions or concerns.

Through these processes the company believes that the framework for public involvement within the Original Forest Management Area will be provided. By providing a meaningful public involvement process with regards to operations the company hopes to aid in the paradigm shift from sustainable timber management towards sustainable forest management.

1.6 LIAISON WITH REGULATORY AGENCIES AND QUOTA HOLDERS

Each year there are a number of different federal, provincial and municipal Government agencies involved in the review of operations on the Original Forest Management Area.

TABLE 1-4: SUMMARY OF GOVERNMENT AGENCIES

Government Agency	Section/Branch	Location
Alberta Sustainable Resource Development	Forest Management Branch	Edmonton
Alberta Sustainable Resource Development	Lesser Slave Forest Area	High Prairie
Alberta Sustainable Resource Development	Lesser Slave Forest Area	Slave Lake
Alberta Sustainable Resource Development	Wapiti Forest Area	Valleyview
Alberta Sustainable Resource Development	Wapiti Forest Area	Grande Prairie
Alberta Sustainable Resource Development	Peace River Forest Area	Peace River
Federal Department of Fisheries and Oceans (DFO)	Impact Assessment	Peace River
Alberta Environment	Water Resources	High Prairie
Alberta Sustainable Resource Development	Fish and Wildlife Division	High Prairie
Alberta Sustainable Resource Development	Fish and Wildlife Division	Slave Lake
Alberta Sustainable Resource Development	Forest Health	Peace River
Alberta Sustainable Resource Development	Forest Protection	Slave Lake
Alberta Sustainable Resource Development	Forest Protection	Grande Prairie
Municipal District of Big Lakes		High Prairie
Municipal District of Greenview		Valleyview
Municipal District of Smoky		Falher
County of Birch Hills		Wanham
Northern Sunrise County		Peace River
Grande Prairie County		Grande Prairie
Saddle Hills County		Spirit River

The Original Forest Management Area has a Coniferous Timber Quota Holder in the Utikuma Operating Area. A summary of the existing allocations is provided in the following table.

TABLE 1-5: CONIFEROUS TIMBER QUOTA HOLDER SUMMARY

Company	Operating Area	License	Annual Allowable Cut
Alberta Plywood Ltd.	S9 and Utikuma	CTQS090002	38 704 m^3

In addition to the Quota Holders, the Community Timber Program operates in the Salt and Whitemud Operating Areas. A summary of the existing allocations is provided in the following table.

TABLE 1-6: COMMUNITY TIMBER PROGRAM SUMMARY

Organization	Operating Area	Annual Allowable Cut
Lakeshore Timber Company Ltd.	Salt (S19T (S3))	9 743 m^3
Smoky River Loggers Ltd.	Whitemud (S19T (G2))	16 680 m^3
Smoky Area Community Timber Program	Whitemud (S19T (G2))	Permits as required

DFMP

2.0

Description of the Forest Management Agreement Area (FMA)

2.0 DESCRIPTION OF THE FOREST MANAGEMENT AGREEMENT AREA (FMA)

2.1 HISTORY OF THE HIGH PRAIRIE TIMBER DEVELOPMENT AREA

Over the years, the High Prairie area has been the focus of numerous attempts to foster an economically viable forest products industry. The history of the High Prairie Timber Development Area illustrates the difficulties associated with consolidating the fibre supply and developing a cohesive management plan for such a heterogeneous area. Following is a brief overview of events leading up to the establishment of Tolko's Forest Management Agreement Area.

Serious interest in the High Prairie Timber Development Area began in 1988 with YFY (Yuen Fung Yoo) Paper Company from Taiwan. The Provincial government encouraged YFY to propose a CTMP pulp/paper complex for High Prairie based on an estimated conifer fibre supply of 860 000m^3/year and 820 000m^3/year of deciduous. Early timber supply analyses indicated that deciduous fibre was abundant, but that insufficient conifer existed for the planned facility. Areas under consideration included forest management units G2, G2C, G5C, G02, G03, G04, P3 P01, S1, S2, S3, S6, S9, S02 and the Gift Lake and Peavine Metis Settlements (M3). The YFY proposal, revised to accommodate less conifer, was favourably received and gained momentum. The company even issued debentures in American markets to finance the mill. The YFY proposal faltered for a number of reasons, which are believed to include fears over effluent and the security of the fibre supply (e.g. allocation of deciduous to Slave Lake Pulp Corporation).

Following YFY's attempt to develop in High Prairie, both Polyboard Manufacturing Corporation and H. Jager Investments proposed OSB mills for the area. Neither proposal was successful, probably due to fibre tenure issues and the lack of capital.

Tolko Industries Ltd. was attracted to the High Prairie Timber Development Area when the Government of Alberta advertised the opportunity in 1994. The availability of the hardwood fibre supply, a growing OSB market, a corporate goal of product and geographic diversification, and an abundant and motivated workforce were the primary reasons for Tolko's interest in the High Prairie Timber Development Area.

Tolko Industries Ltd. was the successful bidder for the High Prairie Timber Development Area and was subsequently awarded the deciduous rights through a Deciduous Timber Allocation (DTA) in 1994. Construction on the mill began in 1994 and was completed in 1995. In 1996 Tolko began negotiations with the Crown for conversion of the Deciduous Timber Allocation into a Forest Management Agreement Area (FMA). The negotiations culminated in 1997 with the awarding of a new Forest Management Agreement Area to Tolko Industries Ltd. covering most of the Deciduous Timber Allocation Lands.

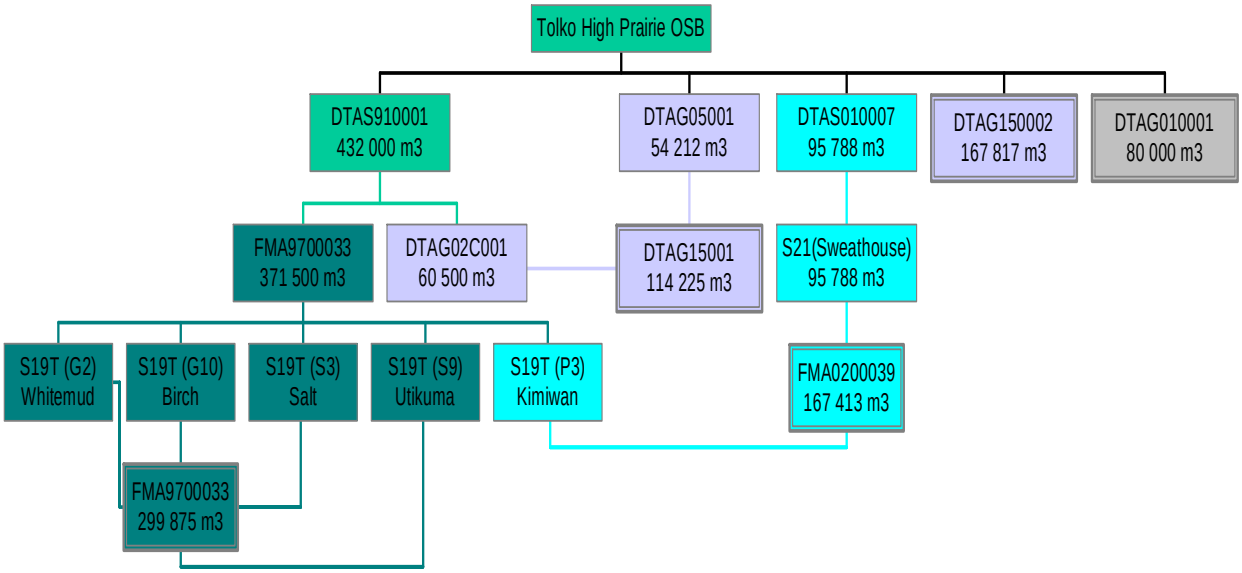
In addition to the Forest Management Agreement Area 9700033 Tolko Operates as a Deciduous Timber Allocation (Quota) Holder in Canadian Forest Products (Canfor) Forest Management Agreement known as Forest Management Units G2C and G5C. This area has been recently renamed G15 and a new quota certificate issued combining the certificates issued for G2C and G5C.

August 1, 1999 Tolko Industries Ltd. was issued a Deciduous Timber Allocation in the Forest Management Unit known as S1 West.

Early in 2002 Tolko Industries Ltd. and Buchanan Lumber Ltd. were issued the first Joint Forest Management Agreement Area in the province of Alberta. The Forest Management Agreement Area 0200039 was created by the removal of the P3 Forest Management Unit from Tolko's Original Forest Management Area where Buchanan Lumber Ltd. operated as a quota holder, and the addition of the S1 West Forest Management Unit where both companies operated as quota holders.

In 2003, Tolko Industries Ltd. was the successful bidder for two new Deciduous Timber Allocations. The deciduous timber allocation known as DTAG150002 was issued in Canfor's Forest Management Area. A deciduous timber allocation known as DTAG010001 was issued in the Saddle Hills portion of Weyerhaeuser's Forest Management Area.

FIGURE 2-1: SUMMARY OF DECIDUOUS CURRENT AND HISTORICAL ANNUAL ALLOWABLE CUT



2.2 LANDSCAPE AND PLANNING BOUNDARIES

Tolko will operate the Forest Management Agreement Area as a single sustained yield unit.

Tolko's Original Forest Management Agreement Area 9700033 is a heterogeneous area consisting of non-contiguous management units dispersed across the boreal mixedwood region of mid-central Alberta.

The Forest Management Unit S19T has been divided into four individual operating areas: Whitemud, Birch, Salt and Utikuma (formerly known as G2, G10, S3 and S9 respectively).

Unlike many other Forest Management Agreement Areas in the Province, Tolko's Original Forest Management Agreement Area is distinguished by the complexity of the landuse and ownership adjacent to its borders and between individual operating areas. In addition there is a complex overlapping tenure structure with multiple forest industry operators.

2.3 MANAGEMENT SUBDIVISIONS

Each of the operating areas (Whitemud, Birch, Salt and Utikuma) has been further divided into compartments. These compartments were developed using geographic features like watercourses, or heights of land and manmade features like main roadways. The intent was to make operational areas that could be easily identified on the ground and appropriate in size for a Compartment Plan or Annual Operating Plan.

In total there are 23 compartments ranging in size from 4,347 hectares to 19,110 hectares with the mean compartment size at approximately 11,888 hectares. The Utikuma operating area has the largest number of compartments at eleven (11) followed by Whitemud with six (6), Salt with four (4) and Birch which is the smallest operating area with two (2) compartments. A summary of the compartments and their size in hectares is provided in Table 2-1.

TABLE 2-1: COMPARTMENT SUMMARY

FMU	COMPARTMENT NUMBER	GROSS AREA (HA)	NET AREA (HA)
Birch	1	5,983	5,532
	2	4,347	2,589
Birch Total		*10,330*	*8,121*
Salt	1	14,064	10,796
	2	14,169	11,927
	3	10,404	6,525
	4	10,395	6,713
Salt Total		*49,032*	*35,961*
Utikuma	1	11,952	3,253
	2	11,992	4,252
	3	18,687	8,766
	4	7,777	2,131
	5	11,650	7,144
	6	9,115	5,445
	7	10,134	4,458
	8	10,281	5,657
	9	18,660	10,656
	10	19,110	10,125
	11	15,612	9,802
Utikuma Total		*144,969*	*71,689*
Whitemud	1	11,003	10,358
	2	14,164	10,015
	3	8,909	6,226
	4	12,534	7,682
	5	9,946	3,720
	6	12,539	2,878
Whitemud Total		*69,095*	*40,880*
FMA Total		**273,425**	**156,651**

2.4 BIOPHYSICAL DESCRIPTION

2.4.1 ECOLOGICAL CLASSIFICATION

The Boreal Forest Natural Region is the largest natural region in Alberta and encompasses the majority of the Original FMA. This region is characterized by broad lowland plains, discontinuous hill systems and extensive wetlands. The winters are typically long and cold, with short, cool summers. Most of the precipitation falls between May and August. The dominant soils are Luvisols on the well-drained uplands and Organics in the poorly drained lowland areas. Vegetation in this region is aspen dominated forests, with mixedwood or coniferous forests occurring at higher elevation sites or in the wetlands. This natural region is highly diverse and is further divided into six different sub-regions based on differences in vegetation, geology and landforms. Three sub-regions are represented on the Original FMA area:

- Central Mixedwood;
- Dry Mixedwood;
- Peace River Parkland.

The original FMA has a small portion of the Parkland Region represented. Of the three sub-regions, only one, the Peace River Parkland is present in the Birch portion of the Forest Management Area. This Natural Region forms a transition between the grasslands to the south of the province and the forests to the north. The landforms can vary from broad plains to rolling morainal terrain. Climate is largely influenced by prairie, boreal and mountain landscapes and weather patterns.

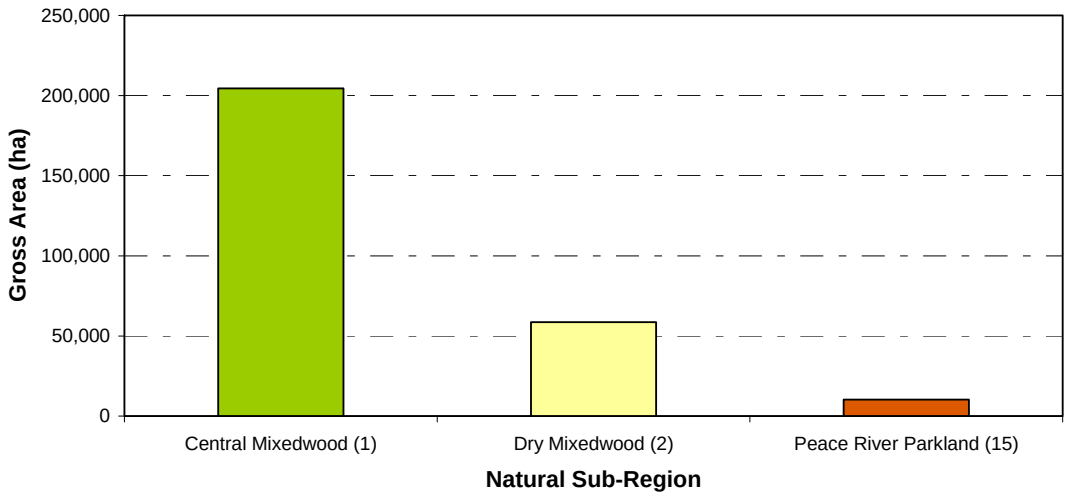
Approximately 75% of the gross area is found in the Central Mixedwood natural sub-region. Smaller portions of the Original FMA are found in the Dry Mixedwood and Peace River Parkland natural sub-regions (21% and 4% respectively).

An area summary of the natural sub-regions across the FMA area can be found in Table 2-2 and Figure 2-2. The individual characteristics for each natural sub-region are described in Table 2-3. The distribution of the natural sub-regions across the Tolko FMA is illustrated on Map 2-1 (full size maps can be found in Appendix H, Map H-1).

TABLE 2-2: NATURAL SUB-REGION AREA SUMMARY

NATURAL SUB-REGION	AREA (HA)
Central Mixedwood (1)	204,435
Dry Mixedwood (2)	58,660
Peace River Parkland (15)	10,330
TOTAL	**273,425**

FIGURE 2-2: NATURAL SUB-REGION AREA SUMMARY



2.4.1.1 CENTRAL MIXEDWOOD NATURAL SUB-REGION

This is the largest natural sub-region in Alberta. 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 sub-region is drier than the Lower Foothills with an average annual precipitation of 380mm. In this sub-region June and July are the wettest months with relatively dry winters 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.

The dominant tree species in this sub-region is aspen occurring in both pure and mixed stands. Balsam Poplar often occurs with aspen in more moist 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-colored peavine, pink wintergreen, palmate-leaved coltsfoot, hairy wild rye, and marsh reed grass. Feathermosses are the dominant understorey in areas with greater representation of conifers. Mixedwood forests contain a mosaic of these typical deciduous and coniferous understories. Common peatland vegetation within this sub-region includes black spruce, Labrador tea, and various peatmosses in bogs of tamarack, dwarf birches, sedges, and brown mosses.

2.4.1.2 DRY MIXEDWOOD NATURAL SUB-REGION

The Dry Mixedwood Sub-region is another of the ecological sub-regions found within the Original FMA area. The climate of this sub-region is continental, similar to that of the Central Mixedwood Sub-region. 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 Original FMA, Luvisolic soil developments on glacial lacustrine materials are 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 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 understorey vegetation is similar to that found in the Central Mixedwood Natural Sub-region.

2.4.1.3 PEACE RIVER PARKLAND NATURAL SUB-REGION

The Peace River Parkland Sub-Region is characterized by broad, gently rolling plains with upland areas in the Grande Prairie and Peace River regions. The characteristic soils are Solodic soils in the grassland areas which have been extensively cultivated, so little native grassland still remains in the sub-region. The soils in the forested areas are mainly Gray and Dark Gray Luvisols. On upland forests mixed aspen and white spruce stands occur. The grassland communities are very characteristic of this sub-region and are comprised of a mosaic of grass and grass-like species such as California oar grass, slender wheat grass, western porcupine grass, low goldenrod and sedges.

TABLE 2-3: SUB-REGION DESCRIPTIONS[1]

	Parent Material	Soil Types/Drainage	Climate	Vegetation	Unique Characteristics
Peace River Parkland	Glaciolacustrine silts and clays	- Solonetzic - Luvisolics	- Short cool summers - Long, cold winters - High precipitation, low wind and low evaporation	- Upland forests are indistinguishable from surrounding Mixedwood - Mainly dominated by Aspen and White Spruce - The grasslands are dominated by sedges and grass sp.	Permafrost occurs in many peatlands. Frost free period is about 85 days. PARKLAND NATURAL REGION
Central Mixedwood	Morainal	- Gray Luvisol - Eutric Brunisol - Well drained	Subhumid, continental - Cool short summers - Long, cold winters	- Aspen and balsam poplar - White spruce &/or balsam fir successionally replace deciduous species	Frequent fires seldom permit conifers to succeed and pure deciduous stands dominate the sub-region. BOREAL FOREST NATURAL REGION[2]
Dry Mixedwood	Morainal	- Gray Luvisol - Eutric Brunisol - Well drained-	Subhumid, continental - Cool short summers - Long, cold winters	- Aspen and balsam poplar - White spruce &/or balsam fir successionally replace deciduous species	Frequent fires seldom permit conifers to succeed and pure deciduous stands dominate the sub-region. BOREAL FOREST NATURAL REGION

[1] *Alberta Environment, 2000. Alberta Natural Region Land Classification System. On Alberta Natural Heritage Information Centre website. www.go.ab.ca/env/parks/anhic.*

[2] *"The Boreal Forest Natural Region is very diverse topographically, climatically and biologically. Many of the changes are gradual and subtle which makes division into sub-regions often difficult and seemingly arbitrary. Lack of adequate information about much of this vast area further compounds the problems. However the region has been divided into six sub-regions based primarily on vegetational, geological and landform characteristics." Alberta Natural Region Land Classification System, Alberta Environment website*

MAP 2-1: NATURAL SUB-REGIONS OF ALBERTA

2.5 OTHER RESOURCE USERS

2.5.1 OIL AND GAS INDUSTRY

The non timber resource extraction industries are prevalent on the Original Forest Management Area. Oil and Gas development is the most frequent activity. There are a number of oil and gas fields located throughout the Original Forest Management Area. The Utikuma operating area has the highest amount of activity. The Salt operating area had a significant amount of seismic activity in recent years which is beginning to translate into increased wellsite and roadway development.

Tolko Industries Ltd. interacts with these companies in a number of different capacities. The following are the most active oil and gas companies currently operating in the Forest Management Area:

- Canadian Natural Resources Limited;
- Vermilion Resources Ltd.;
- Conocophilips Canada Resources Corp.;
- Primewest Energy Inc.;
- Pengrowth Corporation;
- Apache Canada Ltd.;
- Northstar Energy Corporation;
- Enermark Inc.;
- Anadarko Canada Corporation;
- Penn West Petroleum Ltd.'
- Devon Canada Corporation;
- Viking Energy Ltd.;
- Nova Gas Transmission Ltd.;
- Husky Oil Operations Limited;
- Vintage Petroleum Canada, Inc.;
- Pembina Pipeline Corporation;
- Real Resources Inc.;
- American Leduc Petroleum Limited;
- Cal Ven Limited;
- Paramount Resources Ltd.

2.5.2 REGISTERED TRAPPERS ON THE FMA

The location of Trapline boundaries has been derived from Government LSAS information and summarized in Section 6.4 of the DFMP document. There are a total of forty (40) different traplines located on the Original Forest Management Area.

The table below summarizes the number of Trapline Licenses located in each operating area.

TABLE 2-4: TRAPLINE SUMMARY BY OPERATING AREA

Operating Area	Number of Trapline Licenses
Birch	1
Whitemud	12
Salt	7
Utikuma	20
Total	**40**

It is important to note that for the majority of the Trapline Licenses only a portion of the license area is located within the Original Forest Management Area.

TABLE 2-5: PERCENT OF TRAPLINE WITHIN THE TOLKO FMA

Percent of Trapline License in FMA	Number of Trapline Licenses
<10	2
11-50	18
51-75	12
76-99	3
100 %	5

2.5.3 GUIDE/OUTFITTERS

There are guides and outfitters operating on the Original Forest Management Area. At the time of submission Tolko had conformation from the following four individuals that operate on or adjacent to the Forest Management Area:

- Big Lakes Goose Hunting;
- Alberta Brush Adventures;
- Smoky River Outfitting Ltd.;
- South Peace Outfitters.

2.5.4 GRAZING LEASES/RESERVATIONS

There are two types of Grazing Dispositions located on the Original Forest Management Area. There are ten (10) Grazing Leases (GRL) and two (2) Forest Grazing Licenses (FGL) in the Original Forest Management Area. The majority of the Grazing Leases are located in the Whitemud operating area.

TABLE 2-6: GRAZING LEASE SUMMARY

FGL/GRL Number	Operating Area
GRL 34658	Whitemud
GRL 36005	Whitemud
GRL 36078	Whitemud
GRL 36578	Whitemud
GRL 37531	Birch
GRL 37557	Birch
GRL 39736	Whitemud
GRL 39876	Whitemud
GRL 40850	Birch
GRL 920052	Whitemud
FGL 920007	Whitemud
FGL 000010	Salt

DFMP

3.0

Resource Management Goals and Objectives

3.0 RESOURCE MANAGEMENT GOALS AND OBJECTIVES

3.1 SUSTAINABLE FOREST MANAGEMENT PHILOSOPHY

Tolko Industries Ltd. High Prairie OSB Division is committed to responsible stewardship of the environment throughout their operations. This commitment involves following the principals of sustainable forest management, while mitigating the impacts of forestry operations on other resource values. The company strives to fully utilize the timber resource to ensure the viability of the timber resource-based investment in High Prairie, and the economic well-being of the local communities associated with this investment. Throughout the development and implementation of the Detailed Forest Management Plan the company will co-operate with other forest users and involve the public and stakeholders in planning processes.

The company has adopted a philosophy of adaptive management. Through the process of monitoring the application of the objectives and strategies to the landbase, a feedback loop has been created which will allow for the modification or adjustment of the forest management practices.

The Interim Forest Management Planning Manual Guidelines to Plan Development Version: April 1998 were utilized for the development of this Detailed Forest Management Plan.

3.2 GOALS

The government of Alberta has developed and articulated its Commitment to Sustainable Resource Development and Environmental Management (March 1999). This document clearly indicates the vision of Sustainable Resource Development, "Alberta, a member of the global community, is a leader in sustainable development, ensuring a healthy environment, a healthy economy, and a high quality of life in the present and future." Sustainable development means "Renewable resources shall be managed to ensure their long-term viability and future use potential."

A number of goals have been developed for the Detailed Forest Management Plans. These goals have been organized into three broad categories: Ecological (Goals 1-2), Social (Goals 3-4) and Economic (Goals 5-6). The application of these goals on the landbase requires a link between the goals and objectives. In addition, there is also a link to the strategies that are employed and the monitoring and reporting of the results.

- Goal #1: To Practice Sustainable Forest Management;
- Goal #2: To Practice Responsible Environmental Stewardship;
- Goal #3: To support the employment, business and public interests of the local and aboriginal communities;
- Goal #4: Create and maintain an open consultative environment for the communication of information and the resolution of issues;
- Goal #5: Ensure the viability of a timber resource based investment and the economic well-being of timber based communities relating to the Forest Management Area;
- Goal #6: To cooperate with other commercial and non commercial users of the Forest Management Area.

The numbering of Goals, Objectives and Strategies is consistent between the Original Detailed Forest Management Plan and the Joint Detailed Forest Management Plan. There are a small number of strategies that apply specifically to only one of the Forest Management Agreement areas. Those strategies which apply specifically to only one of the Forest Management Agreement areas have been clearly identified throughout Section 3.0 of the document.

3.3 SPECIFIC OBJECTIVES

Each of the goals has objectives and strategies for application to the landbase. The company is required to demonstrate the progress and achievement of the goals, objectives and strategies. A monitoring and reporting component has been included with each objective to demonstrate how the information will be communicated to the Government and Stakeholders.

Further to the broad division of the goals, the objectives for Goal 1 and Goal 2 have been further organized into the following topics: Timber Management, Water Management, Wildlife Habitat Management, Fisheries Habitat Management, Natural Disturbance and Access Network.

3.3.1 SUSTAINABLE FOREST MANAGEMENT

Goal #1:

To Practice Sustainable Forest Management

3.3.1.1 TIMBER MANAGEMENT OBJECTIVES

Objective 1.1:

Maintain an acceptable range of forest ecosystems, tree species, and age class representation across the landscape.

In order to determine the potential impacts of forestry activities, the current forest composition must be evaluated. A Landscape Assessment which describes the current condition of the forest vegetation, anthropogenic disturbances, and fire history is utilized to compare the current forest conditions to the future forest conditions predicted by the preferred forest management strategy.

Strategy 1.1.1:

Complete a Landscape Assessment of the current Forest Management Agreement Area by submission of the Detailed Forest Management Plan that will be used to evaluate the impacts of planned forest management activities on the future forest condition.

Strategy 1.1.2:

Develop and implement a twenty year spatial harvest sequence to be followed by all operators on the Forest Management Area. Variance from the twenty year spatial harvest sequence will be monitored, tracked and reported annually. If the variance from the twenty year spatial harvest sequence for the Forest Management Area by compartment, by decade is greater than 20%, the Government may require a compartment assessment, a review of the twenty year spatial harvest sequence or an adjustment to the sustainable harvest level calculation.

To address operational planning concerns, operators are authorized to modify the spatial harvest sequence by deleting no more than 20% of the total sequenced area (hectares) in each compartment within each decade. Operators may harvest no more than 100% of the total area (hectares) in the

twenty year spatial harvest sequence by compartment, by decade. Operators may replace stands equivalent area (hectares) deleted from the twenty year spatial harvest sequence. Preference for replacement stands will be from the second ten year period (years 11 to 20) of the twenty year spatial harvest sequence. Where this is not feasible, replacement of an equivalent area (hectares) may be made from other stands in the approved net landbase of the Forest Management Area. Identified high quality late seral stage stands will not be included in the variance, or available for selection as replacements for deleted stands.

Strategy 1.1.3:

Complete a comparison of the preferred forest management strategy to the current Landscape Assessment by the submission of the Detailed Forest Management Plan as a measurement of the potential impact of forestry practices on the Forest Management Agreement Area.

Strategy 1.1.4:

Implement harvesting patterns which include a range of opening sizes from 1 hectare to 1500 hectares across the Forest Management Agreement Area, to promote the reduction of fragmentation on the landbase created by historical harvesting activities utilizing the cut and leave harvesting pattern.

Strategy 1.1.5:

Manage for high quality late seral stage representation on the Forest Management Agreement Area. Both the gross forested and operable landbase contribute to the maintenance of high quality late seral stage for each of the following cover groups: Deciduous, Mixedwood, Conifer Pine Leading, Conifer White Spruce Leading, and Conifer Black Spruce Leading.

Over the entire 160 year planning horizon, representation of late seral stage for the Deciduous, Mixedwood, Conifer Pine Leading, Conifer White Spruce leading and Conifer Black Spruce Leading on the gross forested landbase for the for the Original Forest Management Agreement Area will be on average 7%, 14%, 4%, 8% and 42% respectively.

Over the entire 160 year planning horizon, representation of high quality late seral stage on the operable landbase will be maintained at a minimum of 1% Deciduous, 2% Mixedwood, 1.5% Conifer Pine Leading, 0.5% Conifer White Spruce leading and 0% Conifer Black Spruce Leading.

Strategy 1.1.6:

All coniferous and deciduous species identified in the Alberta Vegetation Inventory forest cover types are considered commercial tree species for fibre supply and regeneration. These currently include white spruce *(Picea glauca)*, black spruce *(Picea mariana)*, lodgepole pine *(Pinus contorta v. latifolia)*, jack pine *(Pinus banksiana)*, balsam fir *(Abies balsamea)*, larch *(Larix laricina)*, aspen *(Populus tremuloides)*, balsam poplar *(Populus balsamifera)* and paper birch *(Betula papyrifera)*.

Monitoring:

M1 - Landscape Assessment

M8 - Landscape Structural Summary Table

M11 - Spatial Harvest Sequence Variance Table

Objective 1.2:

Develop and maintain a government approved forest inventory (AVI 2.1) of the Forest Management Agreement Area.

A key element in the development and planning of forestry activities is maintenance of a current and accurate inventory of the Forest Management Agreement Area.

Strategy 1.2.1:

Develop and maintain the currently approved Alberta Vegetation Inventory Version 2.1 for the Forest Management Agreement Area.

Strategy 1.2.2:

Implement a maintenance schedule for regular updates of the Alberta Vegetation Inventory (Version 2.1). Complete a re-inventory by operating area for the Original Forest Management Agreement Area (Utikuma, Salt, Whitemud and Birch) to Alberta Vegetation Inventory Version 2.1 specifications. .

TABLE 3-1: PHOTOGRAPHY UPDATE

OPERATING AREA	ORIGINAL PHOTOGRAPHY	UPDATE YEAR
Birch	1996	2008
Whitemud	1995/1996	2008
Salt	1995/1996	2006
Utikuma	1995/1996/1997	2009

Strategy 1.2.3:

On an annual basis, complete timber harvesting updates to capture timber harvesting activities.

Strategy 1.2.4:

On an ongoing basis, capture the landuse activities on the Forest Management Agreement Area by loading planned activities (wellsites, pipelines, roadways) from the Timber Damage Assessment procedure. Verify and update this information during the re-inventory of the operating area as per the Alberta Vegetation Inventory maintenance schedule.

Strategy 1.2.5: *(applicable to the Original Forest Management Area)*

Encourage Sustainable Resource Development to maintain the Alberta Vegetation Inventory, harvest update, road information and landuse activities for the twelve townships in Forest Management Unit S9 outside the Original Forest Management Agreement Area as per the schedule for the Original Forest Management Agreement Utikuma Operating Area.

Monitoring:

M2 - Inventory and Inventory Updates

M17 - Landuse Summary

M29 - Annual Landuse Summary

Objective 1.3:

Monitor spatial diversity and forest fragmentation at the landscape level across the Forest Management Agreement Area.

Forestry practices and landuse activities on the Forest Management Agreement Area can increase the fragmentation of the forest. The Landscape Assessment will provide data regarding the current level of fragmentation in the operating areas, and allow for a prediction of future forest conditions.

Strategy 1.3.1:

Complete a Landscape Assessment of the current Forest Management Agreement Area that will be used to evaluate the impacts of planned forest management activities on the future forest condition.

Strategy 1.3.2:

Develop and implement a twenty year spatial harvest sequence to be followed by all operators on the Forest Management Area. Variance from the twenty year spatial harvest sequence will be monitored, tracked and reported annually. If the variance from the twenty year spatial harvest sequence for the Forest Management Area by compartment, by decade is greater than 20%, the Government may require a compartment assessment, a review of the twenty year spatial harvest sequence or an adjustment to the sustainable harvest level calculation.

To address operational planning concerns, operators are authorized to modify the spatial harvest sequence by deleting no more than 20% of the total sequenced area (hectares) in each compartment within each decade. Operators may harvest no more than 100% of the total area (hectares) in the twenty year spatial harvest sequence by compartment, by decade. Operators may replace stands equivalent area (hectares) deleted from the twenty year spatial harvest sequence. Preference for replacement stands will be from the second ten year period (years 11 to 20) of the twenty year spatial harvest sequence. Where this is not feasible, replacement of an equivalent area (hectares) may be made from other stands in the approved net landbase of the Forest Management Area. Identified high quality late seral stage stands will not be included in the variance, or available for selection as replacements for deleted stands.

Strategy 1.3.3:

Implement harvesting patterns which include a range of opening sizes from 1 hectare to 1500 hectares across the Forest Management Agreement Area, to promote the reduction of fragmentation on the landbase created by historical harvesting activities utilizing the cut and leave harvesting pattern.

Strategy 1.3.4:

On an ongoing basis, work with other forest users to minimize roads and promote utilization of existing disturbances.

Monitoring

M1 - Landscape Assessment

M8 - Landscape Structural Summary Table

M11 - Spatial Harvest Sequence Variance Table

M25 - Forest Road Use Agreement Summary

Objective 1.4:

Develop stand level management strategies.

Stand level management strategies have been identified for application at the block or stand level that ensure the key features of stands and biodiversity are maintained throughout time. These strategies also contribute to other values such as wildlife, soil nutrients and carbon cycling.

Strategy 1.4.1:

Structure containing dead and live trees, representative of the pre-harvest stand condition including species, tree size, condition and distribution, will be retained on the harvest areas. Single tree or patch retention will be applied to a minimum level of 1% of the scheduled harvest area within each compartment up to an average level of 3% of the scheduled harvest area across each operating area over the term of the Detailed Forest Management Plan.

The following techniques will be applied to the landbase alone or in combination to harvest areas to achieve the desired structure retention:

- Single tree retention will be applied to the landbase by leaving approximately 8 stems per hectare on the harvest area. The technique will be implemented on the landbase via guidance to machine operators during harvest operations.
- Small clump retention will be applied to the landbase by leaving small groups of trees in conjunction with other operational issues within the harvest area (examples: understorey protection or avoidance, wildlife features such as dens, nests and mineral licks, and watercourse or water source area buffers etc),via instructions to machine operators.
- Green island retention will be applied on harvest areas greater than 100 hectares in size. Green island retention patches will be clearly identified on detailed block plans and in the field prior to harvest operations.

The area retained on the harvest areas will be assessed and tracked on harvest area basis through a post-harvest assessment program utilizing post harvest aerial photography and photo interpretation. The structure that is maintained will be reported by area and category at the end of every cut control period and reconciled each decade.

Strategy 1.4.2:

Maintain coarse woody debris (CWD) over the short term by leaving standing and downed woody debris on the harvest area during forestry operations.

Strategy 1.4.3:

Maintain coarse woody debris (CWD) over the long term by leaving live residual trees within the harvest area during forestry operations. Over time these trees will die and contribute to coarse woody debris on the harvest area in the future.

Strategy 1.4.4:

During the life of the Detailed Forest Management Plan, the primary slash abatement strategy will be to pile and burn. In areas where "pile and burn" is the slash abatement strategy, 1 pile for every 5 hectares of harvested area will be retained over the Operating Area. The retained piles should contain a range of debris piece sizes and a minimum amount of finely packed debris or dirt.

Strategy 1.4.5:

During the life of the Detailed Forest Management Plan the alternate slash abatement strategy that may be employed on harvest areas on a trial or experimental basis is spreading of debris throughout the harvested area.

Monitoring

M3 - Ground Rule Development

M8 - Landscape Structural Summary Table

M14 - Stand Structure Retention Summary

M36 - Annual Harvest Summary

M39 - Annual Research Listing

Objective 1.5:

Develop Landscape level management strategies.

Landscape strategies which are broader in scope than the stand level strategies are applied at the operating area level to ensure that large scale objectives are achieved on the Forest Management Agreement Area.

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 opening but, by also harvesting the small stands that exist across the landscape. 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. In addition, the single pass will minimize the number of entries for other forest values and reduce or minimize fragmentation.

Strategy 1.5.1:

Design harvest areas following patterns identified in the Landscape Assessment. This design strategy includes incorporating a broad range of stand types, shapes and sizes.

Strategy 1.5.2: *(applicable to the Original Forest Management Area)*

Prior to harvest complete a visual impact assessment of planned harvesting activities for the Birch Hills, Salt area adjacent to Lesser Slave Lake, the highway #750 corridor and the highway #88 corridor.

Strategy 1.5.3: *(applicable to the Joint Forest Management Area)*

Strategy 1.5.4: (*applicable to the Original Forest Management Area)*

Operate the Original Forest Management Agreement Area as a single sustainable timber supply unit for the deciduous and coniferous landbase (single landbase). The deciduous sustainable harvest level will be calculated for the Forest Management Agreement Area as a whole. The coniferous sustainable harvest level will be calculated and summarized by operating area. A twenty year spatial harvest sequence incorporating both species will be developed for the Forest Management Agreement Area.

Strategy 1.5.5:

Manage for high quality late seral stage representation on the Forest Management Agreement Area. Both the gross forested and operable landbase contribute to the maintenance of high quality late seral stage for each of the following cover groups: Deciduous, Mixedwood, Conifer Pine Leading, Conifer White Spruce Leading, and Conifer Black Spruce Leading.

Over the entire 160 year planning horizon, representation of late seral stage for the Deciduous, Mixedwood, Conifer Pine Leading, Conifer White Spruce Leading and Conifer Black Spruce Leading on the gross forested landbase for the for the Original Forest Management Agreement Area will be on average 7%, 14%, 4%, 8% and 42% respectively.

Over the entire 160 year planning horizon, representation of high quality late seral stage on the operable landbase will be maintained at a minimum of 1% Deciduous, 2% Mixedwood, 1.5% Conifer Pine Leading, 0.5% Conifer White Spruce Leading and 0% Conifer Black Spruce Leading.

Strategy 1.5.6:

On an operating area basis, reforest sites with commercial tree species, approximately in proportion to pre-harvest types identified in the Alberta Vegetation Inventory.

Strategy 1.5.7:

Implement harvesting patterns which include a range of opening sizes from 1 hectare to 1500 hectares across the Forest Management Agreement Area, to promote the reduction of fragmentation on the landbase created by historical harvesting activities utilizing the cut and leave harvesting pattern.

Monitoring

M1 - Landscape Assessment

M8 - Landscape Structural Summary Table

M11 - Spatial Harvest Sequence Variance Table

M36 - Annual Harvest Summary

Objective 1.6:

Develop a pure stand management strategy that is beneficial for all parties.

The range of pure and mixedwood stand types on the Forest Management Agreement Area contributes to the biodiversity of the landbase.

Strategy 1.6.1:

Identify the current extent and distribution of pure and mixedwood stands on the Forest Management Agreement Area.

Strategy 1.6.2:

On an operating area basis maintain the same relative proportions of pre-harvest species strata (Deciduous, Coniferous, Deciduous dominated Mixedwood and Coniferous dominated Mixedwood).

Strategy 1.6.3:

Validate yield curves for pure deciduous and coniferous strata as per the approved Growth and Yield Plan.

Strategy 1.6.4:

Utilizing existing information, and in cooperation with Coniferous Quota Holders, within one year of Detailed Forest Management Plan approval develop operational procedures for the identification and classification of understoreys and employ harvesting methods that will minimize damage to those understoreys.

Monitoring:

M1 - Landscape Assessment

M8 - Landscape Structural Summary Table

M10 - Understorey Inventory

M21 - Growth and Yield Activity Summary

M36 - Annual Harvest Summary

Objective 1.7:

Develop a mixedwood management strategy that is beneficial for all parties involved while maintaining the objective of balanced overstorey groups.

The range of pure and mixedwood stand types on the Forest Management Agreement Area contributes to the biodiversity of the landbase.

Strategy 1.7.1:

Identify the current extent and distribution of pure and mixedwood stands on the Forest Management Agreement Area.

Strategy 1.7.2:

On an operating area basis maintain the same relative proportions of pre-harvest species strata (Deciduous, Coniferous, Deciduous dominated Mixedwood and Coniferous dominated Mixedwood).

Strategy 1.7.3:

Validate yield curves for mixedwood strata as per the approved Growth and Yield Plan.

Strategy 1.7.4:

Utilizing existing information, and in cooperation with Coniferous Quota Holders, within one year of Detailed Forest Management Plan approval develop operational procedures for the identification and classification of understoreys and employ harvesting methods that will minimize damage to those understoreys.

Monitoring

M1 - Landscape Assessment

M8 - Landscape Structural Summary Table

M10 - Understorey Inventory

M21 - Growth and Yield Activity Summary

M36 - Annual Harvest Summary

Objective 1.8:

Validate growth information by yield class.

Strategy 1.8.1:

Collect harvested volume information annually to facilitate the comparison of yield curve estimates to actual harvested volumes.

Strategy 1.8.2:

Undertake a gap analysis in existing yield curves and develop information collection program to fill existing gaps (if any) during the implementation of the approved Growth and Yield Program.

Strategy 1.8.3:

Relate the approved Growth and Yield Program to the yield curves. The current plan, once implemented will have approximately seventy percent of the plots having a re-measurement prior to the next scheduled Timber Supply Analysis.

Monitoring:

M21 - Growth and Yield Activity Summary

M36 - Annual Harvest Summary

Objective 1.9:

Conduct research on yield information on harvest treatments for multi-tiered stands.

The concept of a multi-tiered stand is a difficult concept to communicate. Basically, a multi-tiered stand would be described as a stand with an overstorey canopy with multiple understorey layers. These stands may require operations to be completed utilizing some type of modified harvesting system. This modified harvesting system would remove all or a portion of the overstorey, and protect the understorey. This would allow the understorey layer additional growing time.

Strategy 1.9.1:

Within one year of Detailed Forest Management Plan approval, identify existing multi-tiered stands on the Forest Management Agreement Area.

Strategy 1.9.2:

Throughout the life of the Detailed Forest Management Plan develop and implement on an experimental or operational trial basis, harvesting prescriptions for multi tiered stands.

Strategy 1.9.3:

Continue to participate in mixedwood management organizations.

Monitoring:

M21 – Growth and Yield Activity Summary

M31 – Membership Listing

M36 - Annual Harvest Summary

M39 - Annual Research Listing

Objective 1.10:

Implement regeneration standards which reflect yield class assumptions.

Strategy 1.10.1:

Utilize pre-harvest information from Alberta Vegetation Inventory or pre-harvest assessments conducted on proposed harvest areas to determine the appropriate reforestation strategy.

Strategy 1.10.2:

Survey all harvest areas according to the Alberta Regeneration Manual and develop an action plan for "Not Satisfactorily Restocked" (NSR) areas within one year of the survey.

Strategy 1.10.3:

Promote the natural reforestation of deciduous tree species via suckering, vegetation propagation and natural seeding.

Strategy 1.10.4:

Promote the reforestation of conifer species using seedlings grown from seed collected from within the same general geographic region, in accordance with the Seed Zone Guidelines for the Province of Alberta.

Strategy 1.10.5:

Follow Provincial Legislation regarding genetically modified stock or exotic species on the Forest Management Agreement Area.

Strategy 1.10.6:

On an operating area basis maintain the same relative proportions of pre-harvest species strata (Deciduous, Coniferous, Deciduous dominated Mixedwood and Coniferous dominated Mixedwood).

Strategy 1.10.7:

Complete initial reforestation treatment on harvest areas within two years of harvest.

Strategy 1.10.8:

All coniferous and deciduous species identified in the Alberta Vegetation Inventory forest cover types are considered commercial tree species for fibre supply and regeneration. These currently include white spruce *(Picea glauca)*, black spruce *(Picea mariana)*, lodgepole pine *(Pinus contorta v. latifolia)*, jack pine *(Pinus banksiana)*, balsam fir *(Abies balsamea)*, larch *(Larix laricina)*, aspen *(Populus tremuloides)*, balsam poplar *(Populus balsamifera)* and paper birch *(Betula papyrifera)*.

Strategy 1.10.9:

Collect information on regenerating stands via implementation of the approved Growth and Yield Program and regeneration surveys to develop regenerating stand yield curves for the next timber supply Analysis.

Monitoring:

M1 - Landscape Assessment

M21 - Growth and Yield Activity Summary

M37 - Annual Silviculture Summary

Objective 1.11:

Maintain or enhance the deciduous and coniferous Annual Allowable Cut.

Responsible stewardship and professional forest management of the Forest Management Agreement Area requires credible and accurate information to substantiate the Annual Allowable Cut and the sustainability of the fibre supply.

Strategy 1.11.1:

Determine the Net Landbase available for production of timber by submission of the Detailed Forest Management Plan.

Strategy 1.11.2:

Harvest according to the calculated deciduous and coniferous sustainable harvest level.

Strategy 1.11.3:

Implement Timber Supply Analysis assumptions regarding transition of low (AB) density stands to full (CD) stocking throughout the life of the Detailed Forest Management Plan.

The range of treatments that could be utilized for original stand composition are summarized in Table 3-2. It is important to understand that this table is a snapshot in time and changes are an integral component of the philosophy of continuous improvement and site-specific silviculture. Prescriptions are adjusted as required on a site-specific basis. Deviations in treatment could result from the following factors: ecosite, regeneration standards strata balancing, re-classification, understorey protection, slash loading, terrain, residual overstorey, season of harvest, cone crops, seed availability, seedling availability, season of access, adjacency, available microsites, weather, climatic factors, insects and disease, other resource values, drainage, new tools and technology, seedzone limitations, or survey results, etc.

TABLE 3-2: SILVICULTURE ASSUMPTIONS

YIELD STRATUM	TRANSITION ASSUMPTIONS	SITE PREP*	ESTABLISHMENT TYPE		COMPETITION CONTROL *
			DECIDUOUS COMPONENT †	CONIFER COMPONENT	
1 (D)	100% to Yield Curve 5	NIL,M,CH	LFN/PLANT	Replacement of conifer understorey protection or plant	NIL,M,CH
2 (D)	100% to Yield Curve 6	NIL,M,CH	LFN/PLANT	Replacement of conifer understorey protection or plant	NIL,M,CH
3 (D)	100% to Yield Curve 7	NIL,M,CH	LFN/PLANT	Replacement of conifer understorey protection or plant	NIL,M,CH
4 (D)	100% to Yield Curve 8	NIL,M,CH	LFN/PLANT	Replacement of conifer understorey protection or plant	NIL,M,CH
5 (D)	Status Quo	NIL,M,CH	LFN	Replacement of conifer understorey protection or plant	NIL,M,CH
6 (D)	Status Quo	NIL,M,CH	LFN	Replacement of conifer understorey protection or plant	NIL,M,CH
7 (D)	Status Quo	NIL,M,CH	LFN	Replacement of conifer understorey protection or plant	NIL,M,CH
8 (D)	Status Quo	NIL,M,CH	LFN	Replacement of conifer understorey protection or plant	NIL,M,CH
9 (DC)	100% to Yield Curve 10	M,CH,NIL	LFN	Plant 800-1200 stems/ha	M,CH,NIL
10 (DC)	Status Quo	M,CH,NIL	LFN	Plant 800-1200 stems/ha	M,CH,NIL
11 (CD)	100% to Yield Curve 12	M,CH,NIL	LFN	Plant 1100-1600 stems/ha	M,CH,NIL
12 (CD)	Status Quo	M,CH,NIL	LFN	Plant 1100-1600 stems/ha	M,CH,NIL
13 (C-Sw/Fb)	100% to Yield Curve 16	M,CH,NIL	LFN	Plant 1400-1600 stems/ha	M,CH,NIL
14 (C-Pl)	100% to Yield Curve 17	M,DC,CH,NIL	LFN	Plant 1400-1600 stems/ha	M,CH,NIL
15 (C-Sb)	100% to Yield Curve 18	M	LFN	Plant 1400-1600 stems/ha	M,CH,NIL
16 (C-Sw/Fb)	Status Quo	M,CH,NIL	LFN	Plant 1400-1600 stems/ha	M,CH,NIL
17 (C-Pl)	Status Quo	M,DC,CH,NIL	LFN	Plant 1400-1600 stems/ha	M,CH,NIL
18 (C-Sb)	Status Quo	M	LFN	Plant 1400-1600 stems/ha	M,CH,NIL

* NIL No Site Preparation
M Mechanical
DC Drag Chain
CH Chemical

† LFN Leave for Natural Regeneration

Strategy 1.11.4:
Work with Government and other forest users to review reclamation standards and promote the re-establishment of commercial tree species on reclaimed landuse dispositions.

Strategy 1.11.5:

Encourage Alberta Sustainable Resource Development to create and manage forest Community Timber Programs within the vicinity of the Forest Management Agreement Area.

Strategy 1.11.6:

Ensure both conifer and deciduous Timber Damages Assessment (TDA) dollars are collected from the Original Forest Management Agreement Area. Apply Timber Damages Assessment money collected to offset damage to improvements, to replace timber resource or to re-establish commercial tree species.

Strategy 1.11.7:

The amount of wet low (AB) density deciduous stands has been limited through the net landbase determination. A total of 77 hectares of low density deciduous wet site area has been included in the 20 year spatial harvest sequence. As these stands are identified there will be a pre harvest assessment to determine the appropriate silviculture treatment. A post harvest assessment to ensure the stocking is adequate. The following tables summarize the amount of area

TABLE 3-3: SUMMARY OF LOW DENSITY DECIDUOUS AREAS LOCATED ON WET SITES IN THE NET LANDBASE

DENSITY	SITE	AREA (ha)
A	Wet	1955
B	Wet	316
Total		**2271**

TABLE 3-4: SUMMARY OF LOW DENSITY DECIDUOUS AREAS LOCATED ON WET SITES SCHEDULED FOR HARVEST IN THE TWENTY YEAR SPATIAL HARVEST SEQUENCE

DENSITY	SITE	AREA (ha)
A	Wet	75
B	Wet	2
Total		**77**

Strategy 1.11.8:

Both coniferous and deciduous secondary species volumes are to be sustainable on the landbase. The estimated timber volume from a hectare of landbase was determined by utilizing volume information from the approved yield curves. A summary is presented in the following tables:

TABLE 3-5: TARGET FOR REPLACEMENT OF CONIFER FROM PURE DECIDUOUS STRATA

YIELD CURVE	STRATUM	TOTAL STRATA NET LANDBASE (ha)	AVERAGE TARGET HARVEST AGE (20 YEAR SPATIAL HARVEST SEQUENCE)	INCIDENTAL CONIFER VOLUME* (m^3/ha)	TOTAL VOLUME* (m^3)
1	MX-AB-D-A-G	14,057	80	26	365,482
2	MX-AB-D-A-MF	30,330	100	22	667,260
5	MX-CD-D-A-G	45,325	70	25	1,133,125
6	MX-CD-D-A-MF	77,283	80	25	1,932,075
3	FH-AB-D-A-G	1,709	80	18	30,762
4	FH-AB-D-A-MF	2,189	100	12	26,268
7	FH-CD-D-A-G	9,117	70	16	145,872
8	FH-CD-D-A-MF	5,033	90	34	171,122
Total Hectares		**185,043**	**Total Volume**		**4,471,966**
Target Volume per hectare (m^3/ha) for conifer replacement in pure D stands					**24.17**

*Cull deduction of 2% applied to volumes.

TABLE 3-6: TARGET FOR REPLACEMENT OF DECIDUOUS FROM PURE CONIFER STRATA

YIELD CURVE	STRATUM	TOTAL STRATA NET LANDBASE (ha)	AVERAGE TARGET HARVEST AGE (20 YEAR SPATIAL HARVEST SEQUENCE)	INCIDENTAL CONIFER VOLUME* (m^3/ha)	TOTAL VOLUME* (m^3)
13	A-AB-C-SW-A	17,100	130	57	974,700
16	A-CD-C-SW-A	19,228	130	74	1,422,872
14	A-AB-C-P-A	11,486	130	2	22,972
17	A-CD-C-P-A	16,174	130	24	388,176
15	A-AB-C-SB-A	8,619	140	0	0
18	A-CD-C-SB-A	6,760	130	0	0
Total Hectares		**79,367**	**Total Volume**		**2,808,720**
Target Volume per hectare for deciduous replacement in pure C stands					**35.39**

*Cull deduction of 10% applied to volumes.

The delivery of conifer and deciduous species from the forest management area will be tracked and reported. The replacement of secondary species on the landbase will be geared to the target volumes from the Spatial Harvest Sequence and reconciled to the actual volumes in the Stewardship Report. The harvest areas will be assessed and tracked through a post-harvest assessment program utilizing

post harvest aerial photography, photo interpretation, site visits (as required) and reforestation surveys. The primary method for replacement of incidental conifer will be to protect or avoid any existing understorey conifer. If adequate healthy stems to achieve conifer replacement are not available, the following areas could be utilized for planting of conifer seedlings: low wet areas, roads and landings from harvest operations or low density deciduous stands. If the opportunities listed above do not apply then the companies will jointly determine where the conifer will be replaced in the harvest areas.

The strategy to be utilized for accounting of the replacement volumes will be linked to the regenerated yields from fully stocked curves within each strata. These are summarized in the following tables.

TABLE 3-7: CONIFER TARGET REPLACEMENT VOLUMES AND STEM DENSITIES

REPLACEMENT STRATUM	TARGET AGE (years)	CONIFER VOLUME FULLY STOCKED (m3/ha)	ESTABLISHMENT TARGET (stems/ha)
C (White Spruce)	80	238	1400 - 1600
C (Pine)	80	196	1400 - 1600
C (Black Spruce)	80	33	1400 - 1600
CD	80	162	1100 - 1600
DC	80	116	800 - 1200
D (Mixedwood Natural Subregion) TPR G	80	35	200 - 300
D (Mixedwood Natural Subregion) TPR MF	80	25	200 - 300
D (Foothills Natural Subregion) TPR G	80	19	100 - 200
D (Foothills Natural Subregion) TPR MF	80	34	100 - 200

TABLE 3-8: DECIDUOUS TARGET REPLACEMENT VOLUMES AND STEM DENSITIES

REPLACEMENT STRATUM	TARGET AGE (years)	DECIDUOUS VOLUME FULLY STOCKED (m3/ha)	ESTABLISHMENT TARGET (stems/ha)
C (White Spruce)	80	58	*
C (Pine)	80	33	*
C (Black Spruce)	80	3	*
CD	80	72	*
DC	80	168	*
D (Mixedwood Natural Subregion) TPR G	80	226	*
D (Mixedwood Natural Subregion) TPR MF	80	179	*
D (Foothills Natural Subregion) TPR G	80	315	*
D (Foothills Natural Subregion) TPR MF	80	260	*

* Monitor and report actual results to determine the range of variability.

Monitoring:

M1 - Landscape Assessment

M9 - Reclamation Listing

M17 - Landuse Summary

M28 - Fibre Supply Table

M29 - Annual Landuse Summary

M36 - Annual Harvest Summary

M37 - Annual Silviculture Summary

Objective 1.12:

Develop and maintain a growth and yield program.

The intent of the approved Growth and Yield Program is to collect information that will be utilized to verify:

- Natural stand yield as predicted by the yield curves developed in the Detailed Forest Management Plan process,
- Regeneration on harvest openings as assumed in AAC calculations, and
- Overall forest level growth is sustainable when considered in conjunction with other timber and non timber related activities.

Strategy 1.12.1:

Implement the approved Growth and Yield program by establishing permanent and temporary sample plots over a ten year period.

Strategy 1.12.2:

As part of the approved Growth and Yield Program implementation, conduct a gap analysis and implement a strategy for collecting information for the next Timber Supply Analysis.

Monitoring:

M21 - Growth and Yield Activity Summary

Objective 1.13:

Minimize the effects of forestry practices on the productive capacity of the forest.

Strategy 1.13.1:

Operate in compliance with the Soil Conservation Guidelines and ground rules.

Strategy 1.13.2:

Within six months of the approval of the Detailed Forest Management Plan develop Forest Management Agreement Area specific ground rules that mitigate the potential effects of forestry practices on the productive capacity of the forest.

Strategy 1.13.3:

Conduct harvest operations during frozen or dry ground conditions to minimize damage to the productive capacity of the Operating Areas

Strategy 1.13.4:

Roads will be kept to a minimum while still maintaining safe and efficient harvesting and log haul operations. The temporary in-block roads will be limited to less than or equal to 5% of the gross harvest area.

Strategy 1.13.5:

Reduce the amount of area lost to the productive landbase due to slash accumulation. The tactic employed will be to "pile and burn" slash accumulations, leaving a maximum of one pile for every five hectares.

Strategy 1.13.6:

Utilize existing access, where feasible, on the Forest Management Agreement Area to minimize roading. Currently, access is provided to the Operating Areas within the Original Forest Management Agreement Area via a number of existing routes. These routes include primary and secondary paved Highways, Municipal District or County gravel roads, oilfield road networks and LOC roads. The following is a summary of the primary access to each of the operating areas and the within operating area access.

- Primary access to the Birch Operating Area is provided via paved primary (Hwy #49), paved secondary (Hwy #733) and the County of Birch Hills gravel (Codesa Road).
- Primary access to the Salt Operating Area is provided via paved primary (Hwy #2A), and paved secondary (Hwy #750). Within the Salt operating area access is provided via the Little Horse Oil Field Road Network, the Salt Prairie Tower/Oil Field Road Network and the Hilliard's Bay Park Road.
- Primary access to the Whitemud Operating Area is provided via paved primary (Hwy #2A), paved primary (Hwy #49), and paved secondary (Hwy #676). Within the Whitemud operating area access is provided via Tolko LOC's (LOC941940, LOC012256, LOC012265), and various Grazing Lease Trail Networks. There are four roadway's planned for the Whitemud Operating Area. The first two planned route provide access to compartments located on the north east side of the operating area. The third planned route is located in the south west portion of the operating area and extends west from Tolko' s existing LOC. The fourth planned route provides access from the private land to the Forest Management Area on the south east portion of the Whitemud operating area. All of these planned roadways follow existing routes which will be upgraded to seasonal access during the first ten year period of the twenty year spatial harvest sequence.
- Primary access to the Utikuma Operating Area is provided via paved primary (Hwy #2A), paved secondary (Hwy #750), and paved secondary (Hwy #88). Access within the Utikuma operating area access is provided via the Utikuma Oil Field Road Network, the Harmon Valley Road, the Nowell Road, the Seal Lake Road, the Chicken Ridge Road, the Nipisi Oilfield Road Network the Whitefish Tower Road and Tolko LOC910801.

See the compartment access plan on Map 3-1 (full size maps can be found in Appendix H, Map H-2).

Monitoring:

M3 - Ground Rule Development

M6 - Access Corridor Identification Map

M23- Detailed Road Inventory Map

M36 - Annual Harvest Summary

M37 - Annual Silviculture Summary

MAP 3-1: COMPARTMENT ACCESS PLAN

Objective 1.14:

Mitigate the impacts of forestry practices on forest soils.

Forest harvesting and reforestation operations have the potential to disturb forest soils. Maintaining the productive capacity of forest soils and mitigating the impact of detrimental effects is important to sustaining the supply of timber from the Forest Management Agreement Area.

Strategy 1.14.1:

Operate in compliance with Soil Conservation Guidelines and Ground Rules.

Strategy 1.14.2:

Conduct harvest operations during frozen or dry ground conditions to minimize damage to the forest soils on the Operating Areas.

Strategy 1.14.3:

Roads will be kept to a minimum while still maintaining safe and efficient harvesting and log haul operations. The temporary in-block roads will be limited to less than or equal to 5% of the gross harvest area.

Strategy 1.14.4:

Reclaim temporary in-block roads constructed during non-frozen conditions by decompacting and rolling back any debris and topsoil.

Strategy 1.14.5:

Reclaim temporary in-block roads constructed during frozen ground conditions by rolling back any debris and topsoil.

Strategy 1.14.6:

Maintain coarse woody debris (CWD) over the short term by leaving standing and downed woody debris on the harvest area during forestry operations. Coarse woody debris contributes to the maintenance of nutrients and carbon cycling.

Strategy 1.14.7:

Maintain coarse woody debris (CWD) over the long term by leaving live residual trees within the harvest area during forestry operations. Over time these trees will die and contribute to coarse woody debris on the harvest area in the future.

Strategy 1.14.8:

Through the life of the Detailed Forest Management plan investigate site preparation methods and their effects on forest soils.

Monitoring:

M3 - Ground Rule Development

M36 - Annual Harvest Summary

M37 - Annual Silviculture Summary

Objective 1.15:

Ensure that company personnel are aware of and current with all applicable laws, regulations and policies affecting forest practices.

The policies, laws and regulations governing the forest industry change as a result of new information and trends in public opinion. Company staff are committed to remain current with the science and art of forestry practices and the current policies, laws and regulations.

Strategy 1.15.1:

Provide opportunity for company staff to maintain professional development through structured and non-structured training activities.

Strategy 1.15.2:

Maintain subscription to a program which provides regular updates to forest related legislation (i.e. Forest Views or Natural Resource).

Monitoring:

M20 - Training and Employment Listing

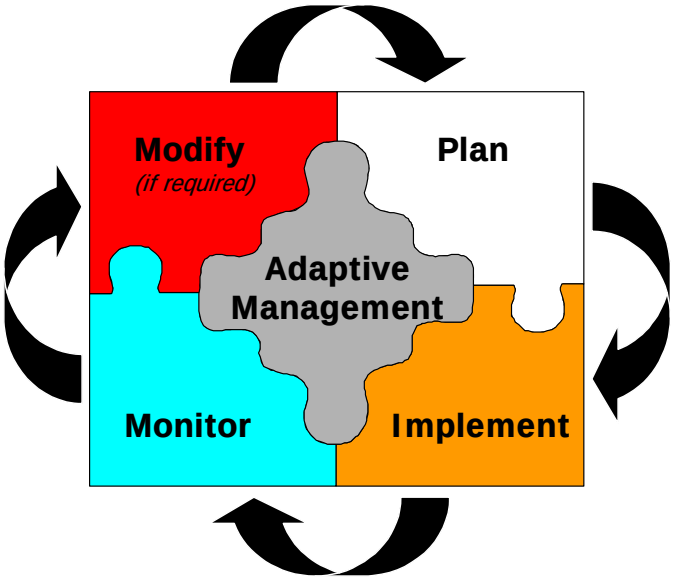
M24 - Forest Legislation

M31 – Membership Listing

Objective 1.16:

Ensure implemented management strategies are achieving desired results by adopting the philosophy of adaptive management.

FIGURE 3-1: ADAPTIVE MANAGEMENT FLOW CHART



Strategy 1.16.1:

Report on the harvesting operations and reforestation efforts in the Five Year Stewardship Report to ensure that commitments outlined in the Detailed Forest Management Plan are being achieved or changed as a result of new information or knowledge.

Monitoring:

M8 - Landscape Structural Summary Table

M11 - Spatial Harvest Sequence Variance Table

M36 - Annual Harvest Summary

M37 - Annual Silviculture Summary

Objective 1.17:

Ensure appropriate stand utilization by implementation of the twenty year spatial harvest sequence.

Strategy 1.17.1:

Ensure that all forestry operators on the Forest Management Agreement Area follow the twenty year spatial harvest sequence and the harvest profile as it is outlined in the Detailed Forest Management Plan within the allowable variance range of 20%.

Monitoring:

M11 - Spatial Harvest Sequence Variance Table

M36 - Annual Harvest Summary

3.3.2 ENVIRONMENTAL STEWARDSHIP

Goal #2:

To Practice Responsible Environmental Stewardship

3.3.2.1 WATER MANAGEMENT OBJECTIVES

The watersheds on the Forest Management area have been identified on the landbase to facilitate the evaluation of the preferred forest management strategy and twenty year spatial harvest sequence.

The interface between waterbodies, watercourses and the upland area, known as riparian areas, are important areas. They are usually very rich, productive sites important for forestry, wildlife, water quality and biodiversity.

Objective 2.1:

Mitigate the impacts of forestry practices on riparian areas, water bodies, watersheds and hydrological cycles.

Strategy 2.1.1:

Operate in compliance with Provincial and Federal Legislation.

Strategy 2.1.2:

Identify major watersheds on Forest Management Agreement Area, to improve the understanding of the impacts of forestry practices on hydrological cycles. Through the use of computer simulation models (e.g. Cumulative Watershed Disturbance and Hydrologic Recovery Simulator (ECA- Alberta)) evaluate the potential impacts of forestry practices on water flows.

Strategy 2.1.3:

Analyze watersheds using the Age Threshold Analysis to determine the percentages of area affected by harvesting activities. Plan harvest operations to ensure that a minimum of 50% of the watershed will be older than the specified threshold ages for species cover types.

Strategy 2.1.4:

Identify waterbody and watercourse areas, apply the appropriate buffer depending on classification and remove the area from the net landbase.

Strategy 2.1.5:

Design forestry activities in the vicinity of riparian areas in a manner that will not compromise the objectives of the area.

Monitoring:

M1 - Landscape Assessment

M3 - Ground Rule Development

M4 - Watershed Assessment

M18 - Watershed Analyses Summary

M36 - Annual Harvest Summary

Objective 2.2:

Minimize the effects of roadway development on watercourses within the Forest Management Agreement Area

Roadway development on the Forest Management Agreement Area can impact watercourses through the creation of crossings. Crossings create the opportunity for increased sedimentation and restriction of water flow.

Strategy 2.2.1:

Plan access routes to minimize the number of stream crossings and reduce the potential for runoff from the road to enter waterways.

Strategy 2.2.2:

Install watercourse crossing structures that are appropriate for the watercourse being crossed, the season of use, and in compliance with the Provincial and Federal Legislation.

Strategy 2.2.3:

Develop a watercourse crossing database for the tracking of crossing installation, removal and re-vegetation efforts within one year of Detailed Forest Management Plan approval.

Strategy 2.2.4:

Operate cooperatively with other forest industry stakeholders in the Forest Management Agreement Area to develop integrated forest harvest plans and coordinate (where possible) the number and timing of entries into operating areas.

Strategy 2.2.5:

Reduce the amount of new road being developed on the Forest Management Agreement Area. Where possible, enter into commercial road use agreements with companies that operate on the Forest Management Agreement Area.

Strategy 2.2.6:

Conduct harvest operations during frozen or dry ground conditions. Watercourse crossing construction techniques such as snow fills, ice bridges or the use of log fills, with removal prior to spring melt will be used to minimize effects of roadway development on watercourses.

Monitoring:

M3 - Ground Rule Development

M6 - Access Corridor Identification Map

M17 - Landuse Summary

M23- Detailed Road Inventory Map

M25 - Forest Road Use Agreement Summary

M26 - Integrated Harvest Summary

M27 - Road Maintenance and Abandonment Summary

M36 - Annual Harvest Summary

3.3.2.2 WILDLIFE HABITAT MANAGEMENT OBJECTIVES

The management of wildlife populations is the mandate of the Alberta Government. The involvement of forest companies is limited to minimization of potential impacts and mitigation of the detrimental effects of forestry practices on the wildlife habitat. A number of coarse filter and fine filter approaches to wildlife habitat management will be employed to maintain features of wildlife habitat.

Objective 2.3:

Manage forestry operations to provide wildlife habitat features.

Strategy 2.3.1:

Minimize fragmentation of the landscape with the single pass harvest system. The intent of the harvest system is to create a range of opening sizes from 1 to 1500 hectares. This distribution of opening sizes will sustain the larger tracts of contiguous habitat required by some species while providing for species that require multiple habitat types.

Strategy 2.3.2:

In conjunction with the wildlife life requisites assessment of the Forest Management Area, analyze the Preferred Forest Management strategy for connectivity and compare to the current landbase.

Strategy 2.3.3:

Recognize and implement appropriate protection of existing identified unique or rare habitat.

Strategy 2.3.4:

Structure containing dead and live trees, representative of the pre-harvest stand condition including species, tree size, condition and distribution, will be retained on the harvest areas. Single tree or patch retention will be applied to a minimum level of 1% of the scheduled harvest area within each compartment up to an average level of 3% of the scheduled harvest area across each operating area over the term of the Detailed Forest Management Plan.

The following techniques will be applied to the landbase alone or in combination to harvest areas to achieve the desired structure retention:

- Single tree retention will be applied to the landbase by leaving approximately 8 stems per hectare on the harvest area. The technique will be implemented on the landbase via guidance to machine operators during harvest operations.
- Small clump retention will be applied to the landbase by leaving small groups of trees in conjunction with other operational issues within the harvest area (examples: understorey protection or avoidance, wildlife features such as dens, nests and mineral licks, and watercourse or water source area buffers etc),via instructions to machine operators.
- Green island retention will be applied on harvest areas greater than 100 hectares in size. Green island retention patches will be clearly identified on detailed block plans and in the field prior to harvest operations.

The area retained on the harvest areas will be assessed and tracked on harvest area basis through a post-harvest assessment program utilizing post harvest aerial photography and photo interpretation. The structure that is maintained will be reported by area and category at the end of every cut control period and reconciled each decade.

Strategy 2.3.5:

Leave coarse woody debris to provide wildlife habitat and stand structure in balance with tree utilization standards. Maintain coarse woody debris (CWD) over the short term by leaving standing and downed woody debris on the site during forestry operations.

Strategy 2.3.6:

Leave coarse woody debris to provide wildlife habitat and stand structure in balance with tree utilization standards. Maintain coarse woody debris (CWD) over the long term by leaving live residual trees within the harvest area during forestry operations over time these trees will die and contribute to coarse woody debris on the site in the future.

Strategy 2.3.7:

During the life of the Detailed Forest Management Plan, retain 1 pile for every 5 hectares of harvested area, in areas where "pile and burn" is the slash abatement strategy. The retained piles

should contain a range of debris piece sizes with a minimum amount of finely packed debris or dirt and will contribute to the habitat of some species.

Strategy 2.3.8:

Manage for high quality late seral stage representation on the Forest Management Agreement Area. Both the gross forested and operable landbase contribute to the maintenance of high quality late seral stage for each of the following cover groups: Deciduous, Mixedwood, Conifer Pine Leading, Conifer White Spruce Leading, and Conifer Black Spruce Leading

Over the entire 160 year planning horizon, representation of late seral stage for the Deciduous, Mixedwood, Conifer Pine Leading, Conifer White Spruce Leading and Conifer Black Spruce Leading on the gross forested landbase for the for the Original Forest Management Agreement Area will be on average 7%, 14%, 4%, 8% and 42% respectively.

Over the entire 160 year planning horizon, representation of high quality late seral stage on the operable landbase will be maintained at a minimum of 1% Deciduous, 2% Mixedwood, 1.5% Conifer Pine Leading, 0.5% Conifer White Spruce leading and 0% Conifer Black Spruce Leading.

Strategy 2.3.9:

Utilizing available Alberta Vegetation Inventory and Wildlife Species Life Requisite information complete an assessment to forecast the habitat availability throughout the life of the plan for the following Moose (***Alces alces andersoni***), American Marten (***Martes americana actuosa***), Northern Goshawk (***Accipiter gentilis atricapillus)***, Pileated Woodpecker (***Dryocopus pileatus abieticola***), and Grizzly Bear (***Ursus arctos)***,wildlife species using the Alberta Vegetation Inventory the preferred forest management strategy and its associated twenty year spatial harvest sequence.

Monitoring:

M1 - Landscape Assessment

M8 - Landscape Structural Summary Table

M12 - Wildlife Species Life Requisite Information

M14 - Stand Structure Retention Summary

M36 - Annual Harvest Summary

Objective 2.4:

Manage forestry operations to maintain habitat features of specific wildlife areas identified by Sustainable Resource Development - Fish and Wildlife Division.

Strategy 2.4.1:

Minimize fragmentation of the landscape with the single pass harvest system. The intent of the harvest system is to create a range of opening sizes from 1 hectare to 1500 hectares. This distribution of opening sizes will sustain the larger tracts of contiguous habitat required by some species while providing for species that require multiple habitat types.

Strategy 2.4.2:

In conjunction with the wildlife life requisites assessment of the Forest Management Area, analyse the Preferred Forest Management strategy for connectivity and compare to the current landbase.

Strategy 2.4.3:

Manage for high quality late seral stage representation on the Forest Management Agreement Area. Both the gross forested and operable landbase contribute to the maintenance of high quality late seral stage for each of the following cover groups: Deciduous, Mixedwood, Conifer Pine Leading, Conifer White Spruce Leading, and Conifer Black Spruce Leading

Over the entire 160 year planning horizon, representation of late seral stage for the Deciduous, Mixedwood, Conifer Pine Leading, Conifer White Spruce Leading and Conifer Black Spruce Leading on the gross forested landbase for the for the Original Forest Management Agreement Area will be on average 7%, 14%, 4%, 8% and 42% respectively.

Over the entire 160 year planning horizon, representation of high quality late seral stage on the operable landbase will be maintained at a minimum of 1% Deciduous, 2% Mixedwood, 1.5% Conifer Pine Leading, 0.5% Conifer White Spruce leading and 0% Conifer Black Spruce Leading.

Strategy 2.4.4: *(applicable to the Joint Forest Management Area)*

Strategy 2.4.5: *(applicable to the Original Forest Management Area)*

As presented in the Landscape Assessment, a River Corridor has been identified in the S19T Whitemud operating area along the Smoky and Little Smoky River. Within this identified river corridor, priority will be given to wildlife habitat values to maintain the overall habitat integrity of the major river corridors by minimizing access and fragmentation of the landscape.

Stands have been identified in the twenty year spatial harvest sequence. During development of the annual operating plan for compartments affected by the identified river corridor, the following operations tools will be utilized to address operational planning concerns and harvest operations:

- Harvest opening size;
- Temporary access only, with access controls;
- Plan operations for early winter time period;
- Retain unique stands identified by age or species (i.e. isolated white spruce patches);
- Increase stand structure retention, to modify character of block;
- Work with the Department on habitat enhancement projects where timber harvesting is the appropriate tool.

If other resource extraction activities are identified in this river corridor, Tolko Industries Ltd. will salvage the timber resource and promote the use of tree species during site reclamation activities.

Strategy 2.4.6: *(applicable to the Original Forest Management Area)*

Manage harvesting operations in the Birch Hills in the S19T- Birch Operating Area to provide high quality ungulate habitat.

Strategy 2.4.7: *(applicable to the Joint Forest Management Area)*

Monitoring:

M1 - Landscape Assessment

M8 - Landscape Structural Summary Table

M11 - Spatial Harvest Sequence Variance Table

Objective 2.5:

Manage forestry operations to maintain habitat features for species of concern.

Strategy 2.5.1:

Obtain the Federal and Provincial listing of forest dependant wildlife species. Within two years of Detailed Forest Management Plan approval, identify the known occurrences (if any) of these forest dependant species on the Forest Management Areas.

Strategy 2.5.2:

Utilizing existing information, complete an assessment within two years of Detailed Forest Management Plan approval, to determine if the habitat features for the listed forest dependant wildlife species are located on the Forest Management Agreement Area.

Strategy 2.5.3:

On an ongoing basis and in conjunction with Alberta Sustainable Resource Development investigate whether the species is utilizing the identified habitat.

Strategy 2.5.4:

Implement specified buffer zone strategy around identified trumpeter swan nesting lakes. Identified trumpeter swan nesting lakes will be verified within active operating area compartments. Any "new" identified trumpeter swan nesting lakes will be incorporated into plans (Detailed Forest Management Plans, Compartment Plans, General Development Plan and Annual Operating Plans).

Strategy 2.5.5:

Manage timing of forestry operations to minimize potential for disturbance to raptor species and colonial nesting birds during the breeding season.

Strategy 2.5.6:

Plan operations in accordance with the Boreal Caribou Committee Guidelines in any known Caribou Zone.

Monitoring:

M3 - Ground Rule Development

M13 - Species of Concern Listing

Objective 2.6:

Operate in compliance with legislation aimed at maintaining unique or rare flora and fauna.

Strategy 2.6.1:

Utilizing existing information sources (Committee on the Status of Endangered Wildlife in Canada COSEWIC, Alberta Natural History Information Centre ANHIC) obtain a listing of the Federally and Provincially endangered species. Within two years of Detailed Forest Management Plan approval, locate information identifying the known occurrences (if any) of these species on the Forest Management Areas.

Strategy 2.6.2:

Utilizing existing information in order to determine if the habitat features for these species are located on the Forest Management Agreement Area within two years of Detailed Forest Management Plan approval.

Strategy 2.6.3:

On an ongoing basis and in conjunction with Alberta Sustainable Resource Development investigate whether the species is utilizing the habitat.

Monitoring:

M3 - Ground Rule Development

M13 - Species of Concern Listing

3.3.2.3 FISH HABITAT MANAGEMENT OBJECTIVES

The management of fish populations and fish habitat is the mandate of the Federal and Provincial Governments. The involvement of forest companies is the minimization of potential impacts and the mitigation of the detrimental effects of forestry operations on the fish habitat.

Objective 2.7:

Mitigate the impacts of forestry practices on fish and fish habitat.

Strategy 2.7.1:

Meet or exceed government riparian management requirements.

Strategy 2.7.2:

Meet or exceed government watercourse crossing requirements.

Strategy 2.7.3:

Analyze watersheds using the Age Threshold Analysis to determine the percentages of area affected by harvesting activities. Plan harvest operations to ensure that a minimum of 50% of the watershed will be older than the specified threshold ages for species cover types.

Monitoring:

M3 - Ground Rule Development

M18 - Watershed Analyses Summary

M27 - Road Maintenance and Abandonment Summary

M36 - Annual Harvest Summary

3.3.2.4 NATURAL DISTURBANCE OBJECTIVES

Objective 2.8:

Develop proactive strategies to minimize the loss of fiber due to fire, insects and disease on the Forest Management Agreement Area.

Strategy 2.8.1:

Monitor and update the Alberta Vegetation Inventory changes due to occurrence of forest fires.

Strategy 2.8.2:

Promote the utilization of fire killed deciduous and coniferous timber where feasible as per Alberta Sustainable Resource Development Fire Salvage Guidelines.

Strategy 2.8.3:

Maintain forest fire protection equipment and training of Woodlands staff as per Provincial Legislation.

Strategy 2.8.4:

In the event of a large scale fire or insect or disease outbreak greater than 2.5 percent of the Forest Management Agreement Area net landbase the sustainable harvest level will be recalculated and submitted to Sustainable Resource Development for approval.

Strategy 2.8.5:

Maintain active membership within the Northwest Boreal Integrated Pest Management Working Group.

Strategy 2.8.6:

Maintain a library of forest health, insect and disease publications including identification information, annual reports, and research papers. Provide training opportunities for Woodlands staff. In the event of an outbreak Industry staff will work in conjunction with Public Lands and Forest Division staff in managing the pest or disease.

Monitoring:

M2 - Inventory and Inventory Updates

M15 - Insect and Disease Summary

M16 - Forest Fire Summary

M20 - Training and Employment Listing

M28 - Fibre Supply Table

M38 - Forest Control Plan

Objective 2.9:

Reduce the susceptibility for forest fires on the Forest Management Agreement Area

Strategy 2.9.1:

Compare twenty year spatial harvest sequence to areas identified with high fuel loading potential. These stands are to be targeted for harvest early in the twenty year spatial harvest sequence Design harvest plans in areas identified with high fuel loading potential which are the oldest and most susceptible to fire, insects and disease.

Strategy 2.9.2:

Within five years of Detailed Forest Management Plan approval, in conjunctions with Forest Protection Division participate in the development of a wildfire urban interface initiative.

Strategy 2.9.3:

Reduce the susceptibility of forest fire and fire spread potential due to slash accumulation. The tactic employed will be to "pile and burn" slash accumulations, leaving a maximum of one pile for every five hectares.

Strategy 2.9.4:

Participate in the public education forums or seminars related to fire awareness in conjunction with the Forest Protection Division.

Strategy 2.9.5:

Maintain forest fire protection equipment and training of Woodlands staff per the Forest and Prairie Protection Act and associated Regulations.

Monitoring:

M1 - Landscape Assessment

M16 – Forest Fire Summary

M30 - Public Involvement, Education and Safety Summary

M36 - Annual Harvest Summary

M38 - Forest Control Plan

Objective 2.10:

Operate in compliance with legislation aimed at limiting the introduction and spread of noxious and restricted weeds on the Forest Management Agreement Area.

The Public Lands Act indicates that disposition holders must prevent the spread of nuisance weeds, control identified patches of noxious weeds and destroy restricted weeds.

Strategy 2.10.1:

Maintain a current library of weed information. Train company staff and summer students to identify weeds.

Strategy 2.10.2:

Develop a Weed Management Plan within one year of Detailed Forest Management Plan approval which will include education, prevention, detection, monitoring and control strategies.

Strategy 2.10.3:

Continue to participate in the Weed Management Co-operatives that have been initiated by the Provincial and Municipal Governments.

Monitoring:

M20 - Training and Employment Listing

M22 - Weed Management Plan

M31 – Membership Listing

Objective 2.11:

Protect sensitive sites.

The forest companies operating in the Forest Management Agreement Area recognize the importance of protecting sites within the Forest Management Agreement Area, which may be sensitive to commercial operations, human disturbance or unnecessary exposure to increased activity.

Strategy 2.11.1:

Work with Alberta Sustainable Resource Development to identify the location of mineral licks on the Forest Management Agreement Area.

Strategy 2.11.2:

Develop and maintain a listing of trapper cabin locations on the Forest Management Agreement Area. This layer of information will be maintained as confidential information by the company and will not be released to the public.

Strategy 2.11.3:

Identify major waterbodies and watercourses within the Forest Management Agreement Area and coordinate harvest operations to mitigate impacts on those sites.

Strategy 2.11.4:

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

Monitoring:

M1 - Landscape Assessment

M7 - Stakeholder Information Listing

M20 - Training and Employment Listing

M36 - Annual Harvest Summary

3.3.2.5 ACCESS NETWORK OBJECTIVES

The creation of access networks in the Forest Management Agreement Area have the potential to remove productive land from the net landbase, create linear disturbances that fragment the forest and increase the activity by other forest users. In addition, increased activity may create effects on wildlife species movement, habitat selection and habitat use.

Objective 2.12:

Work cooperatively with other forest users to manage the quality, and quantity of access within the Forest Management Agreement Area.

Strategy 2.12.1:

Utilize existing access during field operations where practical.

Strategy 2.12.2:

Minimize the number of entries into a harvest plan area and co-ordinate annual harvesting operations through a single pass harvest system.

Strategy 2.12.3:

During the twenty year spatial harvest sequence implementation identify compartments with low harvest volumes and postpone harvest until later in the planning horizon to group proposed harvest areas and limit the access.

Strategy 2.12.4:

Reclaim all temporary roads following completion of harvesting and silviculture operations to prevent highway vehicle use.

Strategy 2.12.5:

Reduce access opportunities, maintain the productive landbase and limit wildlife harassment potential by rolling back in-block roads.

Strategy 2.12.6:

Identify the access corridors accessing different Operating Areas in the Detailed Forest Management Plan.

Strategy 2.12.7:

Develop a road inventory within one year of Detailed Forest Management Plan approval. This will include an inventory of the current roads by classification on the Forest Management Agreement Area.

Strategy 2.12.8:

Continue to work with Alberta Sustainable Resource Development Public Lands and Forests Division and stakeholders through the Annual Operating Plan referral process to identify access routes and landuse requests.

Monitoring:

M6 - Access Corridor Identification Map

M23- Detailed Road Inventory Map

M25 - Forest Road Use Agreement Summary

M27 - Road Maintenance and Abandonment Summary

3.3.3 SOCIAL OBJECTIVES

Goal #3:

To support the employment, business and public interests of the local and aboriginal communities.

Objective 3.1:

Develop strategies for the identification and protection of unique social and cultural areas.

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

Strategy 3.1.1:

Utilize the existing South Peace Heritage Model to identify the areas with high potential for heritage resources and develop appropriate management strategies for locating any existing heritage resources within these areas during the Preliminary Annual Operating Plan stage.

Strategy 3.1.2:

Utilize the existing South Peace Heritage Model to identify existing heritage resource sites and develop appropriate management strategies for protection of heritage resources during forestry operations and road building operations during the Final Annual Operating Plan stage and field operations.

Strategy 3.1.3:

Operate in compliance with the Alberta Historical Heritage Act and associated regulations.

Strategy 3.1.4:

Work with Local Aboriginal Groups to identify Traditional Landuse Areas and mitigate impacts from forestry operations in these areas.

Monitoring:

M19 - Historical Resources Summary

M30 - Public Involvement, Education and Safety Summary

Objective 3.2

Provide opportunities to involve stakeholders in forest management of the Forest Management Agreement Area.

The Company is committed to soliciting input from the public regarding the management of the Forest Management Agreement area. The input will be obtained through formal regular meetings with interested stakeholders and upon request, through informal meetings with individuals.

Strategy 3.2.1:

Continue to implement the Public Involvement Plan. Activities include: Forest Resources Advisory Committee, Detailed Forest Management Planning Team, open houses, public meetings, tours, and National Forestry Week Activities.

Strategy 3.2.2:

Continue to maintain a corporate presence in local communities.

Monitoring:

M30 - Public Involvement, Education and Safety Summary

Objective 3.3:

Promote reasonable economic opportunities with businesses within the region.

The communities adjacent to the Forest Management Agreement Area and located near the mill facilities of the Company are the direct beneficiaries of the economic activity created by the forest resource. Maintenance of existing jobs and creation of new opportunities for the local population is the mechanism for sustainable communities and growth.

Strategy 3.3.1:

Ensure local businesses, contractors and stakeholders are given reasonable consideration when relevant opportunities arise.

Monitoring:

M35 – Contractor Summary

Objective 3.4:

Recognize public interests within the Forest Management Agreement Area.

The Company is committed to soliciting input from the public regarding their interests within the Forest Management Agreement Area. These inputs will be considered in the forest management activities.

Strategy 3.4.1:

Continue to implement the Public Involvement Plan. Activities include: Forest Resources Advisory Committee, Detailed Forest Management Planning Team, open houses, public meetings, tours, and National Forestry Week Activities.

Monitoring:

M30 - Public Involvement, Education and Safety Summary

Objective 3.5:

Explore research opportunities with industry partners, education institutions, government departments and independent research organizations.

The company recognizes the need to identify gaps in the scientific knowledge base, which would permit informed decision making regarding the management of the forest resource. The acquisition of this information is the basis for adaptive forest management.

Strategy 3.5.1:

Continue to maintain memberships in organizations representing the forest industry and conducting research activities.

Strategy 3.5.2: *(applicable to the Original Forest Management Area)*

Maintain a fund of $0.25 per cubic meter, as per section 32(2) of the Original Forest Management Agreement "to enhance the management activities and level of understanding of the forest resources and forest products within the forest management area."

Strategy 3.5.3: *(applicable to the Joint Forest Management Area)*

Monitoring:

M31 – Membership Listing

M34 – Research and Education Fund Summary

3.3.4 PUBLIC INVOLVEMENT OBJECTIVES

Goal #4:

Create and maintain an open consultative environment for the communication of information and the resolution of issues.

The Company 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 horizon. The company will communicate openly with the public, using local public advisory committees and other forums, regarding the management of the Forest Management Agreement Area.

Objective 4.1:

Encourage public and aboriginal involvement during the development of strategic directions and site specific forest management initiatives.

The company is committed to soliciting input from the public regarding the management of the Forest Management Agreement Area. The input will be obtained through formal regular meetings with interested stakeholders and upon request, through informal meeting with individuals.

Strategy 4.1.1:

Continue to implement the Public Involvement Plan. Activities include: Forest Resources Advisory Committee, Detailed Forest Management Planning Team, Open houses, public meetings, tours, and National Forestry Week Activities.

Strategy 4.1.2:

Continue to support the Lesser Slave and Mackenzie Forest Education Societies.

Monitoring:

M30 - Public Involvement, Education and Safety Summary

M31 – Membership Listing

Objective 4.2:

Provide opportunities to increase public knowledge and awareness of forestry.

The Company is committed to educating the public in the field of forestry to promote informed discussion.

Strategy 4.2.1:

Continue to implement the Public Involvement Plan. Activities include: Forest Resources Advisory Committee, Detailed Forest Management Planning Team, Open houses, public meetings, tours, and National Forestry Week Activities.

Strategy 4.2.2:

Continue to support the Lesser Slave and Mackenzie Forest Education Societies.

Monitoring

M30 - Public Involvement, Education and Safety Summary

M31 – Membership Listing

3.3.5 ECONOMIC OBJECTIVES

Goal #5:

Ensure the viability of a timber resource based investment and the economic well-being of timber based communities relating to the Forest Management Area.

The companies operating in the Forest Management Agreement Area contribute a significant portion of the economic base for the communities in and around the Forest Management Agreement Area. These local communities have strong ties to the forest resource and the economics generated from the forest landbase. Economic stability of these communities is important to the Company and is considered in the Detailed Forest Management Plan process.

Objective 5.1:

Maintain or enhance the currently allocated timber resource for tenure holders.

The Tolko Original Forest Management Agreement states that the Detailed Forest Management Plan shall "follow sound forestry practices, including landscape elements, in managing the landbase for the purpose of achieving and maintaining a perpetual sustained timber yield from the productive forest land base without reducing the productivity of the land." Section 9.

The strategies employed in the timber supply analysis provided in the Original Detailed Forest Management Plans is consistent with the intent of the Forest Management Agreement document.

Strategy 5.1.1:

Maintain or enhance coniferous and deciduous sustainable harvest level. By conversion of low (AB) density stands to full stocking during the life of the plan.

Strategy 5.1.2:

Harvest according to the calculated deciduous and coniferous sustainable harvest level.

Strategy 5.1.3:

Track and report fibre drain from the Forest Management Agreement Area annually.

Strategy 5.1.4:

Collect information and report on the harvested yields for conifer and deciduous harvest areas to validate yield curves. Report of the information to be summarized in the five year stewardship report.

Strategy 5.1.5:

Apply information collected from implementation of the approved Growth and Yield Program to validate the yield curves.

Strategy 5.1.6: *(applicable to the Original Forest Management Area)*

Ensure both conifer and deciduous Timber Damages Assessment (TDA) dollars are collected from the Original Forest Management Agreement Area. Apply Timber Damages Assessment money collected to offset damage to improvements, to replace timber resource and to re-establish commercial tree species.

Strategy 5.1.7: *(applicable to the Joint Forest Management Area)*

Strategy 5.1.8: *(applicable to the Original Forest Management Area)*

There has been a small amount of area designated as potentially productive on the landbase. Approximately 33 hectares on the Original Forest Management Agreement Area. The main category of potential productive land has been defined in the Net Landbase document as a polygon which has been burned since the AVI, and is not already identified in the netdown field or has not already been identified as an update harvest area. These areas will be evaluated to determine the opportunity of returning the area to the net productive landbase via aforestation.

Strategy 5.1.9: *(applicable to the Joint Forest Management Area)*

Strategy 5.1.10:

Work with the local MTU program and Sustainable Resource Development to maintain their traditional areas as much as possible.

Monitoring:

M17 - Landuse Summary

M21 - Growth and Yield Activity Summary

M28 - Fibre Supply Table

M29 - Annual Landuse Summary

M30 - Public Involvement, Education and Safety Summary

M36 - Annual Harvest Summary

M37 - Annual Silviculture Summary

Objective 5.2:

Develop an optimal balance of logging and hauling operations throughout the Forest Management Agreement Area to minimize delivered wood costs.

The company strives to be the low cost producers in oriented strand board, to maintain or enhance their long-term competitiveness. This ability to remain competitive provides long-term stability for the local and regional economies. 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. These initiatives will provide greater flexibility in all phases of operations.

Strategy 5.2.1:

Develop a twenty year spatial harvest sequence that allows for flexibility in forest planning, production and delivery schedules between deciduous and coniferous tenure holders by submission of the plan.

Strategy 5.2.2:

Allow for the switching of areas between the 1-10 year portion and the 11-20 year portions of the twenty year spatial harvest sequence through flexibility built into the twenty year spatial harvest sequence. The stands must be from the same strata (Deciduous, Conifer, and Mixedwood) and equivalent size (hectares).

Strategy 5.2.3: *(applicable to the Joint Forest Management Area)*

Strategy 5.2.4: *(applicable to the Original Forest Management Area)*

Implementation of single pass harvest system based on a single timber supply unit for the deciduous AAC and a conifer AAC for each operating area has been identified as the preferred forest management strategy to facilitate the consolidation of harvest operations and realize significant cost efficiencies.

Strategy 5.2.5:

Forest companies will submit integrated annual operating plans.

Monitoring:

M11 - Spatial Harvest Sequence Variance Table

M26 - Integrated Harvest Summary

Objective 5.3:

Harvest under sustainable forest management principles.

By the company harvesting at sustainable harvest levels they ensure the security of their fibre supply which is paramount to the mills existence and its contribution to the communities.

Strategy 5.3.1:

Harvest according to the calculated deciduous and coniferous sustainable harvest level.

Monitoring:

M28 – Fibre Supply Table

Objective 5.4:

Investigate opportunities to utilize wood from agricultural clearing activities.

The company realizes that by utilizing the timber from agriculture activity they are benefiting from an alternate fibre supply as well as providing an economic benefit to the communities.

Strategy 5.4.1:

Continue to maintain a fair and equitable purchase wood program to fully utilize the timber that is available on the open market, private land or agricultural clearing.

Strategy 5.4.2:

Develop and maintain a list of potential land clearing opportunities throughout the life of the plan.

Monitoring:

M28 – Fibre Supply Table

Objective 5.5

Develop a Deciduous private land woodlot program.

The company realizes that by utilizing the timber from agriculture activity they are benefiting from an alternate fibre supply as well as providing an economic benefit to the communities. Land owners are receiving economic benefit from a resource that was previously under utilized or destroyed.

Strategy 5.5.1:

Identify a woodlands person to be a liaison officer.

Strategy 5.5.2:

Develop and maintain a list of potentially interested parties throughout the life of the plan.

Strategy 5.5.3:

Develop a woodlot program as suitable opportunities are available.

Strategy 5.5.4:

Continue to promote the creation of forest woodlots within the vicinity of the Forest Management Agreement Area and participate in the development of white area forest development strategies.

Monitoring:

M33 - Woodlot Summary

Objective 5.6:

Continue integration of Company and Quota holder planning and operations with a spirit of trust, cooperation and open communication.

Strategy 5.6.1:

Develop a twenty year spatial harvest sequence that allows for flexibility in forest planning, production and delivery schedules between deciduous and coniferous tenure holders. Efficiency dictates that the twenty year spatial harvest sequence allows some degree of variability.

Strategy 5.6.2:

Allow for flow of information between companies.

Strategy 5.6.3: *(applicable to the Joint Forest Management Area)*

Strategy 5.6.4: *(applicable to the Original Forest Management Area)*

Operate the Original Forest Management Agreement Area as a single sustainable timber supply unit for the deciduous and coniferous landbase (single landbase). The deciduous harvest level will be calculated and a twenty year spatial harvest sequence developed for the Forest Management Agreement Area as a whole. The coniferous harvest level will be calculated and summarized by operating area.

Monitoring:

M5 - Information Exchange

M11 - Spatial Harvest Sequence Variance Table

M26 - Integrated Harvest Summary

3.3.6 OTHER RESOURCE USER OBJECTIVES

Goal #6:

To cooperate with other commercial and non commercial users of the Forest Management Area.

Forestry operations can and will have varying impacts on the other users of the Forest Management Agreement Area. Tolko Industries Ltd. together with the forest industry, recognize the need to develop objectives and strategies to identify and work together with other forest users to mitigate the impact of forestry operations and the cumulative effects.

Objective 6.1:

Plan and operate in co-existence with hunting, fishing, guiding, trapping and where appropriate grazing.

Strategy 6.1.1:

Develop and maintain a listing of Trapping License holders on the Forest Management Agreement Area to be completed by submission of the Detailed Forest Management Plan.

Strategy 6.1.2:

Develop and maintain a listing of Trapper Cabin Locations on the Forest Management Agreement Area to be completed by submission of the Detailed Forest Management Plan. This layer of information will be maintained as confidential information by the company and will not be released to the public.

Strategy 6.1.3:

Complete analysis of the impacts to trapping licenses from a single pass, single landbase harvest system by submission of the Detailed Forest Management Plan.

Strategy 6.1.4:

Develop and maintain a listing of Active Guide Outfitters on the Forest Management Agreement Area to be completed by submission of the Detailed Forest Management Plan.

Strategy 6.1.5:

Develop and maintain a listing of Grazing Lease and License holders on the Forest Management Agreement Area to be completed by submission of the Detailed Forest Management Plan.

Strategy 6.1.6:

Continue to participate in the Northwest Boreal Grazing group to facilitate cooperation between forest company and grazing lease holders.

Strategy 6.1.7:

Provide notifications regarding harvesting and silviculture operations to appropriate stakeholders annually.

Strategy 6.1.8:

Address any concerns or comments raised by stakeholders and maintain record of communications as they occur.

Monitoring:

M7 - Stakeholder Information Listing

M30 - Public Involvement, Education and Safety Summary

M31 – Membership Listing

Objective 6.2:

Promote the integration of utility companies, oil and gas industry and forest industry activities on the Forest Management Agreement Area.

Forestry industry, utility companies and oil and gas activities on the Forest Management Agreement Area have resulted in fragmentation becoming more prevalent on the landscape. The intent of promoting the integration of industry activities is to reduce the occurrence of forest fragmentation. Forest fragmentation also occurs naturally as a result of disturbances or by permanent landscape features.

Strategy 6.2.1:

Utilize the current request for withdrawal notification process for landuse dispositions to promote use of common corridors, existing access and salvage of merchantable timber.

Strategy 6.2.2:

Update Forest Inventory Layer for tracking of disturbances from the utility companies and the oil and gas sector. The planned activities are loaded spatially through the Timber Damages Assessment process. Annually these planned activities are incorporated into the Annual Operating Plans. Confirmation of these planned activities is confirmed through the AVI inventory Update process.

Strategy 6.2.3:

Notify Quota holders of salvage opportunities as they are identified through the request for withdrawal notification process.

Strategy 6.2.4:

Create and maintain a listing of oil and gas companies on the Forest Management Agreement Area to be completed by submission of the Detailed Forest Management Plan.

Strategy 6.2.5:

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

Monitoring:

M2 - Inventory and Inventory Updates

M5 - Information Exchange

M7 - Stakeholder Information Listing

M29 - Annual Landuse Summary

Objective 6.3:

Plan and operate in co-existence with non commercial stakeholders.

Forestry operations can and will have varying impacts on the other users of the Forest Management Agreement Area. Tolko Industries Ltd. and the forest industry recognize the need to develop strategies to mitigate the impact of forestry operations on those forest users.

Strategy 6.3.1:

Develop and maintain a listing of non commercial stakeholders on the Forest Management Agreement Area by submission of the Detailed Forest Management Plan.

Strategy 6.3.2:

Continue to provide notifications regarding harvesting and silviculture operations to appropriate stakeholders.

Strategy 6.3.3:

Address any concerns or comments raised by stakeholders and maintain record of communications.

Strategy 6.3.4:

Identify any current or pending recreation opportunities within the Forest Management Agreement Area within one year of Detailed Forest Management Plan approval.

Monitoring:

M7 - Stakeholder Information Listing

M30 - Public Involvement, Education and Safety Summary

Objective 6.4:

Work with stakeholders and Government to enhance public safety.

The company recognizes the need for a public safety program, especially during the intensive winter log haul program when there is the potential for interaction between the log haul fleet and public users of the road network.

Strategy 6.4.1:

Continue to participate in AFPA Log haul sub committee.

Strategy 6.4.2:

Continue a Log Haul Weight and Safety monitoring program. Including log haul commencement notification, incident investigations and corrective action recommendations.

Strategy 6.4.3:

Continue to work with local school boards on school bus safety during log haul.

Strategy 6.4.4:

Place signage in areas with active operations.

Monitoring:

M30 - Public Involvement, Education and Safety Summary

M31 – Membership Listing

M32 – Log Haul Summary

DFMP

4.0

Fibre Supply Analysis

4.0 FIBRE SUPPLY ANALYSIS

4.1 SOURCE INFORMATION

4.1.1 ALBERTA VEGETATION INVENTORY

Medium scale (1:15,000) "leaf-on", black and white panchromatic air photo coverage was obtained for Tolko's entire FMA between 1995 and 1997. The stratification of forested and non-forested lands was completed in accordance with AVI standards version 2.1.

Small scale (1:60,000) "leaf-on", black and white panchromatic air photo coverage was obtained for Tolko's entire FMA in 1996. New, digital orthophotos were produced by the Orthoshop Ltd. (Calgary) from the 1:60,000 photos (in combination with 50 metre digital elevation model data). Data stratified on the aerial photography was transferred to these orthophotos, digitized and attribute data of each polygon entered into a database. Throughout the various processes strict quality control measures were implemented.

4.1.2 INVENTORY UPDATES

Cutblock update boundaries were acquired from 2000 / 2001 aerial photography.

Boundaries of recent fires (post-inventory), up to the end of the 2001/2002 fire year, were also acquired from the Land and Forest Division of Alberta Sustainable Resource Development (SRD) and incorporated into the analysis.

The Timber Damage Assessment area coverage was also updated to reflect the landuse disturbance as of October 2002.

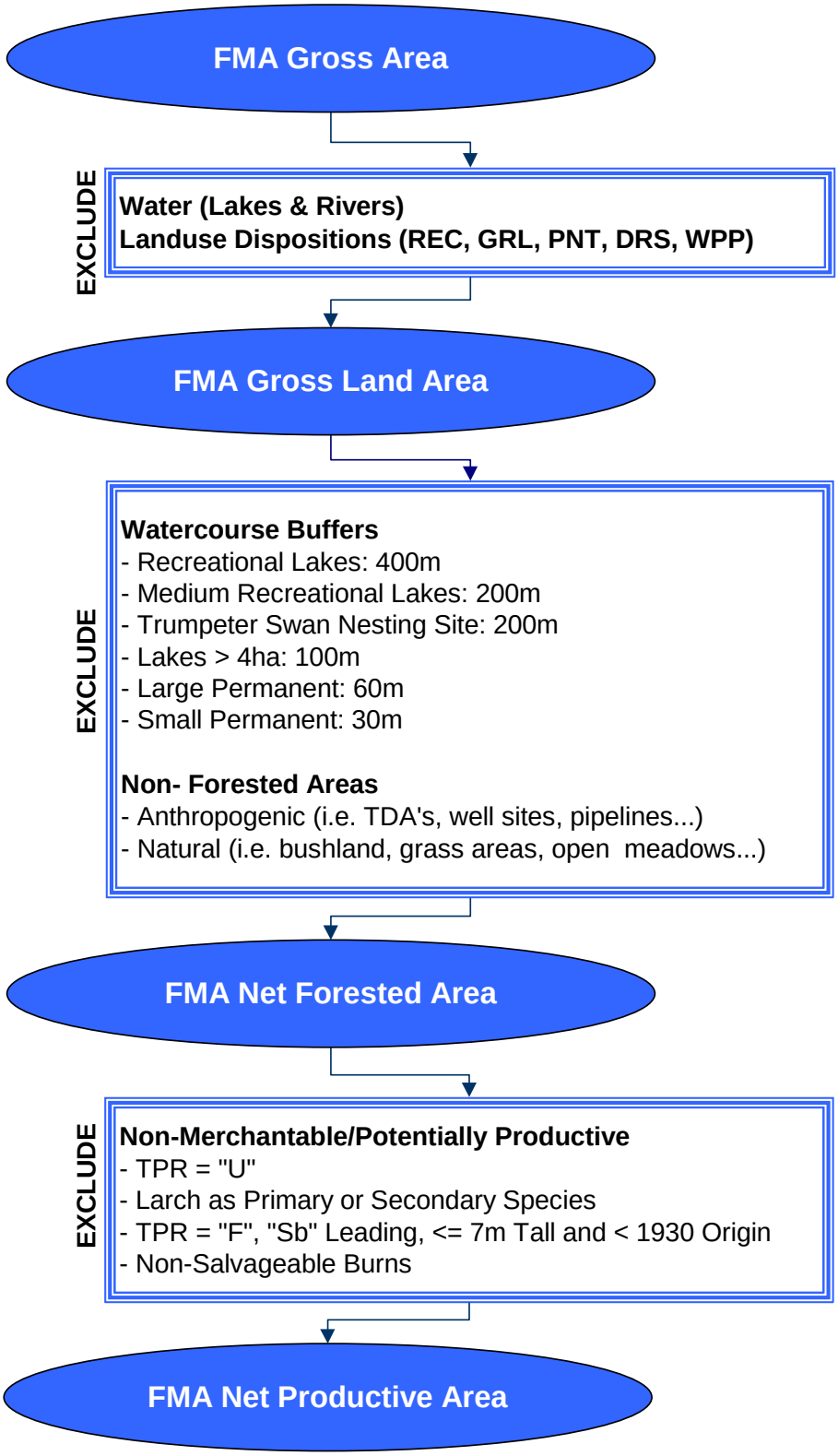
4.2 NET LANDBASE DETERMINATION

This section briefly describes the process used to netdown the Tolko FMA area. A more detailed description of the netdown process can be found in the "Net Landbase Determination" (April 30, 2003) document.

4.2.1 GROSS LANDBASE

The extent of the landbase under consideration for Tolko includes FMU S19T with a gross area of 273,425 ha. Figure 4-1 outlines the approach taken to determine the net productive landbase. The FMA wide map illustrating the landbase categories derived from the netdown procedures is presented on Map 4-1 (full size maps can be found in Appendix H, Map H-3). The FMA wide species group and age class distribution within net productive area map is presented on Map 4-2 of this document (full size maps can be found in Appendix H, Map H-4).

FIGURE 4-1: PRODUCTIVE FOREST CLASSIFICATION PROCEDURES



MAP 4-1: LANDBASE CATEGORIES

MAP 4-2: SPECIES GROUP AND AGE CLASS DISTRIBUTION WITHIN NET PRODUCTIVE AREA

4.2.2 COMPARTMENTALIZATION

Tolko's FMA area is organized into four operating areas: Birch, Whitemud, Salt and Utikuma. Each operating area is further divided into various compartments. Map 4-3 illustrates the FMA's compartmentalization (full size maps can be found in Appendix H, Map H-5).

The area for each landbase category is presented for the entire FMA and for each operating area in Table 4-1 to Table 4-5. The net landbase age class distribution by overstorey species group is presented in Figure 4-2 to Figure 4-6.

MAP 4-3: COMPARTMENT AND OPERATING AREA BOUNDARIES

TABLE 4-1: LANDBASE SUMMARY: ENTIRE FMA

Landbase Category	Area (ha)	Percent of Gross Area
Gross Area	**273,425**	**100.0**
♦ Water	7,909	2.9
♦ Landuse Dispositions (GRL, REC, WPP and DRS)	18,889	6.9
Gross FMA Land Area	**246,627**	**90.2**
Watercourse Buffers		
♦ Recreational Lake Buffers (400m)	66	0.0
♦ Trumpeter Swan Lake Buffers (200m)	370	0.1
♦ Medium Recreational Lake Buffer (200m)	1,462	0.5
♦ Lake Buffers (100m)	5,354	2.0
♦ Large Permanent Buffers (60m)	4,311	1.6
♦ Small Permanent Buffers (30m)	5,541	2.0
Sub-Total	*17,103*	*6.3*
Non-Forested		
♦ Anthropogenic	3,945	1.4
♦ Natural	14,233	5.2
Sub-Total	*18,179*	*6.6*
Net Forested Area	**211,345**	**77.3**
Non-Merchantable		
♦ TPR = "U"	34,382	12.6
♦ Larch Leading	13,260	4.8
♦ Low Productivity SB Stands	7,018	2.6
Sub-Total	*54,661*	*20.0*
Potentially Productive		
♦ Non-Salvageable Burns	33	0.0
Sub-Total	*33*	*0.0*
Net Productive Area	**156,651**	**57.3**

FIGURE 4-2: NET LANDBASE AGE CLASS DISTRIBUTION BY LEADING SPECIES GROUP: ENTIRE FMA

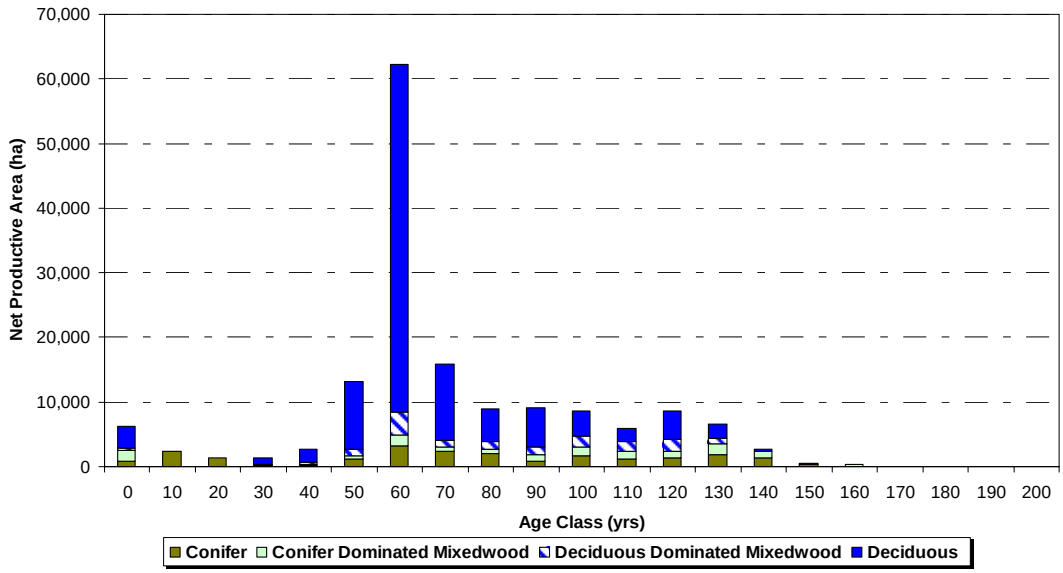


TABLE 4-2: LANDBASE SUMMARY: BIRCH OPERATING AREA

Landbase Category	Area (ha)	Percent of Gross Area
Gross Area	**10,330**	**100.0**
♦ Water	17	0.2
♦ Landuse Dispositions (GRL, REC, WPP and DRS)	1,628	15.8
Gross FMA Land Area	**8,685**	**84.1**
Watercourse Buffers		
♦ Recreational Lake Buffers (400m)	0	0.0
♦ Trumpeter Swan Lake Buffers (200m)	0	0.0
♦ Medium Recreational Lake Buffer (200m)	0	0.0
♦ Lake Buffers (100m)	10	0.1
♦ Large Permanent Buffers (60m)	0	0.0
♦ Small Permanent Buffers (30m)	124	1.2
Sub-Total	*134*	*1.3*
Non-Forested		
♦ Anthropogenic	123	1.2
♦ Natural	179	1.7
Sub-Total	*303*	*2.9*
Net Forested Area	**8,248**	**79.8**
Non-Merchantable		
♦ TPR = "U"	105	1.0
♦ Larch Leading	0	0.0
♦ Low Productivity SB Stands	22	0.2
Sub-Total	*127*	*1.2*
Potentially Productive		
♦ Non-Salvageable Burns	0	0.0
Sub-Total	*0*	*0.0*
Net Productive Area	**8,121**	**78.6**

FIGURE 4-3: NET LANDBASE AGE CLASS DISTRIBUTION BY LEADING SPECIES GROUP: BIRCH OPERATING AREA

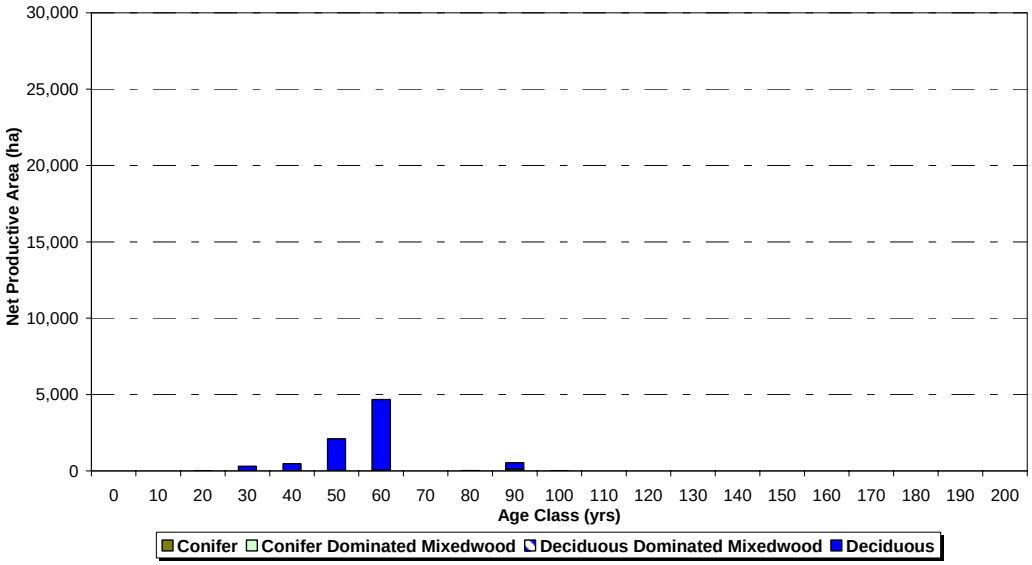


TABLE 4-3: LANDBASE SUMMARY: WHITEMUD OPERATING AREA

Landbase Category	Area (ha)	Percent of Gross Area
Gross Area	**69,095**	**100.0**
♦ Water	907	1.3
♦ Landuse Dispositions (GRL, REC, WPP and DRS)	16,589	24.0
Gross FMA Land Area	**51,599**	**74.7**
Watercourse Buffers		
♦ Recreational Lake Buffers (400m)	0	0.0
♦ Trumpeter Swan Lake Buffers (200m)	181	0.3
♦ Medium Recreational Lake Buffer (200m)	0	0.0
♦ Lake Buffers (100m)	778	1.1
♦ Large Permanent Buffers (60m)	1,403	2.0
♦ Small Permanent Buffers (30m)	1,107	1.6
Sub-Total	*3,468*	*5.0*
Non-Forested		
♦ Anthropogenic	197	0.3
♦ Natural	4,141	6.0
Sub-Total	*4,337*	*6.3*
Net Forested Area	**43,794**	**63.4**
Non-Merchantable		
♦ TPR = "U"	1,604	2.3
♦ Larch Leading	1,025	1.5
♦ Low Productivity SB Stands	285	0.4
Sub-Total	*2,914*	*4.2*
Potentially Productive		
♦ Non-Salvageable Burns	0	0.0
Sub-Total	*0*	*0.0*
Net Productive Area	**40,880**	**59.2**

FIGURE 4-4: NET LANDBASE AGE CLASS DISTRIBUTION BY LEADING SPECIES GROUP: WHITEMUD OPERATING AREA

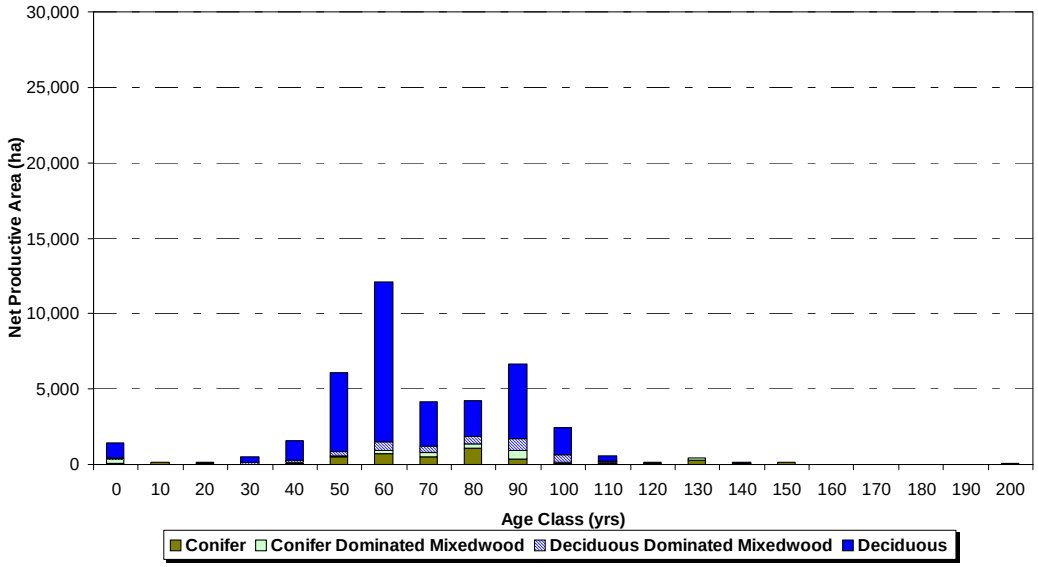


TABLE 4-4: LANDBASE SUMMARY: SALT OPERATING AREA

Landbase Category	Area (ha)	Percent of Gross Area
Gross Area	**49,032**	**100.0**
♦ Water	529	1.1
♦ Landuse Dispositions (GRL, REC, WPP and DRS)	606	1.2
Gross FMA Land Area	**47,897**	**97.7**
Watercourse Buffers		
♦ Recreational Lake Buffers (400m)	66	0.1
♦ Trumpeter Swan Lake Buffers (200m)	0	0.0
♦ Medium Recreational Lake Buffer (200m)	0	0.0
♦ Lake Buffers (100m)	1,282	2.6
♦ Large Permanent Buffers (60m)	874	1.8
♦ Small Permanent Buffers (30m)	1,327	2.7
Sub-Total	*3,549*	*7.2*
Non-Forested		
♦ Anthropogenic	552	1.1
♦ Natural	1,639	3.3
Sub-Total	*2,192*	*4.5*
Net Forested Area	**42,156**	**86.0**
Non-Merchantable		
♦ TPR = "U"	3,843	7.8
♦ Larch Leading	983	2.0
♦ Low Productivity SB Stands	1,370	2.8
Sub-Total	*6,196*	*12.6*
Potentially Productive		
♦ Non-Salvageable Burns	0	0.0
Sub-Total	*0*	*0.0*
Net Productive Area	**35,961**	**73.3**

FIGURE 4-5: NET LANDBASE AGE CLASS DISTRIBUTION BY LEADING SPECIES GROUP: SALT OPERATING AREA

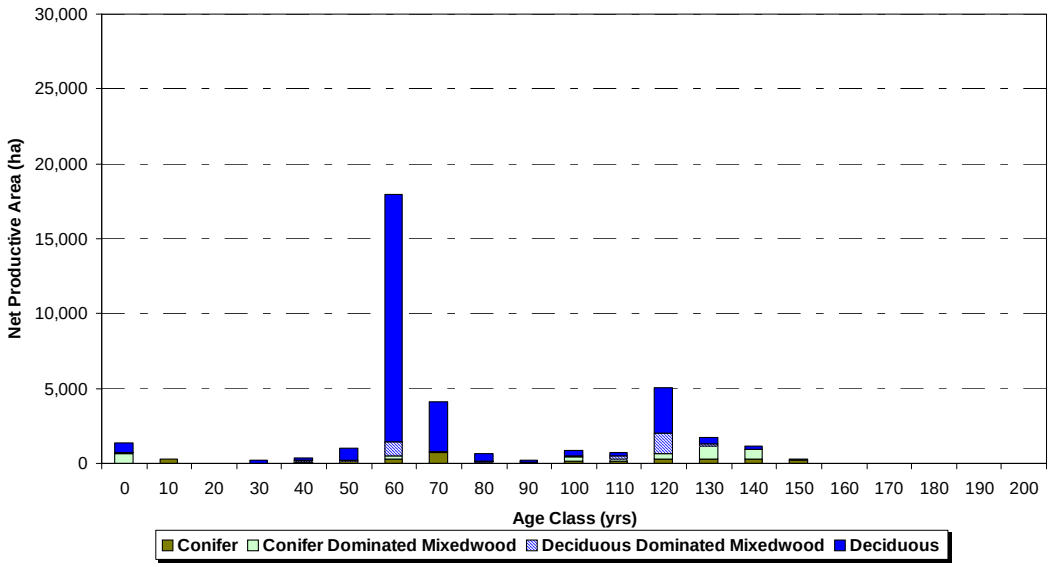
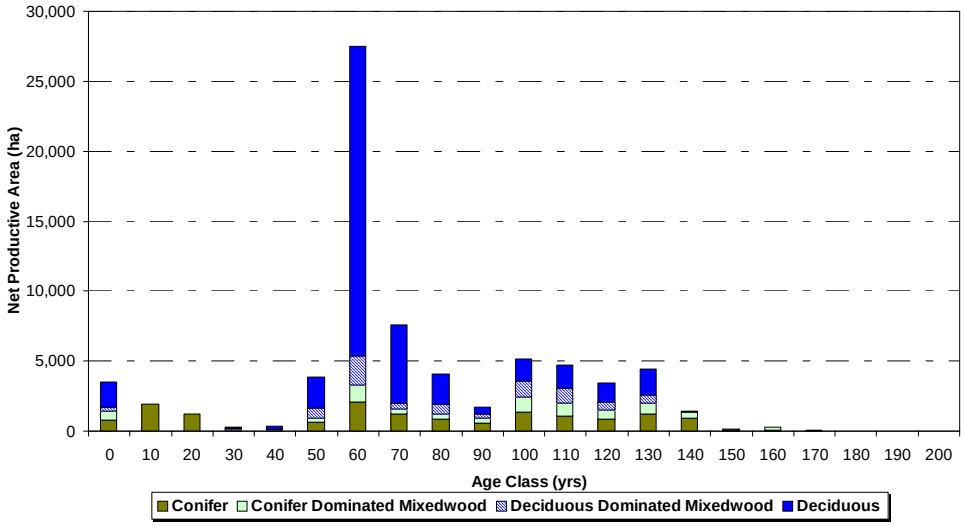


TABLE 4-5: LANDBASE SUMMARY: UTIKUMA OPERATING AREA

Landbase Category	Area (ha)	Percent of Gross Area
Gross Area	**144,969**	**100.0**
♦ Water	6,455	4.5
♦ Landuse Dispositions (GRL, REC, WPP and DRS)	67	0.0
Gross FMA Land Area	**138,447**	**95.5**
Watercourse Buffers		
♦ Recreational Lake Buffers (400m)	0	0.0
♦ Trumpeter Swan Lake Buffers (200m)	189	0.1
♦ Medium Recreational Lake Buffer (200m)	1,462	1.0
♦ Lake Buffers (100m)	3,284	2.3
♦ Large Permanent Buffers (60m)	2,035	1.4
♦ Small Permanent Buffers (30m)	2,984	2.1
Sub-Total	*9,953*	*6.9*
Non-Forested		
♦ Anthropogenic	3,073	2.1
♦ Natural	8,274	5.7
Sub-Total	*11,347*	*7.8*
Net Forested Area	**117,147**	**80.8**
Non-Merchantable		
♦ TPR = "U"	28,830	19.9
♦ Larch Leading	11,252	7.8
♦ Low Productivity SB Stands	5,341	3.7
Sub-Total	*45,424*	*31.3*
Potentially Productive		
♦ Non-Salvageable Burns	33	0.0
Sub-Total	*33*	*0.0*
Net Productive Area	**71,689**	**49.5**

FIGURE 4-6: NET LANDBASE AGE CLASS DISTRIBUTION BY LEADING SPECIES GROUP: UTIKUMA OPERATING AREA



4.3 GROWTH AND YIELD

The following section provides an overview of the growth and yield analysis for the Tolko FMA area and the Tolko and Buchanan Joint FMA area. A more detailed description of the methods used in predicting volume estimates can be found in the "Yield Curve Development" (August 30, 2003) document.

4.3.1 YIELD CURVE STRATIFICATION

The following predictors of yields were examined as possible classes for yield curve stratification:

- Natural sub-region (NSR, NSR_NAME);
- Species group (SPGRP);
- Crown closure (CROWN);
- Leading species (SP1);
- Timber Productivity Rating (TPR).

These predictors were examined in age ranges where the most plot data was available so that the greatest amount of supporting evidence was available for stratifying or not stratifying by the examined property. These age classes would also have the most influence on the resulting yield curves because of the plot-based methodology that would be used to fit the yield curves. If statistical differences were exhibited in these age classes statistical differences would also most likely be evident in the resulting yield curves.

These predictors were also examined by holding all other variables constant. For example when testing for significant differences in volume between crown closure classes, the species group, leading species, natural sub-region and TPR were held constant.

Although management objectives do play a certain role in yield curve stratification, significance testing was used for determining yield curve stratification because it would predict yield curve volumes that would be closer to the actual volumes harvested.

Figure 4-7 provides a detailed description of the yield strata assignments showing the number of plots and net landbase area for each yield stratum class.

Figure 4-8 and Figure 4-9 contain the final proposed yield curves for the conifer and deciduous strata.

FIGURE 4-7: YIELD CURVE DEVELOPMENT

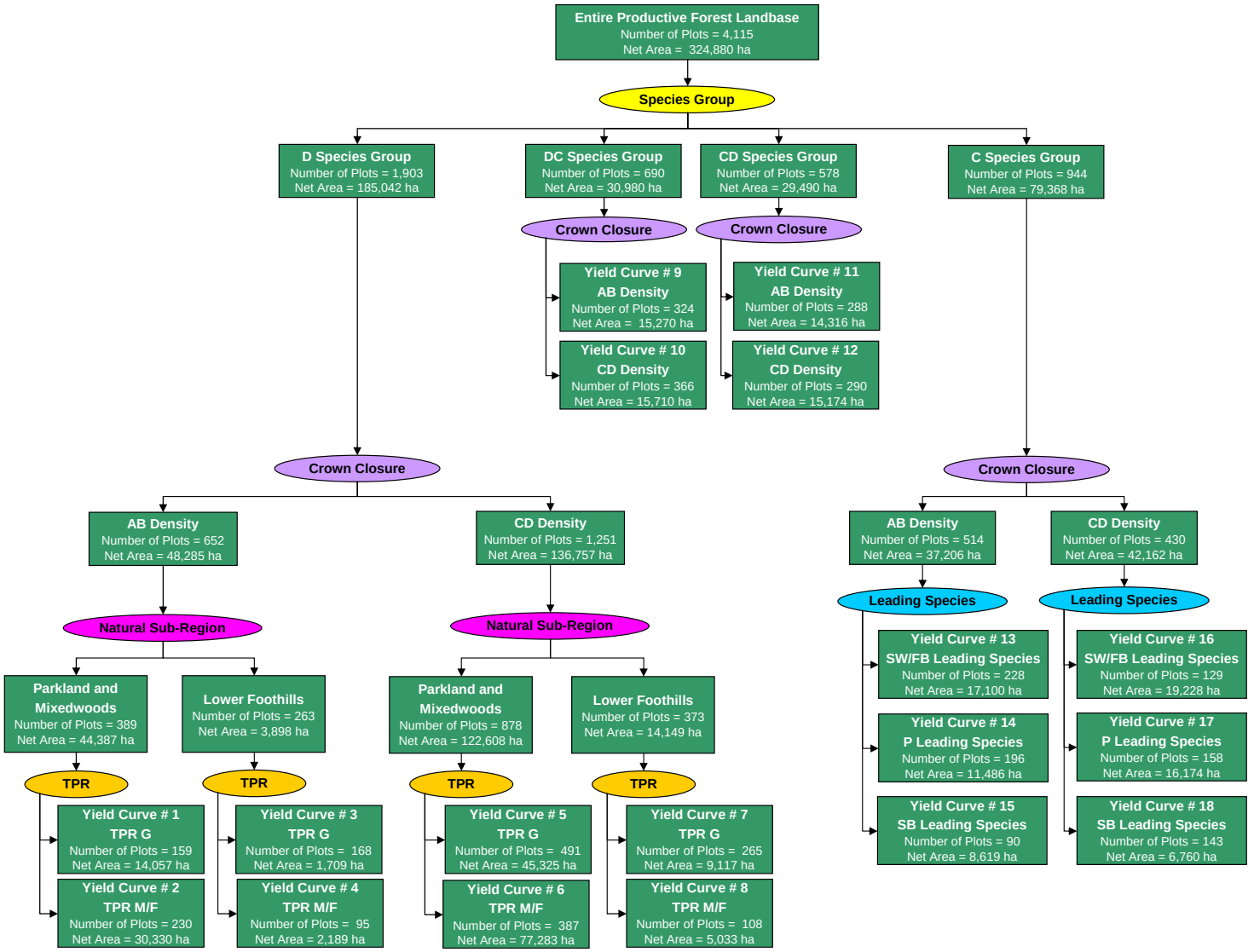
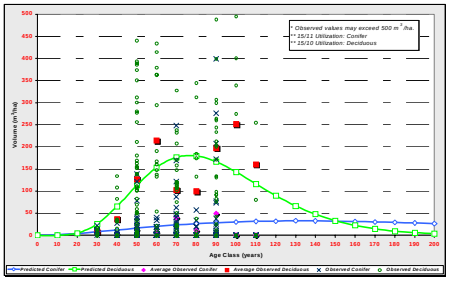
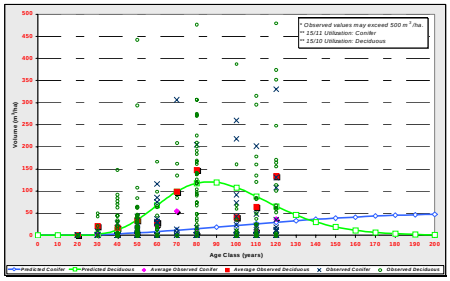


FIGURE 4-8: YIELD CURVES – AB CROWN CLOSURE

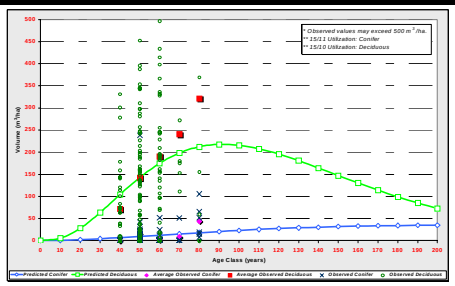
MX-AB-D-A-G



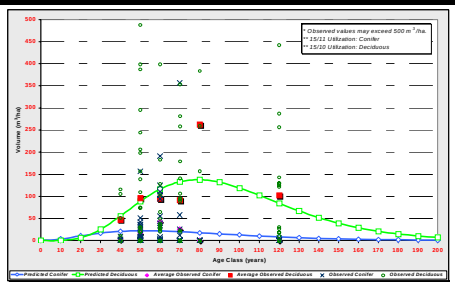
MX-AB-D-A-MF



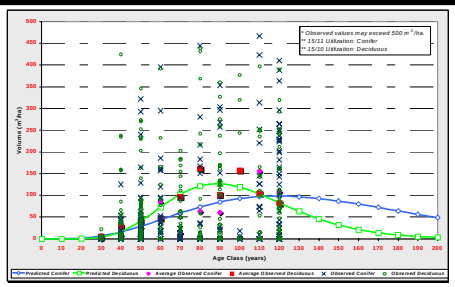
FH-AB-D-A-G



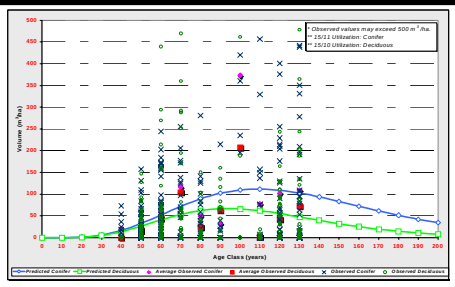
FH-AB-D-MF



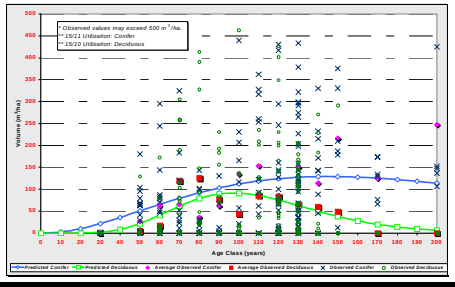
A-AB-DC-A-A



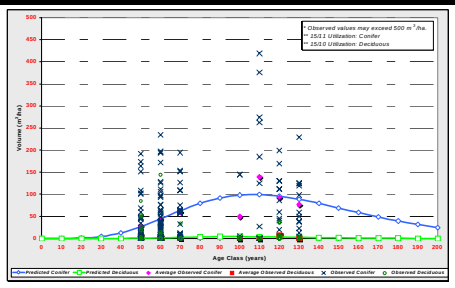
A-AB-CD-A-A



A-AB-C-SW-A



A-AB-C-P-A



A-AB-C-SB-A

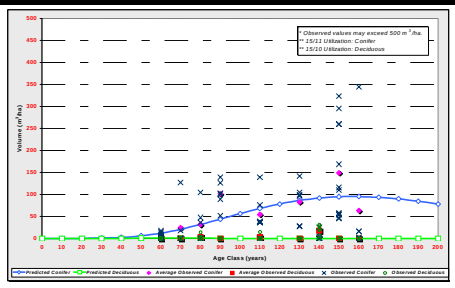
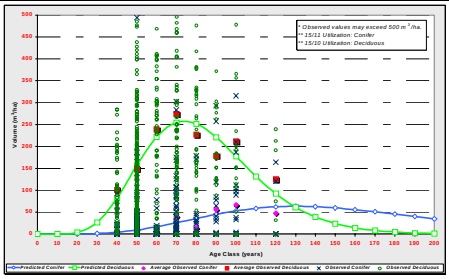
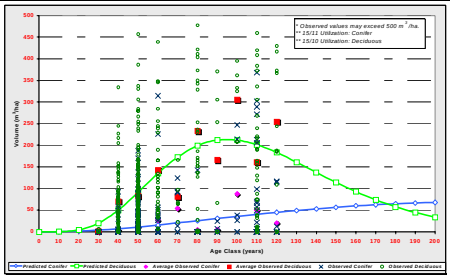


FIGURE 4-9: YIELD CURVES – CD CROWN CLOSURE

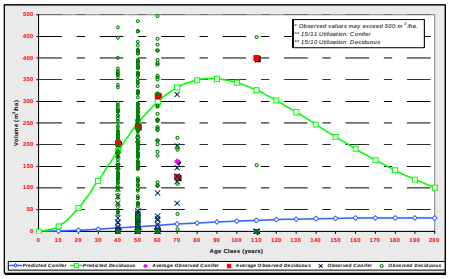
MX-CD-D-A-G



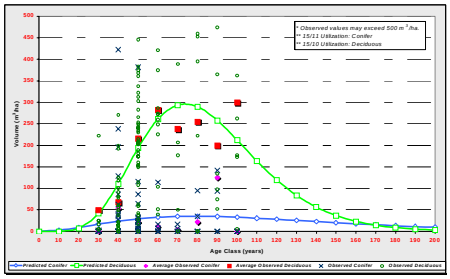
MX-CD-D-A-MF



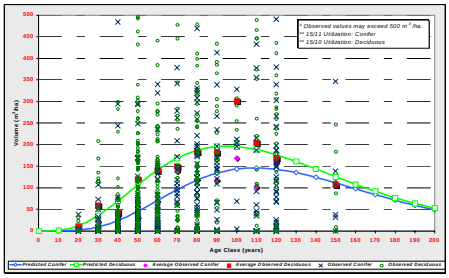
FH-CD-D-A-G



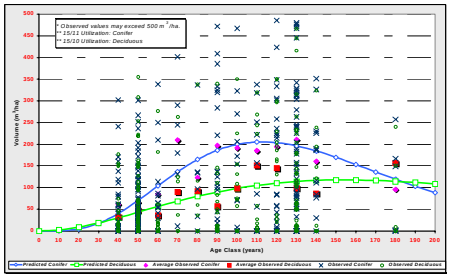
FH-CD-D-MF



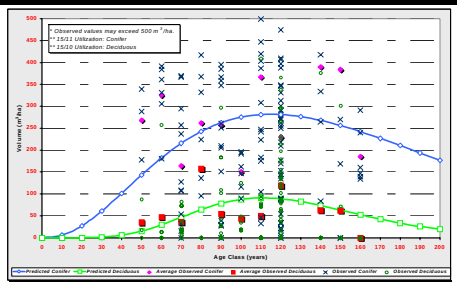
A-CD-DC-A-A



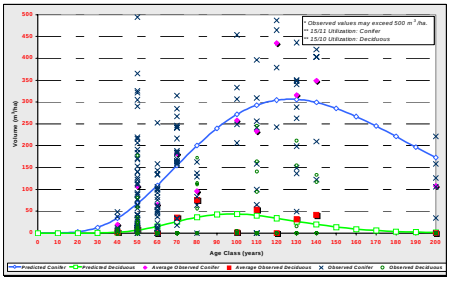
A-CD-CD-A-A



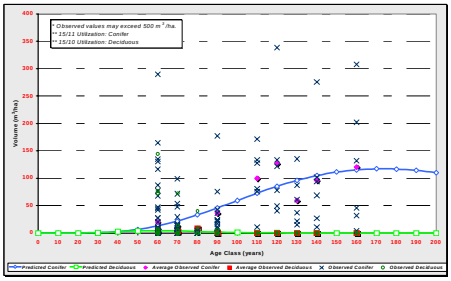
A-CD-C-SW-A



A-CD-C-P-A



A-CD-C-SB-A



4.3.2 CULL DEDUCTIONS

Cull deductions were not applied during the yield curve development. The following cull deductions were applied to the yield curves during the timber supply analysis:

- 2% conifer cull deduction (derived from the provincial average);
- 10% deciduous cull deduction (derived from Tolko's historical scale data).

4.3.3 YIELD STRATA TRANSITION

Stands were assumed to regenerate on the fully stocked yield curve (i.e. AB density regenerates to CD density) with the same species composition and TPR. The yield curve transition is demonstrated in Table 4-6.

TABLE 4-6: YIELD CURVE TRANSITION

NATURAL SUBREGION	CROWN CLOSURE	SPECIES GROUP	LEADING SPECIES	TPR	YIELD CURVE STRATA	TRANSITION CURVE STRATA
1 or 2 or 15	A or B	D	ALL	G	MX-AB-D-A-G	MX-CD-D-A-G
1 or 2 or 15	A or B	D	ALL	M or F	MX-AB-D-A-MF	MX-CD-D-A-MF
11	A or B	D	ALL	G	FH-AB-D-A-G	FH-CD-D-A-G
11	A or B	D	ALL	M or F	FH-AB-D-A-MF	FH-CD-D-A-MF
1 or 2 or 15	C or D	D	ALL	G	MX-CD-D-A-G	MX-CD-D-A-G
1 or 2 or 15	C or D	D	ALL	M or F	MX-CD-D-A-MF	MX-CD-D-A-MF
11	C or D	D	ALL	G	FH-CD-D-A-G	FH-CD-D-A-G
11	C or D	D	ALL	M or F	FH-CD-D-A-MF	FH-CD-D-A-MF
ALL	A or B	DC	ALL	ALL	A-AB-DC-A-A	A-CD-DC-A-A
ALL	C or D	DC	ALL	ALL	A-CD-DC-A-A	A-CD-DC-A-A
ALL	A or B	CD	ALL	ALL	A-AB-CD-A-A	A-CD-CD-A-A
ALL	C or D	CD	ALL	ALL	A-CD-CD-A-A	A-CD-CD-A-A
ALL	A or B	C	SW or FB	ALL	A-AB-C-SW-A	A-CD-C-SW-A
ALL	A or B	C	PL, P or PJ	ALL	A-AB-C-P-A	A-CD-C-P-A
ALL	A or B	C	SB	ALL	A-AB-C-SB-A	A-CD-C-SB-A
ALL	C or D	C	SW or FB	ALL	A-CD-C-SW-A	A-CD-C-SW-A
ALL	C or D	C	PL, P or PJ	ALL	A-CD-C-P-A	A-CD-C-P-A
ALL	C or D	C	SB	ALL	A-CD-C-SB-A	A-CD-C-SB-A

4.4 TIMBER SUPPLY ANALYSIS

This section summarizes the procedures, results and assumptions applied in determining the annual allowable harvest level for the Tolko FMA area.

4.4.1 MODELS

4.4.1.1 LRSYA

Long-run sustained-yield average (LRSYA) is a measure of forest productivity that is calculated as the sum of growth per year of regenerated stands at a selected rotation age. It is derived from the theoretical concept of a regulated forest with static and uniform age class distribution, a single rotation age and a single yield function operating across equally productive sites. Under this assumption, the annual harvest equates the annual growth in the oldest age class. LRSYA is calculated using the following formula:

$$LRSYA = \sum_{1}^{i} MAI_i \bullet A_i$$

Where:

LRSYA= long-run sustained-yield average (m^3/yr)

MAI_i = mean annual increment (m^3/ha/yr) for yield class "i"

A_i = net area (ha) for yield class "i"

The LRSYA estimates are provided in Table 4-7 through Table 4-16.

TABLE 4-7: LRSYA ESTIMATES: "STATUS QUO" REGENERATION TRANSITION - FMA

Yield Curve	Net Area (ha)	MAI (m^3/ha/yr) @ 80 Years		LRSYA (m^3/yr)	
		Conifer	Deciduous	Conifer	Deciduous
MX-AB-D-A-G	8,483	0.32	2.02	2,715	17,136
MX-AB-D-A-MF	15,988	0.18	1.33	2,878	21,264
FH-AB-D-A-G	0	0.22	2.39	0	0
FH-AB-D-A-MF	0	0.22	1.55	0	0
MX-CD-D-A-G	33,620	0.44	2.83	14,793	95,146
MX-CD-D-A-MF	48,285	0.31	2.24	14,968	108,158
FH-CD-D-A-G	0	0.24	3.93	0	0
FH-CD-D-A-MF	0	0.43	3.26	0	0
A-AB-DC-A-A	7,620	0.90	1.37	6,858	10,439
A-CD-DC-A-A	7,211	1.44	2.10	10,383	15,143
A-AB-CD-A-A	6,122	1.09	0.70	6,673	4,285
A-CD-CD-A-A	6,967	2.02	0.90	14,074	6,271
A-AB-C-SW-A	7,843	1.13	0.89	8,862	6,980
A-AB-C-PL-A	1,783	0.97	0.04	1,730	71
A-AB-C-SB-A	3,306	0.39	0.00	1,289	0
A-CD-C-SW-A	6,926	2.97	0.72	20,570	4,987
A-CD-C-PL-A	1,617	2.45	0.41	3,962	663
A-CD-C-SB-A	880	0.41	0.03	361	26
Total	**156,651**			**110,116**	**290,569**

TABLE 4-8: LRSYA ESTIMATES: "FULLY STOCKED" REGENERATION TRANSITION - FMA

Yield Curve	Net Area (ha)	MAI (m^3/ha/yr) @ 80 Years		LRSYA (m^3/yr)	
		Conifer	Deciduous	Conifer	Deciduous
MX-AB-D-A-G	8,483	0.44	2.83	3,733	24,008
MX-AB-D-A-MF	15,988	0.31	2.24	4,956	35,813
FH-AB-D-A-G	0	0.24	3.93	0	0
FH-AB-D-A-MF	0	0.43	3.26	0	0
MX-CD-D-A-G	33,620	0.44	2.83	14,793	95,146
MX-CD-D-A-MF	48,285	0.31	2.24	14,968	108,158
FH-CD-D-A-G	0	0.24	3.93	0	0
FH-CD-D-A-MF	0	0.43	3.26	0	0
A-AB-DC-A-A	7,620	1.44	2.10	10,972	16,001
A-CD-DC-A-A	7,211	1.44	2.10	10,383	15,143
A-AB-CD-A-A	6,122	2.02	0.90	12,367	5,510
A-CD-CD-A-A	6,967	2.02	0.90	14,074	6,271
A-AB-C-SW-A	7,843	2.97	0.72	23,292	5,647
A-AB-C-PL-A	1,783	2.45	0.41	4,369	731
A-AB-C-SB-A	3,306	0.41	0.03	1,355	99
A-CD-C-SW-A	6,926	2.97	0.72	20,570	4,987
A-CD-C-PL-A	1,617	2.45	0.41	3,962	663
A-CD-C-SB-A	880	0.41	0.03	361	26
Total	**156,651**			**140,156**	**318,202**

TABLE 4-9: LRSYA ESTIMATES: "STATUS QUO" REGENERATION TRANSITION – BIRCH OPERATING AREA

Yield Curve	Net Area (ha)	MAI (m^3/ha/yr) @ 80 Years		LRSYA (m^3/yr)	
		Conifer	Deciduous	Conifer	Deciduous
MX-AB-D-A-G	20	0.32	2.02	6	40
MX-AB-D-A-MF	2,071	0.18	1.33	373	2,755
FH-AB-D-A-G	0	0.22	2.39	0	0
FH-AB-D-A-MF	0	0.22	1.55	0	0
MX-CD-D-A-G	9	0.44	2.83	4	26
MX-CD-D-A-MF	5,769	0.31	2.24	1,788	12,922
FH-CD-D-A-G	0	0.24	3.93	0	0
FH-CD-D-A-MF	0	0.43	3.26	0	0
A-AB-DC-A-A	87	0.90	1.37	78	119
A-CD-DC-A-A	46	1.44	2.10	66	97
A-AB-CD-A-A	49	1.09	0.70	54	35
A-CD-CD-A-A	18	2.02	0.90	37	16
A-AB-C-SW-A	44	1.13	0.89	50	39
A-AB-C-PL-A	0	0.97	0.04	0	0
A-AB-C-SB-A	0	0.39	0.00	0	0
A-CD-C-SW-A	7	2.97	0.72	21	5
A-CD-C-PL-A	0	2.45	0.41	0	0
A-CD-C-SB-A	0	0.41	0.03	0	0
Total	**8,121**			**2,478**	**16,055**

TABLE 4-10: LRSYA ESTIMATES: "FULLY STOCKED" REGENERATION TRANSITION – BIRCH OPERATING AREA

Yield Curve	Net Area (ha)	MAI (m^3/ha/yr) @ 80 Years		LRSYA (m^3/yr)	
		Conifer	Deciduous	Conifer	Deciduous
MX-AB-D-A-G	20	0.44	2.83	9	56
MX-AB-D-A-MF	2,071	0.31	2.24	642	4,640
FH-AB-D-A-G	0	0.24	3.93	0	0
FH-AB-D-A-MF	0	0.43	3.26	0	0
MX-CD-D-A-G	9	0.44	2.83	4	26
MX-CD-D-A-MF	5,769	0.31	2.24	1,788	12,922
FH-CD-D-A-G	0	0.24	3.93	0	0
FH-CD-D-A-MF	0	0.43	3.26	0	0
A-AB-DC-A-A	87	1.44	2.10	125	183
A-CD-DC-A-A	46	1.44	2.10	66	97
A-AB-CD-A-A	49	2.02	0.90	100	44
A-CD-CD-A-A	18	2.02	0.90	37	16
A-AB-C-SW-A	44	2.97	0.72	132	32
A-AB-C-PL-A	0	2.45	0.41	0	0
A-AB-C-SB-A	0	0.41	0.03	0	0
A-CD-C-SW-A	7	2.97	0.72	21	5
A-CD-C-PL-A	0	2.45	0.41	0	0
A-CD-C-SB-A	0	0.41	0.03	0	0
Total	**8,121**			**2,923**	**18,022**

TABLE 4-11: LRSYA ESTIMATES: "STATUS QUO" REGENERATION TRANSITION – WHITEMUD OPERATING AREA

Yield Curve	Net Area (ha)	MAI (m^3/ha/yr) @ 100 Years		LRSYA (m^3/yr)	
		Conifer	Deciduous	Conifer	Deciduous
MX-AB-D-A-G	4,185	0.32	2.02	1,339	8,453
MX-AB-D-A-MF	5,706	0.18	1.33	1,027	7,589
FH-AB-D-A-G	0	0.22	2.39	0	0
FH-AB-D-A-MF	0	0.22	1.55	0	0
MX-CD-D-A-G	11,285	0.44	2.83	4,965	31,936
MX-CD-D-A-MF	9,731	0.31	2.24	3,017	21,797
FH-CD-D-A-G	0	0.24	3.93	0	0
FH-CD-D-A-MF	0	0.43	3.26	0	0
A-AB-DC-A-A	1,777	0.90	1.37	1,599	2,434
A-CD-DC-A-A	1,779	1.44	2.10	2,562	3,737
A-AB-CD-A-A	1,049	1.09	0.70	1,143	734
A-CD-CD-A-A	1,134	2.02	0.90	2,291	1,021
A-AB-C-SW-A	1,781	1.13	0.89	2,013	1,585
A-AB-C-PL-A	818	0.97	0.04	794	33
A-AB-C-SB-A	316	0.39	0.00	123	0
A-CD-C-SW-A	773	2.97	0.72	2,295	556
A-CD-C-PL-A	461	2.45	0.41	1,129	189
A-CD-C-SB-A	86	0.41	0.03	35	3
Total	**40,880**			**24,332**	**80,066**

TABLE 4-12: LRSYA ESTIMATES: "FULLY STOCKED" REGENERATION TRANSITION – WHITEMUD OPERATING AREA

Yield Curve	Net Area (ha)	MAI (m^3/ha/yr) @ 100 Years		LRSYA (m^3/yr)	
		Conifer	Deciduous	Conifer	Deciduous
MX-AB-D-A-G	4,185	0.44	2.83	1,841	11,843
MX-AB-D-A-MF	5,706	0.31	2.24	1,769	12,781
FH-AB-D-A-G	0	0.24	3.93	0	0
FH-AB-D-A-MF	0	0.43	3.26	0	0
MX-CD-D-A-G	11,285	0.44	2.83	4,965	31,936
MX-CD-D-A-MF	9,731	0.31	2.24	3,017	21,797
FH-CD-D-A-G	0	0.24	3.93	0	0
FH-CD-D-A-MF	0	0.43	3.26	0	0
A-AB-DC-A-A	1,777	1.44	2.10	2,559	3,731
A-CD-DC-A-A	1,779	1.44	2.10	2,562	3,737
A-AB-CD-A-A	1,049	2.02	0.90	2,119	944
A-CD-CD-A-A	1,134	2.02	0.90	2,291	1,021
A-AB-C-SW-A	1,781	2.97	0.72	5,290	1,282
A-AB-C-PL-A	818	2.45	0.41	2,005	335
A-AB-C-SB-A	316	0.41	0.03	130	9
A-CD-C-SW-A	773	2.97	0.72	2,295	556
A-CD-C-PL-A	461	2.45	0.41	1,129	189
A-CD-C-SB-A	86	0.41	0.03	35	3
Total	**40,880**			**32,006**	**90,164**

TABLE 4-13: LRSYA ESTIMATES: "STATUS QUO" REGENERATION TRANSITION – SALT OPERATING AREA

Yield Curve	Net Area (ha)	MAI (m^3/ha/yr) @ 80 Years		LRSYA (m^3/yr)	
		Conifer	Deciduous	Conifer	Deciduous
MX-AB-D-A-G	2,470	0.32	2.02	791	4,990
MX-AB-D-A-MF	2,890	0.18	1.33	520	3,844
FH-AB-D-A-G	0	0.22	2.39	0	0
FH-AB-D-A-MF	0	0.22	1.55	0	0
MX-CD-D-A-G	10,022	0.44	2.83	4,410	28,363
MX-CD-D-A-MF	11,014	0.31	2.24	3,414	24,671
FH-CD-D-A-G	0	0.24	3.93	0	0
FH-CD-D-A-MF	0	0.43	3.26	0	0
A-AB-DC-A-A	1,847	0.90	1.37	1,662	2,530
A-CD-DC-A-A	1,325	1.44	2.10	1,908	2,782
A-AB-CD-A-A	1,524	1.09	0.70	1,661	1,067
A-CD-CD-A-A	1,873	2.02	0.90	3,783	1,685
A-AB-C-SW-A	1,019	1.13	0.89	1,151	907
A-AB-C-PL-A	89	0.97	0.04	86	4
A-AB-C-SB-A	1,030	0.39	0.00	402	0
A-CD-C-SW-A	598	2.97	0.72	1,776	431
A-CD-C-PL-A	28	2.45	0.41	70	12
A-CD-C-SB-A	231	0.41	0.03	95	7
Total	**35,961**			**21,729**	**71,293**

TABLE 4-14: LRSYA ESTIMATES: "FULLY STOCKED" REGENERATION TRANSITION – SALT OPERATING AREA

Yield Curve	Net Area (ha)	MAI (m^3/ha/yr) @ 80 Years		LRSYA (m^3/yr)	
		Conifer	Deciduous	Conifer	Deciduous
MX-AB-D-A-G	2,470	0.44	2.83	1,087	6,991
MX-AB-D-A-MF	2,890	0.31	2.24	896	6,474
FH-AB-D-A-G	0	0.24	3.93	0	0
FH-AB-D-A-MF	0	0.43	3.26	0	0
MX-CD-D-A-G	10,022	0.44	2.83	4,410	28,363
MX-CD-D-A-MF	11,014	0.31	2.24	3,414	24,671
FH-CD-D-A-G	0	0.24	3.93	0	0
FH-CD-D-A-MF	0	0.43	3.26	0	0
A-AB-DC-A-A	1,847	1.44	2.10	2,659	3,878
A-CD-DC-A-A	1,325	1.44	2.10	1,908	2,782
A-AB-CD-A-A	1,524	2.02	0.90	3,079	1,372
A-CD-CD-A-A	1,873	2.02	0.90	3,783	1,685
A-AB-C-SW-A	1,019	2.97	0.72	3,026	734
A-AB-C-PL-A	89	2.45	0.41	217	36
A-AB-C-SB-A	1,030	0.41	0.03	422	31
A-CD-C-SW-A	598	2.97	0.72	1,776	431
A-CD-C-PL-A	28	2.45	0.41	70	12
A-CD-C-SB-A	231	0.41	0.03	95	7
Total	**35,961**			**26,843**	**77,468**

TABLE 4-15: LRSYA ESTIMATES: "STATUS QUO" REGENERATION TRANSITION – UTIKUMA OPERATING AREA

Yield Curve	Net Area (ha)	MAI (m^3/ha/yr) @ 80 Years		LRSYA (m^3/yr)	
		Conifer	Deciduous	Conifer	Deciduous
MX-AB-D-A-G	1,808	0.32	2.02	579	3,653
MX-AB-D-A-MF	5,320	0.18	1.33	958	7,076
FH-AB-D-A-G	0	0.22	2.39	0	0
FH-AB-D-A-MF	0	0.22	1.55	0	0
MX-CD-D-A-G	12,304	0.44	2.83	5,414	34,820
MX-CD-D-A-MF	21,772	0.31	2.24	6,749	48,769
FH-CD-D-A-G	0	0.24	3.93	0	0
FH-CD-D-A-MF	0	0.43	3.26	0	0
A-AB-DC-A-A	3,909	0.90	1.37	3,518	5,356
A-CD-DC-A-A	4,061	1.44	2.10	5,847	8,527
A-AB-CD-A-A	3,499	1.09	0.70	3,814	2,450
A-CD-CD-A-A	3,943	2.02	0.90	7,964	3,548
A-AB-C-SW-A	4,998	1.13	0.89	5,648	4,448
A-AB-C-PL-A	876	0.97	0.04	850	35
A-AB-C-SB-A	1,960	0.39	0.00	764	0
A-CD-C-SW-A	5,548	2.97	0.72	16,478	3,995
A-CD-C-PL-A	1,128	2.45	0.41	2,763	462
A-CD-C-SB-A	563	0.41	0.03	231	17
Total	**71,689**			**61,577**	**123,155**

TABLE 4-16: LRSYA ESTIMATES: "FULLY STOCKED" REGENERATION TRANSITION – UTIKUMA OPERATING AREA

Yield Curve	Net Area (ha)	MAI (m^3/ha/yr) @ 80 Years		LRSYA (m^3/yr)	
		Conifer	Deciduous	Conifer	Deciduous
MX-AB-D-A-G	1,808	0.44	2.83	796	5,118
MX-AB-D-A-MF	5,320	0.31	2.24	1,649	11,918
FH-AB-D-A-G	0	0.24	3.93	0	0
FH-AB-D-A-MF	0	0.43	3.26	0	0
MX-CD-D-A-G	12,304	0.44	2.83	5,414	34,820
MX-CD-D-A-MF	21,772	0.31	2.24	6,749	48,769
FH-CD-D-A-G	0	0.24	3.93	0	0
FH-CD-D-A-MF	0	0.43	3.26	0	0
A-AB-DC-A-A	3,909	1.44	2.10	5,629	8,209
A-CD-DC-A-A	4,061	1.44	2.10	5,847	8,527
A-AB-CD-A-A	3,499	2.02	0.90	7,069	3,150
A-CD-CD-A-A	3,943	2.02	0.90	7,964	3,548
A-AB-C-SW-A	4,998	2.97	0.72	14,845	3,599
A-AB-C-PL-A	876	2.45	0.41	2,147	359
A-AB-C-SB-A	1,960	0.41	0.03	804	59
A-CD-C-SW-A	5,548	2.97	0.72	16,478	3,995
A-CD-C-PL-A	1,128	2.45	0.41	2,763	462
A-CD-C-SB-A	563	0.41	0.03	231	17
Total	**71,689**			**78,384**	**132,549**

4.4.1.2 HARVEST SIMULATION

SILVASYM is Silvacom's proprietary timber supply simulation model. The model simulates the effect of management strategies on sustainable harvest levels over a specified planning horizon. In its most basic form, SILVASYM is a model that cuts and grows each stand in the forest according to user-defined yield functions and forest policy constraints. SILVASYM maintains a full spatial link to the net landbase GIS coverage and attribute file over the entire planning horizon. Compartment sequencing can also be introduced to reflect "real-world" limitations, such as accessibility and multi-pass harvesting rules. Adjacency constraints can be applied on a stand-by-stand basis to control the distribution (or concentration) of the harvest and mimic operational planning strategies.

A number of sorting rules are available that define the harvest priorities assigned to each stand. The simulation model uses binary search methods to assess harvest levels. Average harvest age and post-harvest forest conditions are evaluated at the end of each simulation to determine whether the even-flow harvest levels are too low or too high. Reports and GIS map products can be produced for each scenario to evaluate the condition of the forest throughout, and also at the end of the planning horizon. Table 4-17 provides a definition of the harvest simulation control parameters used in the analysis.

TABLE 4-17: HARVEST SIMULATION CONTROL PARAMETER DEFINITIONS USED IN ANALYSIS

PARAMETER	DEFINITION
FMA/FMU	Description of the administrative area under analysis
Planning horizon	Total time period for the analysis scenario (years)
Targeted average harvest age at the end of the planning horizon	Average age (years) of stands scheduled for harvest in the last twenty years of the planning horizon, typically with a specified tolerance
Minimum harvest age	Minimum age of stands that are eligible for harvest scheduling; may vary by yield stratum (years)
Landbase	Landbase available for analysis (e.g., discrete, single)
Sorting rules	Factors used to prioritize stands for harvest sequencing
Harvest flow constraint	Scheduled harvest level of the primary species between harvest periods (may have tolerances applied)
Yield curve sets	Predicted yields for individual strata
Cull deductions	Percent reduction of predicted yields to account for losses from defects
Regeneration transition	Assumptions applied for the regeneration of stands scheduled for harvest
Introduce harvest plans	Incorporation of existing harvest plans into the harvest sequence
Spatial stand adjacency	The process of protecting other resource values by spatially identifying and scheduling inventory polygons (stands) that share a boundary, or are within a specified distance to that polygon
Adjacency: Time horizon	Total time period that stand adjacency is incorporated into the analysis (years)
Adjacency: Green-up	The time period applied restricting the harvest of adjacent polygons (years)
Adjacency: Accumulate adjacent stands	Maximum total area of adjacent stands scheduled for harvest in the same harvest period
Modulation	Reduces the annual variability in the harvest of the secondary species by distributing the "peaks" in secondary harvest flow to periods with little or no secondary harvest
Compartment sequencing	Prioritization of administrative planning units for harvest scheduling
Number of compartments open simultaneously	Number of compartments available for harvest scheduling at any given time

4.4.2 TIMBER SUPPLY ASSUMPTIONS

The following assumptions were used to formulate the preferred forest management strategy.

4.4.2.1 LANDBASE AGGREGATIONS

Tolko's FMA area is organized into four operating areas: Birch, Whitemud, Salt and Utikuma. The four operating areas have been aggregated into one unit to determine the timber supply for the primary species (deciduous).

4.4.2.2 PLANNING HORIZON

The planning horizon used for the FMA area is 160 years.

4.4.2.3 YIELD CURVE TRANSITIONS (REGENERATION, MULTIPLE ENTRY)

Two yield strata transitions are typically applied to timber supply analysis:

- The status quo transition assumes all stands regenerate to the same yield strata;
- The PFMS incorporates a fully stocked transition strategy which assumes all stands regenerate to the fully stocked density of the existing yield strata.

4.4.2.4 INCORPORATION OF HARVEST PLANS

Existing planned blocks from Annual Operating Plans (AOPs) were introduced into the timber supply analysis to:

- Maintain consistency between the harvest simulation and currently planned operations;
- Bridge the transition from current operational practices to future management strategies that use the spatial harvest sequence.

TABLE 4-18: PLANNED BLOCK SUMMARY TABLE

Operating Area	Conifer Blocks		Deciduous Blocks	
	Area (ha)	Count	Area (ha)	Count
Utikuma / S9 Outside FMA	2,451	126	2,999	73
Salt	625	53	3,796	126
Whitemud	1,533	155	3,332	92
Total	**4,610**	**334**	**10,126**	**291**

4.4.2.5 ADJACENCY / GREEN-UP / ACCUMULATE ADJACENT STANDS

Adjacency is the process of spatially identifying and scheduling inventory polygons (stands) that share a boundary or are within a specified distance. Thus "real-world" decision rules can be introduced into the TSA. The following decision rules are typically analysed:

- Allowing the accumulation of adjacent stands into larger harvest units (cutblocks) to restrict the total area harvested in adjacent stands;
- Applying a delay factor (green-up) that restricts the harvest of adjacent polygons.

4.4.2.6 PATCH SIZE MITIGATION STRATEGY

The PFMS includes a harvest patch size mitigation strategy for the first 20 years. This strategy was applied to planned blocks/existing blocks and TWP 76-12 and 76-13 in the Salt operating area. The result of incorporating this strategy is:

- The reduction of large contiguous harvest patches created, while maintaining a wide range of block sizes across the landscape;
- The distribution of sequenced stands in areas with a high concentration of older age class stands. For an example see township 77-12-5 on Map 4-4 versus Map 5-1.

4.4.2.7 COMPARTMENT SEQUENCING

Compartments have been defined for the entire FMA area. However, since access is not a limiting factor, compartment sequencing was not used in the timber supply analysis.

4.4.2.8 MERCHANTABILITY / ECONOMIC LIMITATIONS

The current utilization standard for the Tolko FMA is 15/11 conifer and 15/10 deciduous utilization.

4.4.3 HARVEST SCHEDULING RESULTS

Throughout the DFMP process many forest management strategies are produced and assessed to aid in the development of the preferred forest management strategy. In this section a summary of the required timber supply analysis is presented in the following tables, which includes the harvest simulation control parameters, detailed profiles showing outputs from the timber supply model used to assess each management strategy, and 20 year harvest sequence maps (full size maps can be found in Appendix H, Map H-6 to H-9). The required forest management strategies include:

- Single pass even flow over two rotations, with "fully stocked" regeneration strategy – (FMS no. 80);
- Two pass even flow over two rotations (fully stocked regeneration strategy) – (FMS no. 78);
- Two pass even flow over one rotation, step-up/down to LRSYA (fully stocked regeneration strategy) – (FMS no. 81);
- Single pass even flow over two rotations with harvest constraints (fully stocked regeneration strategy) (PFMS - no carry over volume) – (FMS no. 112).

4.4.3.1 SINGLE PASS EVEN FLOW OVER TWO ROTATIONS (FULLY STOCKED REGENERATION STRATEGY) – FMS NO. 80

TABLE 4-19: HARVEST SIMULATION CONTROL PARAMETERS – FMS NO. 80

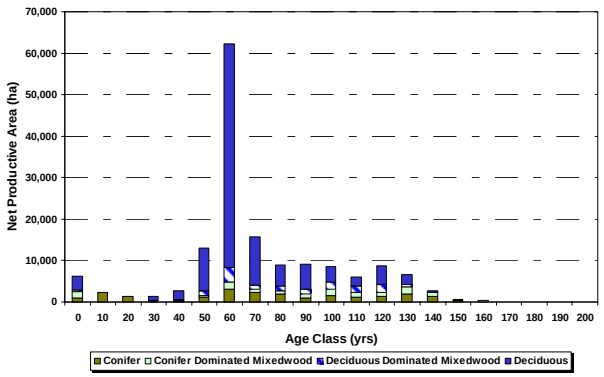
TOLKO HIGH PRAIRIE HARVEST SIMULATION CONTROL PARAMETERS – FMS: 80	
Control Parameter	**Parameter Setting**
Harvest unit:	FMA (Incl. GRL conifer landbase)
Planning horizon:	160 years
Targeted average harvest age at the end of the planning horizon:	80 $\pm$ 5
Minimum harvest age:	70 yrs (Conifer) 50 yrs (Deciduous)
Landbase:	Single
Sorting rules:	1) Maximize deciduous harvest
Modulation:	Non-Constraining
Harvest flow constraint:	Even flow deciduous
Yield curves:	Net yield curves
Cull Deductions:	Applied (2% Conifer, 10% Deciduous)
Regeneration transition:	Fully Stocked
Regeneration lag:	Non-Constraining
Introduce harvest plans:	Non-Constraining
Spatial stand adjacency:	Non-Constraining
Adjacency - Green-up:	Non-Constraining
Adjacency - Accumulate adjacent stands:	Non-Constraining
Age Normalization Factor:	Non-Constraining
Compartment sequencing:	Non-Constraining
Number of compartments open simultaneously:	Non-Constraining

FIGURE 4-10: HARVEST SIMULATION RESULTS – FMS NO. 80

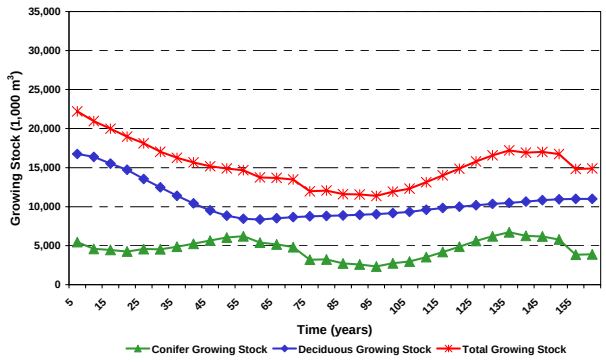
TIMBER SUPPLY SUMMARY

Net Productive Area	156,651 ha + 2,450 ha (GRL Conifer Landbase)
Conifer Harvest Level – 15/11 Utilization:	240,804 m^3/yr (20 yr avg)
Deciduous Harvest Level – 15/10 Utilization	306,500 m^3/yr

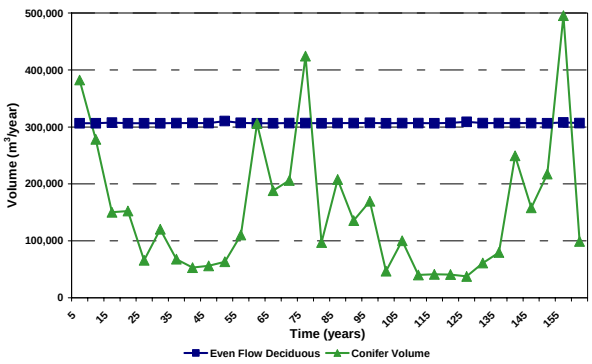
INITIAL AGE CLASS DISTRIBUTION



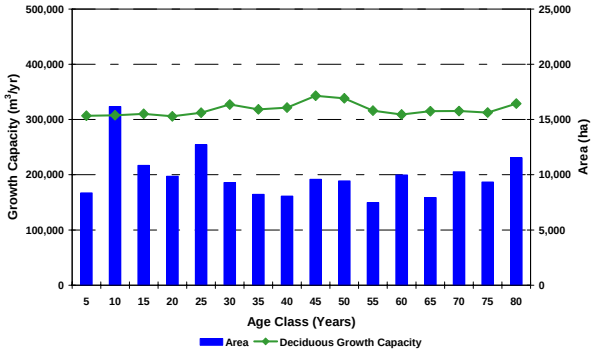
GROWING STOCK



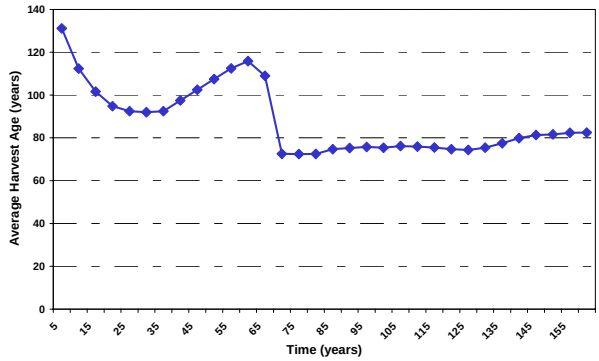
HARVEST FLOW SUMMARY



POST HARVEST FOREST CONDITIONS



AVERAGE HARVEST AGE BY 5 YEAR ITERATION



MAP 4-4: 20 YEAR HARVEST SEQUENCE – FMS NO. 80

4.4.3.2 TWO PASS EVEN FLOW OVER TWO ROTATIONS (FULLY STOCKED REGENERATION STRATEGY) – FMS NO. 78

TABLE 4-20: HARVEST SIMULATION CONTROL PARAMETERS – FMS NO. 78

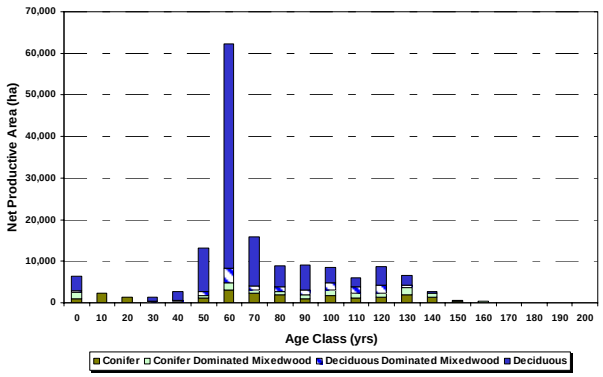
TOLKO HIGH PRAIRIE HARVEST SIMULATION CONTROL PARAMETERS – FMS: 78	
Control Parameter	**Parameter Setting**
Harvest unit:	FMA (Incl. GRL conifer landbase)
Planning horizon:	160 years
Targeted average harvest age at the end of the planning horizon:	80 $\pm$ 5
Minimum harvest age:	70 yrs (Conifer) 50 yrs (Deciduous)
Landbase:	Single
Sorting rules:	1) Maximize deciduous harvest
Modulation:	Non-Constraining
Harvest flow constraint:	Even flow deciduous
Yield curves:	Net yield curves
Cull Deductions:	Applied (2% Conifer, 10% Deciduous)
Regeneration transition:	Fully Stocked
Regeneration lag:	Non-Constraining
Introduce harvest plans:	Non-Constraining
Spatial stand adjacency:	Applied – 55 years
Adjacency - Green-up:	Applied – 20 years
Adjacency - Accumulate adjacent stands:	Applied – max 200 ha
Age Normalization Factor:	Non-Constraining
Compartment sequencing:	Non-Constraining
Number of compartments open simultaneously:	Non-Constraining

FIGURE 4-11: HARVEST SIMULATION RESULTS – FMS NO. 78

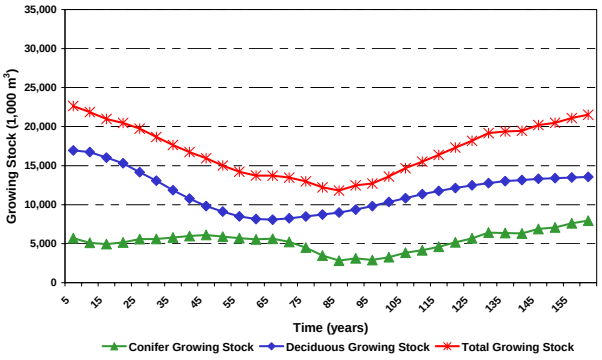
TIMBER SUPPLY SUMMARY

Net Productive Area	156,651 ha + 2,450 ha (GRL Conifer Landbase)
Conifer Harvest Level – 15/11 Utilization:	193,718 m^3/yr (20 yr avg)
Deciduous Harvest Level – 15/10 Utilization	262,000 m^3/yr

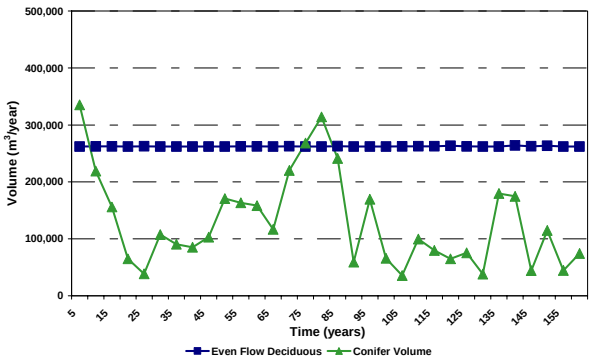
INITIAL AGE CLASS DISTRIBUTION



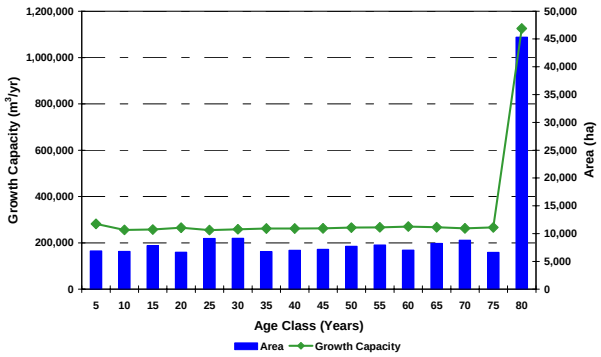
GROWING STOCK



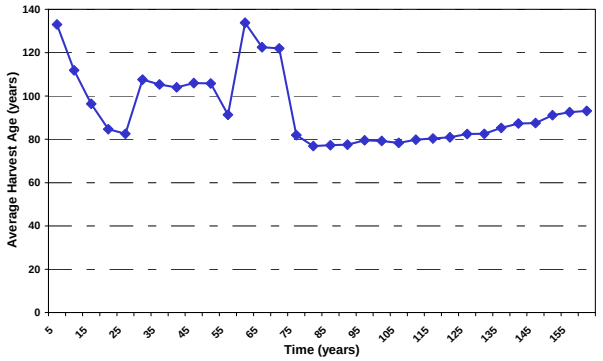
HARVEST FLOW SUMMARY



POST HARVEST FOREST CONDITIONS



AVERAGE HARVEST AGE BY 5 YEAR ITERATION



MAP 4-5: 20 YEAR HARVEST SEQUENCE – FMS NO. 78

4.4.3.3 TWO PASS EVEN FLOW FOR ONE ROTATION; STEP-UP / DOWN TO LRSYA (FULLY STOCKED REGENERATION STRATEGY) – FMS NO. 81

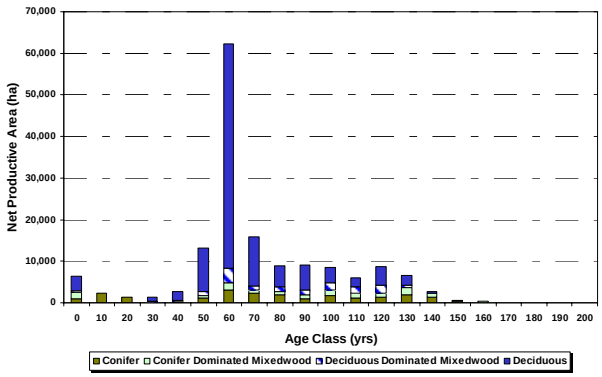
TABLE 4-21: HARVEST SIMULATION CONTROL PARAMETERS – FMS NO. 81

TOLKO HIGH PRAIRIE HARVEST SIMULATION CONTROL PARAMETERS – FMS: 81	
Control Parameter	**Parameter Setting**
Harvest unit:	FMA (Incl. GRL conifer landbase)
Planning horizon:	160 years
Targeted average harvest age at the end of the planning horizon:	80 $\pm$ 5
Minimum harvest age:	70 yrs (Conifer) 50 yrs (Deciduous)
Landbase:	Single
Sorting rules:	1) Maximize deciduous harvest
Modulation:	Non-Constraining
Harvest flow constraint:	1) Even flow deciduous 2) Step up to LRSYA after 80 years
Yield curves:	Net yield curves
Cull Deductions:	Applied (2% Conifer, 10% Deciduous)
Regeneration transition:	Fully Stocked
Regeneration lag:	Non-Constraining
Introduce harvest plans:	Non-Constraining
Spatial stand adjacency:	Applied – 55 years
Adjacency - Green-up:	Applied – 20 years
Adjacency - Accumulate adjacent stands:	Applied – max 200 ha
Age Normalization Factor:	Non-Constraining
Compartment sequencing:	Non-Constraining
Number of compartments open simultaneously:	Non-Constraining

FIGURE 4-12: HARVEST SIMULATION RESULTS – FMS NO. 81

TIMBER SUPPLY SUMMARY	
Net Productive Area	156,651 ha + 2,450 ha (GRL Conifer Landbase)
Conifer Harvest Level – 15/11 Utilization:	193,718 m^3/yr (20 yr avg)
Deciduous Harvest Level – 15/10 Utilization	262,000 m^3/yr step up to 318,200 m^3/yr

INITIAL AGE CLASS DISTRIBUTION



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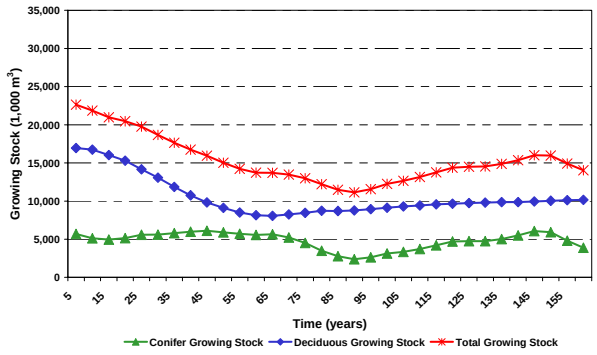
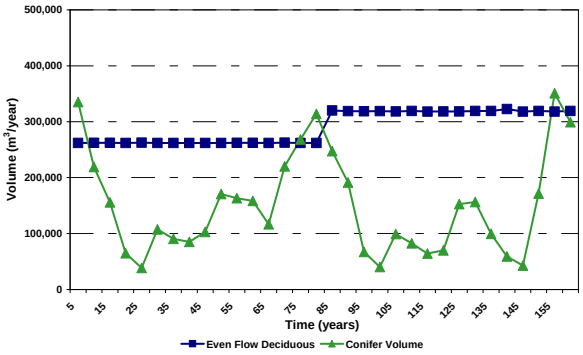
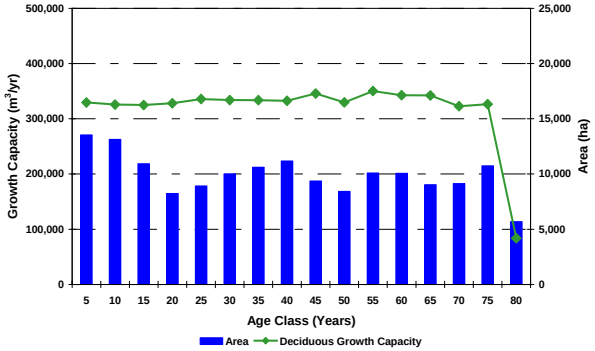


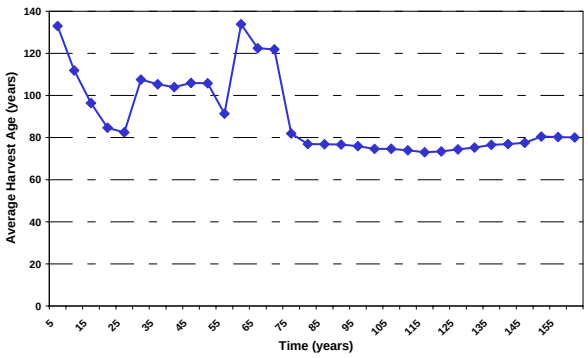
HARVEST FLOW SUMMARY



POST HARVEST FOREST CONDITIONS



AVERAGE HARVEST AGE BY 5 YEAR ITERATION



MAP 4-6: 20 YEAR HARVEST SEQUENCE – FMS NO. 81

4.4.3.4 SINGLE PASS EVEN FLOW OVER TWO ROTATIONS WITH HARVEST CONSTRAINTS (FULLY STOCKED REGENERATION STRATEGY) (PFMS – NO CARRY OVER VOLUME) – FMS NO. 112

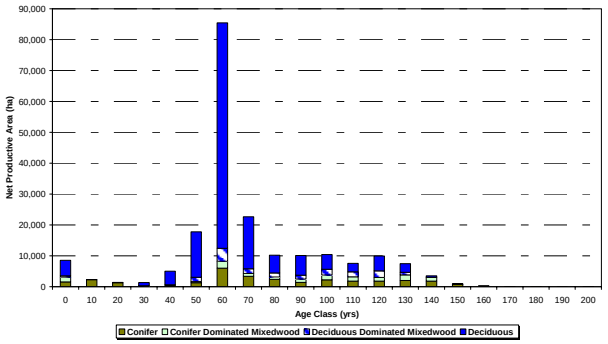
TABLE 4-22: HARVEST SIMULATION CONTROL PARAMETERS – FMS NO. 112

TOLKO HIGH PRAIRIE HARVEST SIMULATION CONTROL PARAMETERS – FMS: 112	
Control Parameter	**Parameter Setting**
Harvest unit:	FMA (Incl. S9 non-FMA and GRL conifer landbase)
Planning horizon:	160 years
Targeted average harvest age at the end of the planning horizon:	80 $\pm$ 5
Minimum harvest age:	70 yrs (Conifer) 50 yrs (Deciduous)
Landbase:	Single
Sorting rules:	1) Modulate conifer flow 2) Modulate deciduous flow in S9 outside FMA 3) Maximize deciduous harvest
Modulation:	Applied
Harvest flow constraint:	Dual even flow
Yield curves:	Net yield curves
Cull Deductions:	Applied (2% Conifer, 10% Deciduous)
Regeneration transition:	Fully Stocked
Regeneration lag:	Non-Constraining
Introduce harvest plans:	Applied
Patch Size Mitigation Strategy:	Applied - 20 years
Adjacency - Green-up:	Non-Constraining
Adjacency - Accumulate adjacent stands:	Non-Constraining
Age Normalization Factor:	Non-Constraining
Compartment sequencing:	Non-Constraining
Number of compartments open simultaneously:	Non-Constraining

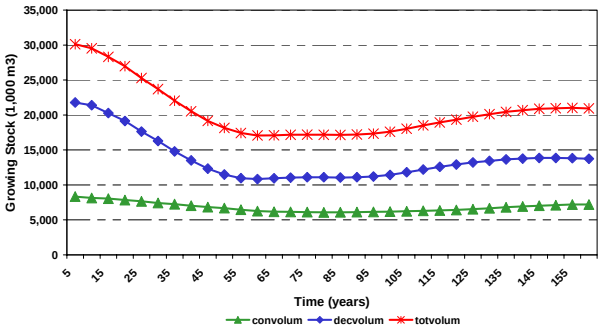
FIGURE 4-13: HARVEST SIMULATION RESULTS – FMS NO. 112

TIMBER SUPPLY SUMMARY	
Net Productive Area	156,651 ha + 48,872 ha (FMU S9) + 2,450 ha (GRL Conifer Landbase)
Conifer Harvest Level – 15/11 Utilization:	167,045 m^3/yr (PH Avg)
FMA: Deciduous Harvest Level – 15/10 Utilization	297,750 m^3/yr
S9: Deciduous Harvest Level – 15/10 Utilization	96,931 m^3/yr

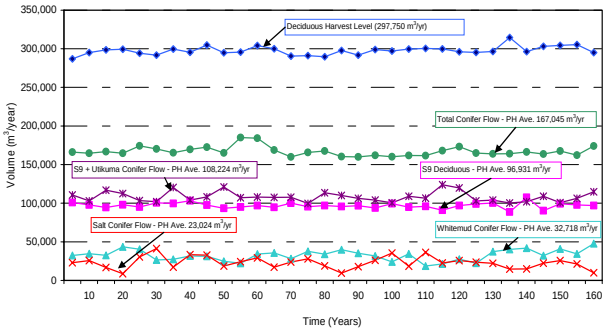
INITIAL AGE CLASS DISTRIBUTION



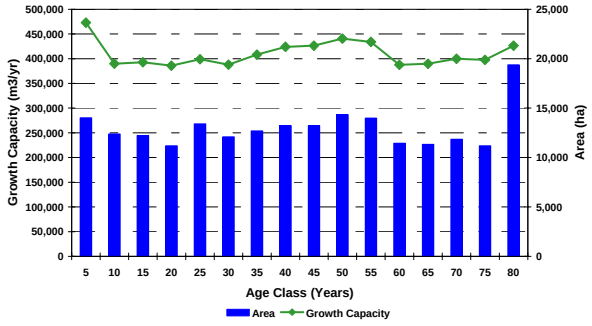
GROWING STOCK



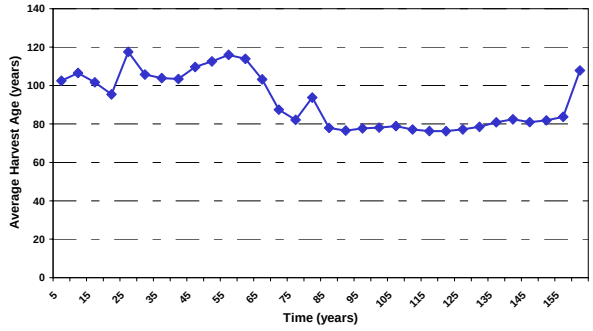
HARVEST FLOW SUMMARY



POST HARVEST FOREST CONDITIONS



AVERAGE HARVEST AGE BY 5 YEAR ITERATION



MAP 4-7: 20 YEAR HARVEST SEQUENCE – FMS NO. 112

DFMP

5.0

Preferred Forest Management Strategy

5.0 PREFERRED FOREST MANAGEMENT STRATEGY

During the development of the Detailed Forest Management Plan over the past three and half years Tolko Industries Ltd. has completed approximately 120 different timber supply model runs utilizing an iterative process to determine the preferred forest management strategy that achieves a balance between environmental, social and economic values. The different model runs were used to evaluate the following topics: Government required baseline runs, single timber supply unit versus multiple timber supply units, status quo regeneration transition versus transition to full stocking, single landbase versus discrete landbase, patch size mitigation, and seral stage age class distribution. The company has selected forest management strategy number 115 as the preferred forest management strategy (PFMS). The following discussion provides a summary of how the goals, objectives and strategies outlined in Section 3 of the Detailed Forest Management Plan are achieved by the selected preferred forest management strategy.

5.1 TIMBER MANAGEMENT OBJECTIVES

Forest management strategy number 115 achieves the various timber supply requirements of the Forest Management Area (FMA) and Forest Management Unit S9 (outside the FMA). The deciduous timber supply analysis of S9 was not an original requirement of this Detailed Forest Management Plan process, however, as requested by Alberta Sustainable Resource Development, it was included to provide an updated deciduous harvest level that reflects the same timber supply assumptions developed for the Tolko Forest Management Area.

This preferred forest management strategy achieves the allocation requirements by incorporating:

- A sustainable even flow deciduous harvest level for the Tolko FMA;
- A sustainable even flow deciduous harvest level for the Forest Management Unit S9 outside the FMA area;
- A sustainable even flow conifer harvest level for the Tolko FMA including the Forest Management Unit S9 outside the FMA area;
- A sustainable conifer harvest level for the Whitemud portion of the Tolko FMA;
- A sustainable conifer harvest level for the Salt portion of the Tolko FMA;
- A sustainable conifer harvest level for the Utikuma portion of the Tolko FMA including the S9 out of FMA portion;
- Utilization of the deciduous carry over for the first twenty years of the planning horizon.

At the beginning of the Detailed Forest Management Planning process a determination of the landbase available for timber operations was completed. This process started with the gross landbase and through a systematic process excluded from the gross area the following: water (lakes and rivers), landuse dispositions (GRL and DRS), watercourse buffers, waterbody buffers, non forested areas, non merchantable areas and potentially productive areas to determine the net landbase. The result for the Original Forest Management Agreement Area is that approximately 57% percent of the landbase is available for forestry operations. This represents the productive operational forest landbase that forest management activities like harvesting and silviculture can occur.

- The preferred forest management strategy provides a sustainable deciduous annual allowable cut for Tolko Industries Ltd. from the Original Forest Management Area *(refer to Figure 5-1)*;
- The preferred forest management strategy allows for the utilization of the undercut volume over a twenty year period. Tolko Industries Ltd. as part of their agreement with the Province of Alberta has been receiving a large component of 'incidental' (deciduous timber production from coniferous harvest areas) wood deliveries since production started at the High Prairie facility. As a result the Company has been placed in an undercut situation on the Forest Management Area. Tolko, with the co-operation of the Alberta Government has proposed that the undercut volume be harvested over a twenty year period. The undercut volume of approximately 2 242 300 m^3 has been incorporated into the preferred forest management strategy at a level of 112 000 m^3 per year for the first twenty years of the planning horizon *(refer to Figure 5-1);*
- The preferred forest management strategy provides a sustainable coniferous annual allowable cut for Alberta Plywood Ltd. in the Utikuma operating area and Forest Management Unit S9 outside the Forest Management Area *(refer to Figure 5-1);*
- The preferred forest management strategy provides a sustainable coniferous annual allowable cut for the Community Timber Program in the Salt operating area *(refer to Figure 5-1);*
- The preferred forest management strategy provides a sustainable coniferous annual allowable cut for the Community Timber Program in the Whitemud operating area *(refer to Figure 5-1)*;
- Compared to a traditional two pass harvest system, the single pass harvest system reduces fragmentation and amount of edge *(refer to Table 5-5, Strategy 1.3.3)*;
- Fragmentation is reduced by providing for a range of block sizes between 1 and 1500 hectares *(refer to Figure 5-2, Objective 1.3 Strategy 1.1.4)*;
- A patch size mitigation strategy has been applied for a twenty year period on existing and planned harvest areas to reduce the number of patches greater than 400 hectares in size. The twenty year spatial harvest sequence with patch size mitigation applied resulted in a more desirable range of harvest area sizes and mitigated potential impacts to a number of individual traplines and watersheds;
- The preferred forest management strategy allows for the maintenance of high quality late seral stage Deciduous, Mixedwood, Conifer - White Spruce Leading, Conifer - Pine Leading and Conifer - Black Spruce Leading strata has been provided over the 160 year planning horizon *(refer to Strategy 1.2.3, Appendix B);*
- The preferred forest management strategy provides for stand structure retention over the short and long term. Methods for stand structure retention include single tree retention, small clump retention and green island retention *(refer to Strategy 1.4.1);*
- The preferred forest management strategy provides a more balanced range of patch sizes than the traditional two pass harvest system *(refer to Figure 5-2, Objective 1.5)*;
- The forest on the timber supply area currently is dominated by the immature age class due to fire history dating back to the 1940's. Approximately forty eight percent of the E class fires occurred in the decade 1941 to 1950. The preferred forest management strategy strives to create a more even distribution of seral stages on the landbase *(refer to Section 6.2, Strategy 1.5.5)*;

- The preferred forest management strategy and the traditional two pass harvest system both provide for maintenance of a range of seral stages *(refer to Section 6.2, Strategy 1.5.5);*
- Through reforestation and silvicultural treatments, harvest areas will transition to fully stocked *(refer to Table 3-2, Strategy 1.11.3)*;
- Deciduous 'A' density wet areas have been limited through the net landbase determination. There is a limited amount of 'A' density wet stands which will be transitioned to fully stocked. A summary of the low density deciduous harvest areas on wet sites indicated a small amount of area is located in the net landbase and only a portion of that is scheduled for harvest in the twenty year spatial harvest sequence *(refer to Strategy 1.11.3)*;

TABLE 5-1: SUMMARY OF LOW DENSITY DECIDUOUS AREAS LOCATED ON WET SITES IN THE NET LANDBASE: TOLKO FMA

Net Landbase Summary		
Density	**Site**	**Area (ha)**
A	Wet	1,955
B	Wet	316
Total		**2,271**

TABLE 5-2: SUMMARY OF LOW DENSITY DECIDUOUS AREAS LOCATED ON WET SITES SCHEDULED FOR HARVEST IN THE TWENTY YEAR SPATIAL HARVEST SEQUENCE: TOLKO FMA

20 Year Harvest Period		
Density	**Site**	**Area (ha)**
A	Wet	75
B	Wet	2
Total		**77**

- A schedule for forest inventory updates has been included in the plan *(refer to Objective 1.2, Strategy 1.2.1, Strategy 1.2.2)*;
- Annual updates of the harvested areas will allow for tracking of harvest areas and within block roads *(Strategy 1.2.3)*;
- Regularly account for landuse withdrawals from the landbase via the Timber Damages Assessment process and verify the location of these activities during the forest inventory updates *(refer to Strategy 6.2.2)*;
- By utilizing a single pass harvesting system, verses the traditional two pass harvest system, the number of entries and amount of roading will be minimized to protect the productive capacity of the forest and forest soils *(refer to Objective 1.13, Objective 1.14)*;
- Identification of the Forest Management Agreement Area as a single landbase will facilitate the integration planning processes and the co-operation between conifer and deciduous operations *(refer to Objective 5.6, Strategy 5.2.4)*;

- It is assumed that biodiversity is being maintained on the landbase through the maintenance of a range of patch sizes, a range of seral stages and the regeneration of native tree species *(refer to Strategy 1.10.6)*.

5.2 WATER MANAGEMENT OBJECTIVES

The management of water is the mandate of the Provincial and Federal Governments. The involvement of forest companies is to: provide protection to the structure and function of the interface between the watercourse or water body and the upland area, minimize the potential impacts to the watercourse or water body, and mitigation of the detrimental effects of forestry practices on water features.

- By utilizing a single pass harvesting system, verses the traditional two pass harvest system, the number of entries and amount of roading will be minimized resulting in a reduction of the number of watercourse crossings *(refer to Objective 2.2)*;
- Buffers have been applied to identified watercourses and waterbodies on the gross landbase and the area was removed from the net landbase *(refer to Strategy 2.1.4)*;
- The plan provides for protection of unidentified watercourses or water source areas *(refer to Strategy 2.1.4)*;
- Watersheds or portions of watersheds have been identified on the Forest Management Area *(refer to Strategy 2.1.2)*;
- Summarize the potential impact of harvest activities on watersheds or portions of watersheds over time *(refer to Figure 6-28 to Figure 6-41, Appendix G)*.

5.3 WILDLIFE HABITAT MANAGEMENT OBJECTIVES

The management of wildlife populations is the mandate of the Alberta Government. The involvement of forest companies is limited to minimization of potential impacts and mitigation of the detrimental effects of forestry practices on the wildlife habitat. A number of coarse filter and fine filter approaches to wildlife habitat management will be employed to maintain features of wildlife habitat.

- The preferred forest management strategy provides for stand structure retention over the short and long term. Methods for stand structure retention include single tree retention, small clump retention and green island retention *(refer to Strategy 2.3.4)*;
- The preferred forest management strategy provides for maintenance of coarse woody debris over the short and long term *(refer to Strategy 2.3.5, Strategy 2.3.6);*
- The single pass harvest system maintains ungulate habitat on a landscape basis *(refer to Strategy 2.3.1)*;
- The preferred forest management strategy has been reviewed to forecast the habitat availability throughout the life of the plan for the following species Moose (***Alces alces andersoni***), American Marten (***Martes americana actuosa***), Northern Goshawk (***Accipiter gentilis atricapillus)***, Pileated Woodpecker (***Dryocopus pileatus abieticola***), and Grizzly Bear (***Ursus arctos)*** *(refer to Section 6.6)*;

- By utilizing a single pass harvesting system, verses the traditional two pass harvest system, the number of entries and amount of roading will be minimized resulting in reduction in disturbance to wildlife *(refer to Strategy 2.12.2, Strategy 2.12.4, Strategy 2.12.5)*;
- Road inventory and corridor identification provides opportunity for implementation of access controls *(refer to Strategy 2.12.7)*;
- The preferred forest management strategy provides for identification and protection of sensitive sites *(refer to Objective 2.6, Strategy 2.4.5, Strategy 2.4.6);*
- The single pass harvest system with no block size restriction, verses the traditional two pass harvest system, results in a range of patch sizes with harvesting as well as a range of patch sizes with no disturbance (*refer to Strategy 2.4.1)*;
- The hourglass portion of the Whitemud operating area has been identified by Alberta Sustainable Resource development as an important travel corridor for wildlife. Additional analysis of this specific area was conducted on this area. The twenty year spatial harvest sequence was summarized in five year periods to ensure that a travel corridor with sufficient hiding cover was maintained during the harvesting operations (Map 5-2, full size maps can be found in Appendix H, Map H-11)..
- The twenty year spatial harvest sequence in the Salt operating area was modified to provide a range of patch sizes and reduce the impact of harvesting operations on traplines and watersheds in the area.
- It is assumed biodiversity is being maintained on the landbase through the maintenance of a range of patch sizes, a range of seral stages and the regeneration of native tree species *(refer to Strategy 2.3.8).*
- The single pass harvest system provides for the maintenance of cover types *(refer to Figure 6-2, Figure 6-3).*
- The preferred forest management strategy allows for the maintenance of high quality late seral stage Deciduous, Mixedwood, Conifer - White Spruce Leading, Conifer - Pine Leading and Conifer - Black Spruce Leading strata over the 160 year planning horizon *(Objective 2.4.3, Objective 2.3.8, Appendix B).*

5.4 FISH HABITAT MANAGEMENT OBJECTIVES

The management of fish populations and fish habitat is the mandate of the Federal and Provincial Governments. The involvement of forest companies is limited to the minimization of potential impacts and the mitigation of the detrimental effects of forestry operations on fish habitat.

- By utilizing a single pass harvesting system, verses the traditional two pass harvest system, minimizes the number of entries and amount of roading resulting in a reduction of the number of watercourse crossings and potential for siltation *(refer to Objective 2.2)*;
- Buffers have been applied to identified watercourses and waterbodies on the gross landbase and the area was removed from the net landbase *(refer to Strategy 2.1.4)*;
- The plan provides for protection of unidentified watercourses or water source areas *(refer to Strategy 2.1.4).*

5.5 NATURAL DISTURBANCE OBJECTIVES

The preferred forest management strategy, utilizing a single pass harvest system by prioritizing more mature stands, reduces the susceptibility of the future forest to catastrophic events such as fire, insect or disease outbreaks. The traditional two pass harvest system does not address the probability of fuel loading within stand types.

- By prioritizing more mature stands in the twenty year spatial harvest sequence the stands susceptible to insect and disease attack or with high fuel loading are removed early in the harvest sequence thereby reducing the risk of loss *(refer to Strategy 2.9.1)*;
- The Company has committed to work with Alberta Sustainable Resource Development to develop a forest/urban interface fire protection plan *(refer to Strategy 2.9.2)*;
- The preferred forest management strategy provides a range of harvest opening sizes between 1 and 1500 hectares. This size range allows for entire polygons to be removed and limit the susceptibility of stands to natural disturbance.

5.6 ACCESS NETWORK OBJECTIVES

In comparison to the traditional two pass harvest system, the single pass harvest system concentrates the harvest in fewer compartments, results in a reduction of long term roading, reduces the number of entries and overall creates a more efficient harvesting operation. The development of permanent roads in the Forest Management Agreement Area has the potential to remove productive land from the net landbase, create linear disturbances that fragment the forest and increase the activity of other forest users. This increased activity may have effects on wildlife species movement, habitat selection and habitat use. By identifying a road corridor plan the Company is promoting integrated use of roadways by other industrial forest users.

- Utilizing a single pass harvesting system, the number of entries and amount of roading will be minimized *(refer to Strategy 2.12.2)*;
- Road inventory and corridor identification provides opportunity for implementation of access controls *(refer to Strategy 2.12.6)*;
- Identification of the Forest Management Area as a single landbase will facilitate the integration planning processes and the co-operation between conifer and deciduous operations *(refer to Strategy 2.12.2)*;
- Integrated use by other industrial users is promoted *(refer to Strategy 2.12.8, Strategy 6.2.1).*

5.7 SOCIAL AND PUBLIC INVOLVEMENT OBJECTIVES

Tolko Industries Ltd. recognises that there are social values associated with the Forest Management Area. The public of Alberta are considered the owner of the crown forested land and as a result their issues must be addressed in Forest Management Activities and the planning process.

- The Detailed Forest Management Plan has provided for the identification of historical resources *(refer to Objective 3.1, Objective 3.4)*;

- An ongoing opportunity for public awareness, education and input via the Forest Resources Advisory Committee, Open Houses and ongoing stakeholder communication has been outlined in the Detailed Forest Management Plan *(refer to Objective 4.2, Strategy 3.2.1, Strategy 3.5.2)*;
- Within the Detailed Forest Management Plan an analysis of impacts of harvest patterns on other values has been conducted *(refer to Strategy 2.1.3, Strategy 6.1.3);*

5.8 ECONOMIC OBJECTIVES

The forest companies operating in the Forest Management Agreement Area contribute a significant portion of the economic base for the communities in and around the Forest Management Agreement Area. These local communities have strong ties to the forest resource and the economics generated from the forest landbase. Economic stability of these communities is important to the Tolko Industries Ltd. and is considered in the Detailed Forest Management Plan process.

- A single pass harvest system on a single landbase provides economic benefit to forest companies as compared to a traditional two pass harvest system, by consolidating harvest operations and realising significant cost efficiencies *(refer to Strategy 5.2.4, Strategy 5.6.4);*
- The preferred Forest Management Strategy allows for the sustainable harvest of timber over the long term which creates stable forest related businesses over the long term that contributes to the stability of communities *(refer to Strategy 5.1.1, Strategy 5.1.2);*
- Utilizing fibre from agricultural lands provides economic benefits to individuals of the local communities (*refer to Objective 5.4, Objective 5.5);*
- The local communities realize economic benefits via the employment and business opportunities created through the utilization of the forest resources *(refer to Objective 3.3).*

5.9 OTHER RESOURCE USER OBJECTIVES

- The Detailed Forest Management Plan has been designed for other forest users and the company to co-exist on the landbase.*(refer to Objective 6.1, Objective 6.3)*
- The Detailed Forest Management Plan promotes integration between the forest companies and other commercial users. *(refer to Objective 6.2)*

A summary of the Preferred Forest Management Strategy timber supply analysis is provided in the following tables, which includes the harvest simulation control parameters, detailed profiles showing outputs from the timber supply model used to assess the Preferred Forest Management Strategy and the twenty year harvest sequence map (full size maps can be found in Appendix H, Map H-10).

5.10 SINGLE PASS SINGLE LANDBASE EVEN FLOW WITH HARVEST CONSTRAINTS AND CARRY OVER (FULLY STOCKED REGENERATION STRATEGY) – FMS NO. 115

TABLE 5-3: HARVEST SIMULATION CONTROL PARAMETERS – FMS NO.115

TOLKO HIGH PRAIRIE HARVEST SIMULATION CONTROL PARAMETERS – FMS: 115	
Control Parameter	**Parameter Setting**
Harvest unit:	FMA (Incl. S9 non-FMA and GRL conifer landbase)
Planning horizon:	160 years
Targeted average harvest age at the end of the planning horizon:	80 $\pm$ 5
Minimum harvest age:	70 yrs (Conifer) 50 yrs (Deciduous)
Landbase:	Single
Sorting rules:	1) Modulate conifer flow 2) Modulate deciduous in S9 outside FMA 3) Maximize deciduous
Modulation:	Applied
Harvest flow constraint:	Dual even flow Carry over volume for the first 20 years
Yield curves:	Net yield curves
Cull Deductions:	Applied (2% Conifer, 10% Deciduous)
Regeneration transition:	Fully Stocked
Regeneration lag:	Non-Constraining
Introduce harvest plans:	Applied
Patch Size Mitigation Strategy	Applied - 20 years
Adjacency - Green-up:	Non-Constraining
Adjacency - Accumulate adjacent stands:	Non-Constraining
Age Normalization Factor:	Non-Constraining
Compartment sequencing:	Non-Constraining
Number of compartments open simultaneously:	Non-Constraining

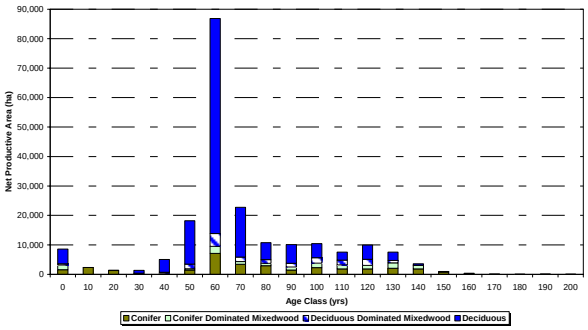
FIGURE 5-1: HARVEST SIMULATION RESULTS – FMS NO. 115

AAC SUMMARY TABLE

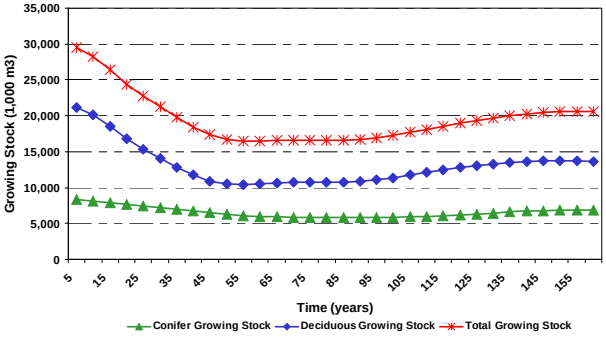
FMA: Deciduous Harvest Level – 15/10 Utilization	409,750 m^3/yr (first 20yrs) 296,000 m^3/yr
S9 Outside FMA: Deciduous Harvest Level	96,572 m^3/yr^1
Total Conifer Harvest Level – 15/11 Utilization:	167,031 m^3/yr^1
Utikuma + S9 Outside FMA Conifer Harvest Level	107,236 m^3/yr^1
Salt Conifer Harvest Level	23,180 m^3/yr^1
Whitemud Conifer Harvest Level	33,649 m^3/yr^1
Birch Conifer Harvest Level	2,965 m^3/yr^1

INITIAL AGE CLASS DISTRIBUTION

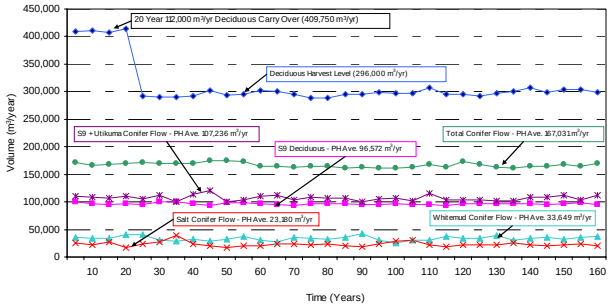
Net Productive Area	156,651 ha + 48,872 ha (FMU S9) + 2,450 ha (GRL Conifer Landbase)



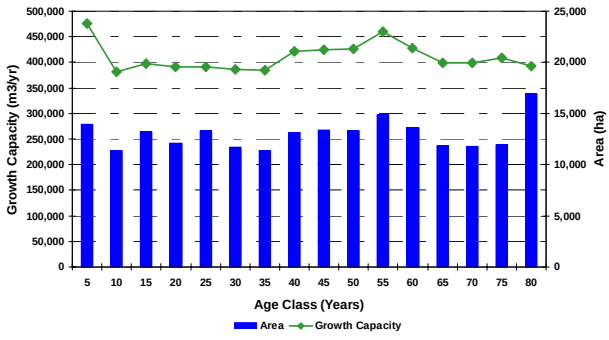
GROWING STOCK



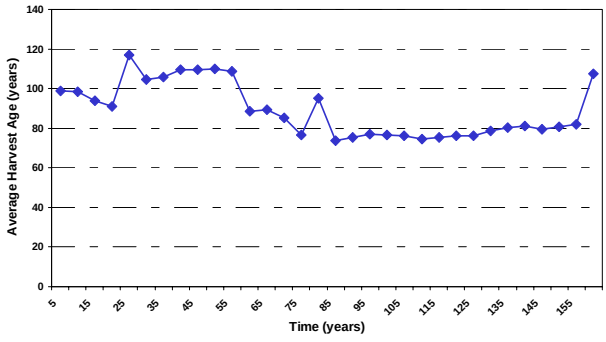
HARVEST FLOW SUMMARY



POST HARVEST FOREST CONDITIONS



AVERAGE HARVEST AGE BY 5 YEAR ITERATION



[1] *The represented AAC values are planning horizon averages.*

TABLE 5-4: PFMS HARVEST FLOW SUMMARY TABLE

Harvest Period	Deciduous Harvest Flow (m^3/yr)		Conifer Harvest Flow (m^3/yr)				
	FMA	S9 Outside FMA	Total Conifer	Utikuma + S9 Outside FMA	Salt	Whitemud	Birch
5	409,750	100,128	171,495	110,426	25,996	34,824	249
10	409,750	96,521	165,730	108,084	21,594	33,877	2,174
15	409,750	95,896	167,562	106,349	27,223	33,776	214
20	409,750	97,312	170,335	111,038	17,497	41,574	225
25	296,000	95,071	171,626	106,014	24,428	40,637	547
30	296,000	100,187	169,711	111,429	27,889	30,164	229
35	296,000	100,563	169,783	100,362	39,507	29,221	693
40	296,000	97,349	170,242	114,149	24,202	31,465	426
45	296,000	93,874	175,408	120,174	20,015	28,830	6,391
50	296,000	98,700	174,972	99,499	16,140	32,224	27,108
55	296,000	97,860	174,032	103,514	20,595	37,644	12,279
60	296,000	97,432	165,365	110,763	20,168	30,456	3,979
65	296,000	94,416	164,964	112,668	24,403	27,481	413
70	296,000	93,791	163,704	103,897	24,039	35,490	278
75	296,000	96,122	165,455	108,480	22,149	33,152	1,674
80	296,000	96,204	163,953	107,827	23,823	31,738	565
85	296,000	96,034	162,094	106,378	19,985	35,522	209
90	296,000	95,429	162,227	100,750	18,757	42,483	236
95	296,000	94,572	161,132	105,172	24,351	31,378	231
100	296,000	96,825	161,117	106,366	29,136	25,387	228
105	296,000	95,523	163,194	101,151	31,181	30,571	291
110	296,000	95,414	167,991	115,209	21,403	31,138	241
115	296,000	93,391	163,546	104,109	18,852	36,868	3,718
120	296,000	97,416	173,966	103,415	21,709	33,475	15,366
125	296,000	97,614	167,406	104,130	21,424	34,646	7,206
130	296,000	96,941	163,477	101,177	21,761	38,736	1,803
135	296,000	97,500	162,065	102,031	25,128	31,258	3,649
140	296,000	97,611	165,120	109,103	22,157	33,590	269
145	296,000	94,701	165,478	109,383	20,546	34,900	649
150	296,000	97,355	167,454	111,880	21,630	31,931	2,012
155	296,000	98,133	164,954	103,814	24,517	35,543	1,080
160	296,000	94,425	169,423	112,808	19,562	36,789	264
Planning Horizon Average	**409,750/ 296,000**	**96,572**	**167,031**	**107,236**	**23,180**	**33,649**	**2,965**

MAP 5-1: 20 YEAR HARVEST SEQUENCE – FMS NO. 115

MAP 5-2: 20 YEAR HARVEST SEQUENCE – WHITEMUD – FMS NO. 115

Figure 5-2 provides a comparison between harvest patches currently on the landscape versus harvest patches generated by the PFMS (FMS 115) and an alternative two pass harvest system (FMS 78). These patches were produced for the first 20 years of the harvest sequence (1-10 years and 11-20 years) to show the percent area harvested and frequency of patches by patch class (0-25 ha, 25.1-50 ha, 50.1-100 ha, 100.1-200 ha, 200.1-400 ha and 400ha+).

FIGURE 5-2: PFMS VS. TWO PASS – HARVEST SEQUENCE PATCH SIZE ANALYSIS

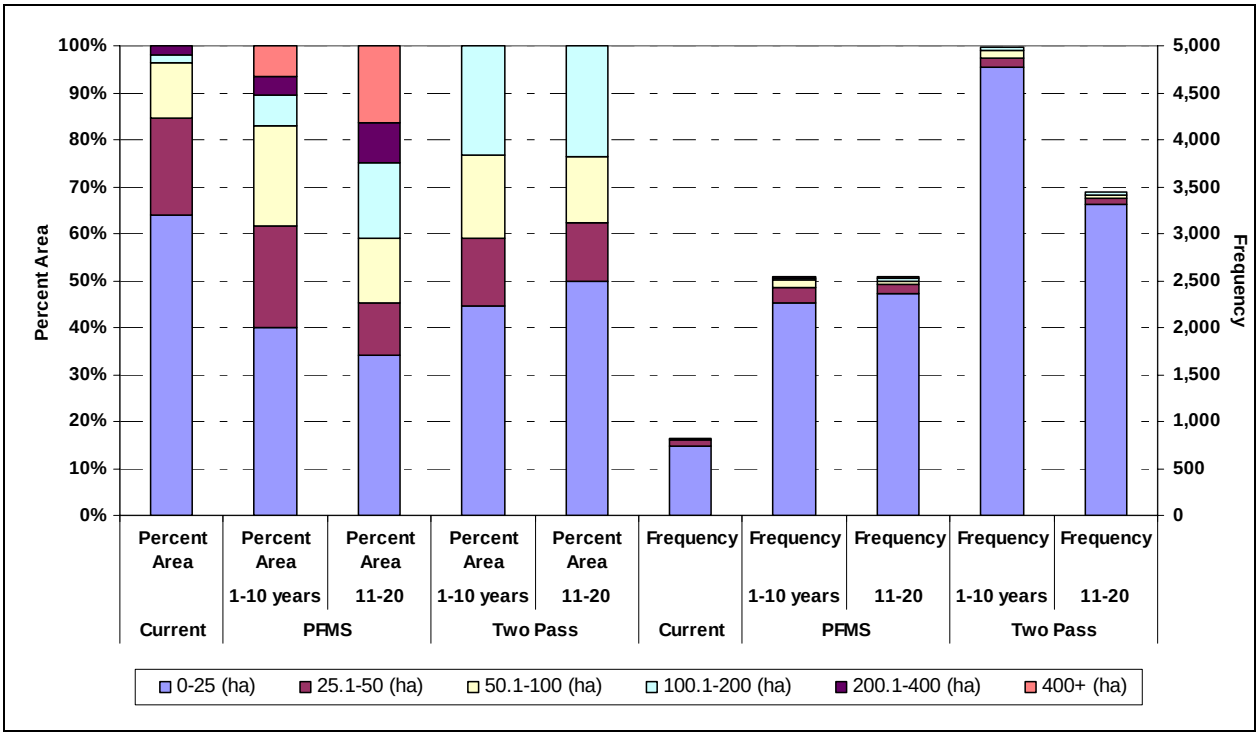


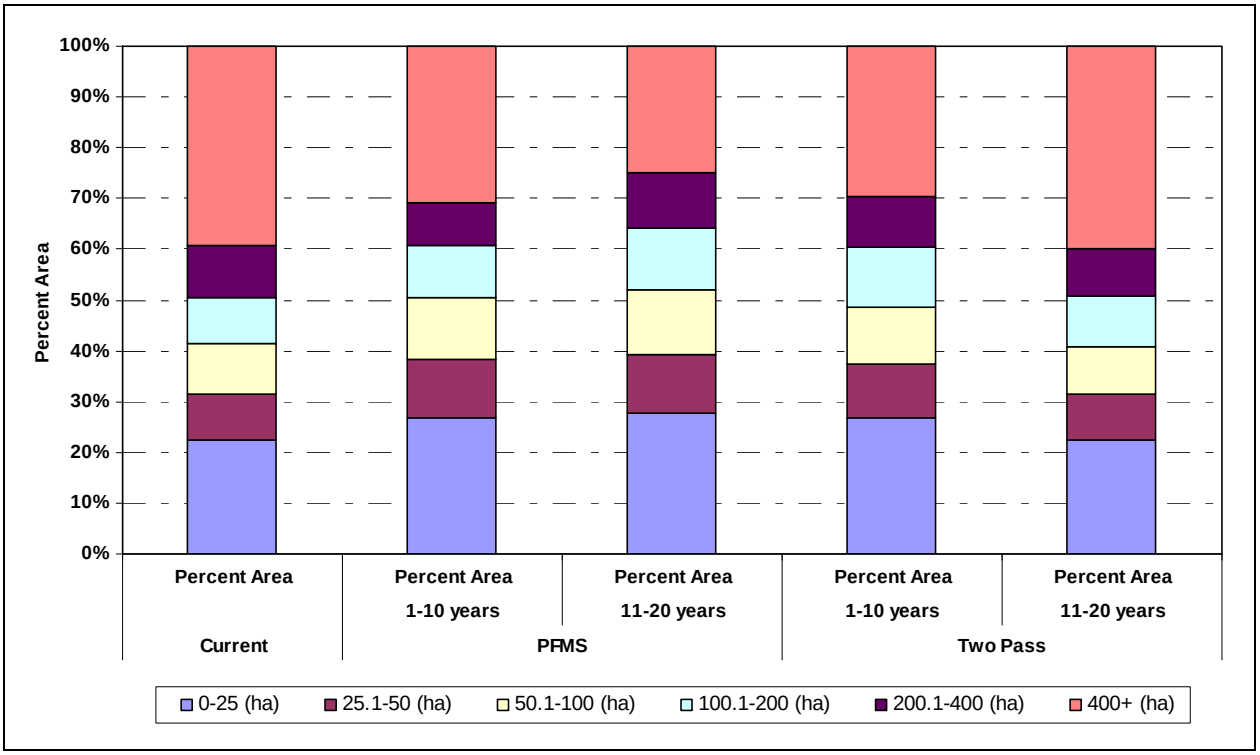
Table 5-5 provides a comparison between the amount of edge created in the PFMS (FMS 115) and an alternative two pass harvest system (FMS 78).

TABLE 5-5: PFMS VS. TWO PASS - EDGE ANALYSIS

Harvest Period (yrs)	PFMS			TWO PASS		
	Area Harvested (ha)	Edge (m)	Metres of Edge per Hectare Harvested (m/ha)	Area Harvested (ha)	Edge (m)	Metres of Edge per Hectare Harvested (m/ha)
1-10	27,930	4,801,929	172	27,340	5,700,616	209
11-20	25,084	4,573,089	182	18,714	4,167,897	223
Total	**53,014**	**9,375,018**	**177**	**46,054**	**9,868,513**	**214**

Figure 5-3 provides a comparison between the seral stage patches generated by the PFMS (FMS 115) and an alternative two pass harvest system (FMS 78) in relation to the patches currently found on the landscape. The patches developed for this analysis were created by grouping contiguous areas of forest within the same seral stage class not split by delineated linear features.

FIGURE 5-3: PFMS VS. TWO PASS - SERAL STAGE PATCH ANALYSIS



5.10.1 GIS COVERAGE DATA AND HARVEST SEQUENCE AND NET LANDBASE DATABASE

The enclosed DVD contains the ArcInfo net landbase coverage and the associated harvest sequence and net landbase database. The link between the coverage and the net landbase is GIS_LINK. The harvest sequence and net landbase database structure and description can be found in Appendix A.

DFMP

6.0

PFMS Additional Analysis

6.0 PFMS ADDITIONAL ANALYSIS[1]

Buchanan and Tolko's PFMS was selected on its ability to achieve specific goals and objectives. Several aspects of the goals and objectives required incorporation into the PFMS modelling and reporting. This section will highlight the following items:

6.1 FUTURE FOREST CONDITION

Future forest condition based on the PFMS is presented in Figure 6-1 through Figure 6-8. The harvest summary tables indicate a relatively even amount of volume being harvested over the entire 160 year planning horizon for both conifer and deciduous, with an average harvest age levelling out at approximately 80 years.

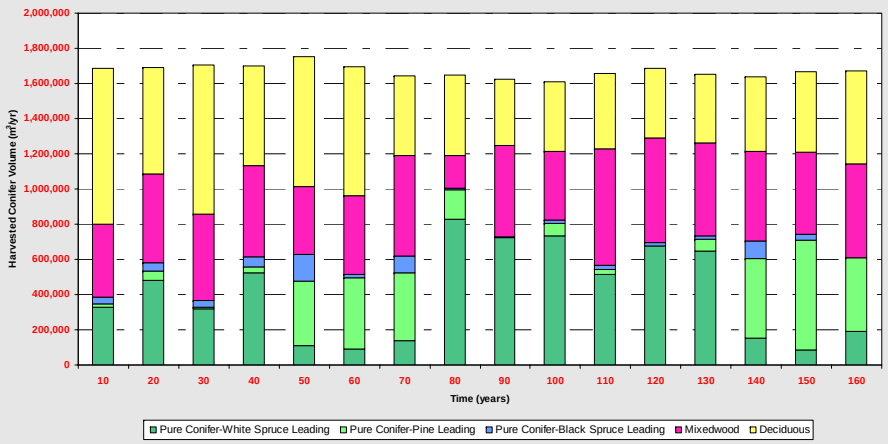
The future forest summary in Figure 6-2 demonstrates how the cover type distribution of the forest changes over time. It identifies there is no change in cover type distribution over the entire planning horizon (as expected from the yield curve transition used, once a stand is harvested it will regenerate on the same yield strata with a fully stocked density class).

The cover type and age class summaries in Figure 6-3 through Figure 6-7 show how the age class distribution of the forest changes over time and Figure 6-8 illustrates how the seral stage distribution of the forest changes over time. To approximate natural stand dynamics, non-operable stands that are assumed to have no anthropogenic disturbance in this plan, will through time have their age cycled from 200 years to the beginning age of its respective cover group late seral stage threshold. This assumption captures the fact that trees and stands will not get indefinitely old through the planning horizon. It also captures the fact that the stand will not revert to an earlier seral stage as a result of the structure and other characteristics that define late seral stage still being intact throughout the 160 year planning horizon. The future forest analysis does not account for area left behind as structure retention, which would also contribute to area in future old age classes. The age class graphs for the net productive landbase show how the forest moves towards a "regulated forest state". Map 6-1 through Map 6-5 depict the current forest, 10 year, 40 year, 80 year and 160 year projection of age class by cover type distribution for the gross landbase (full size maps can be found in Appendix H, Map H-12 to H-16). The net landbase is depicted in Map 6-6 through Map 6-10 (full size maps can be found in Appendix I, Map I-1 to I-5).

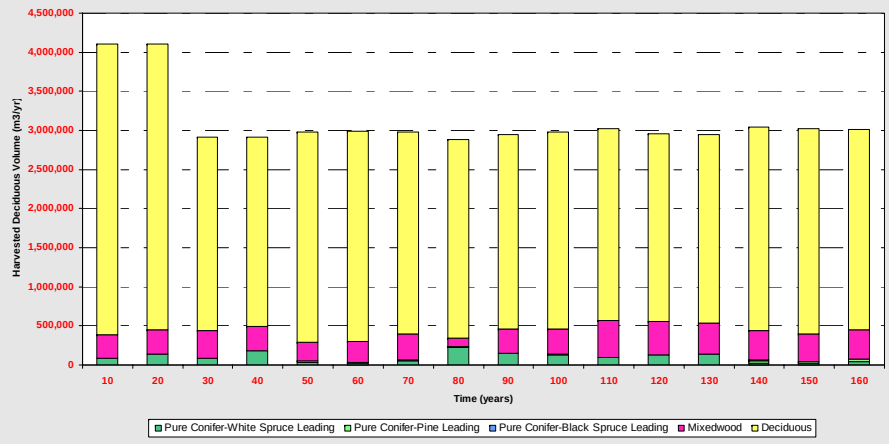
[1] *The additional analysis presented does not account for harvesting activity on the deciduous landbase within grazing lease areas.*

FIGURE 6-1: FUTURE FOREST HARVEST SUMMARIES

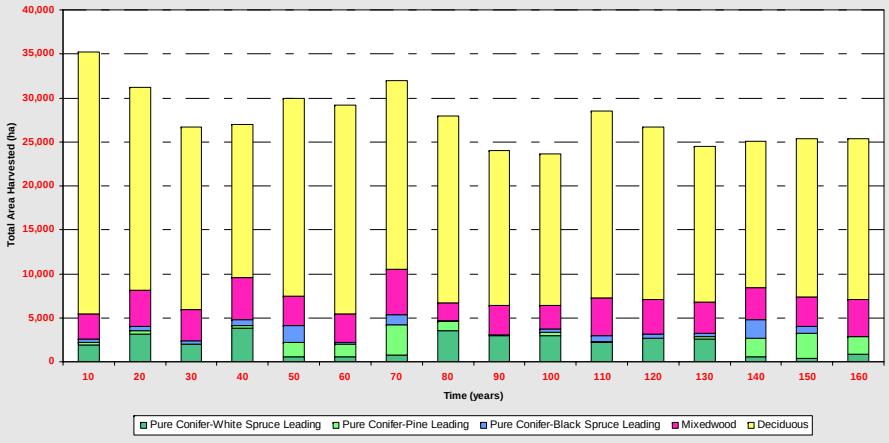
CONIFER VOLUME FLOW (S9 INCLUDED)



DECIDUOUS VOLUME FLOW



HARVESTED AREA (S9 INCLUDED)



AVERAGE HARVEST AGE (S9 INCLUDED)

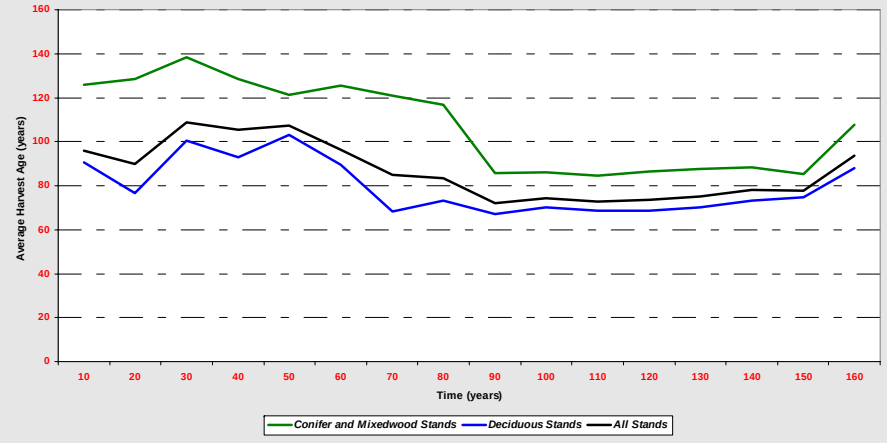


FIGURE 6-2: FUTURE FOREST SUMMARY: COVER TYPE

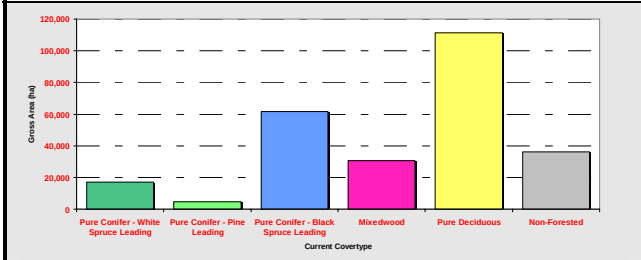
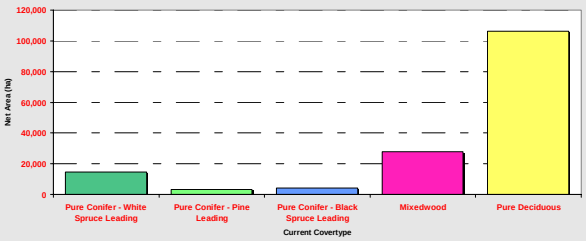
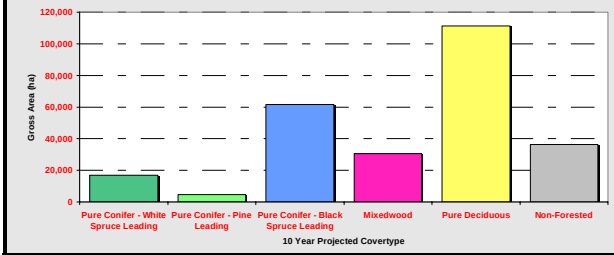
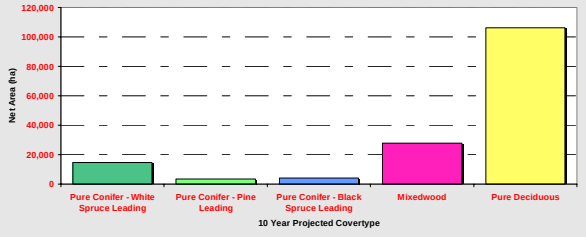
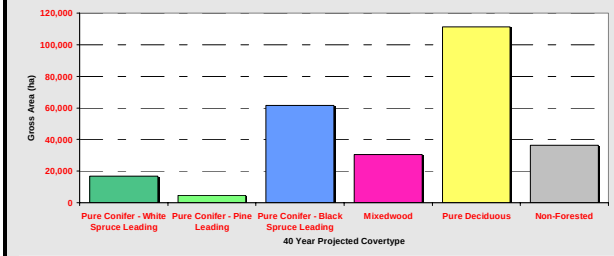
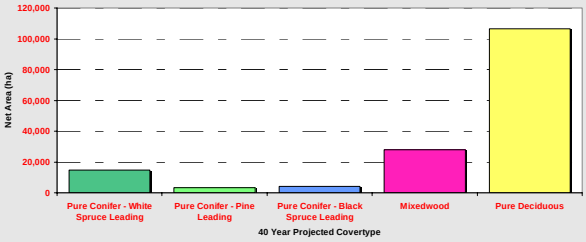
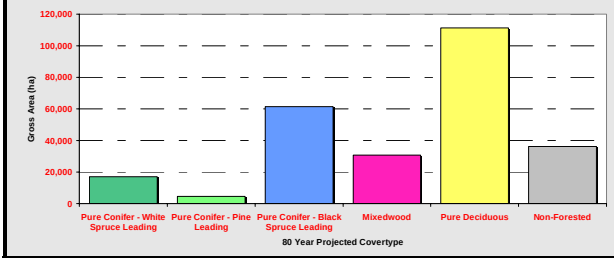
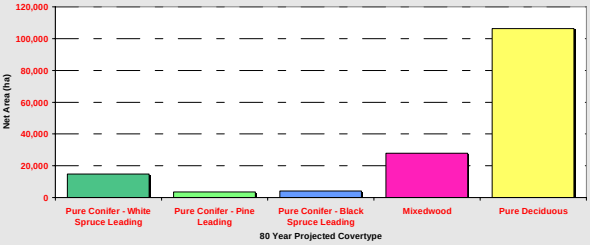
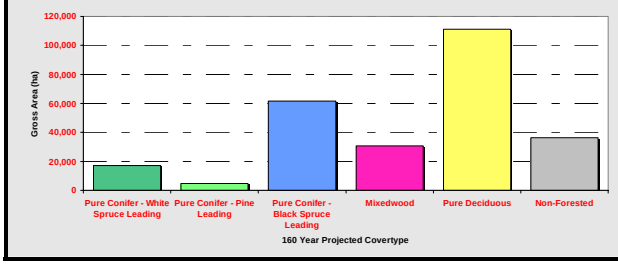
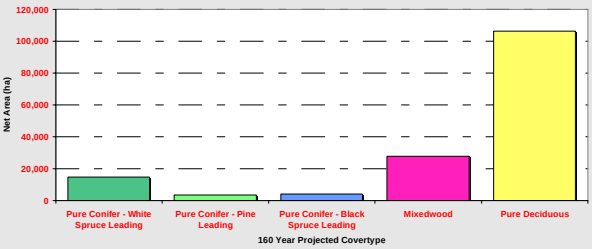
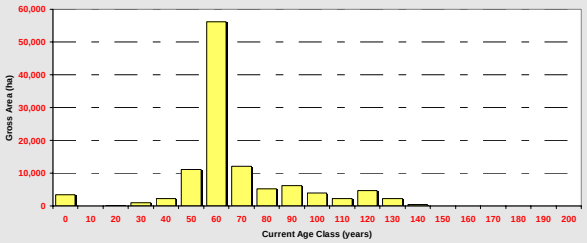
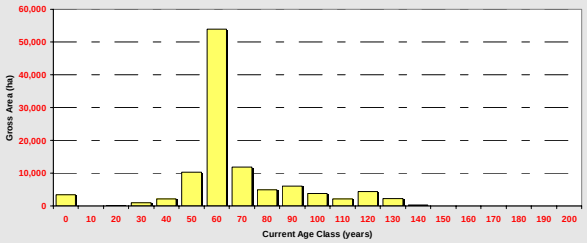
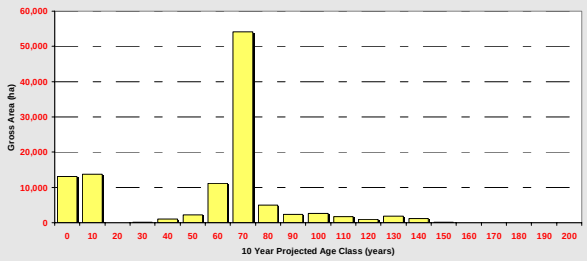
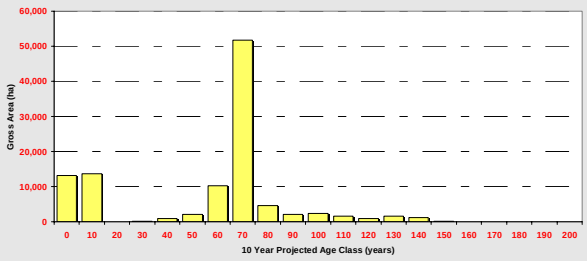
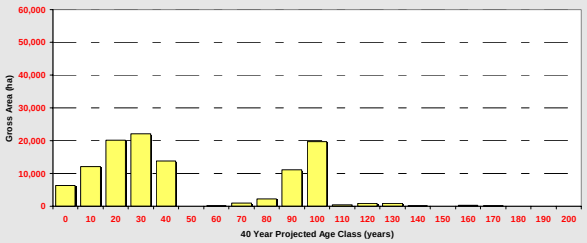
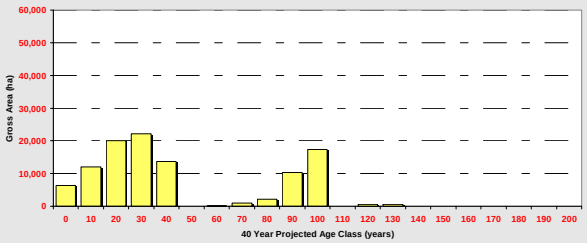
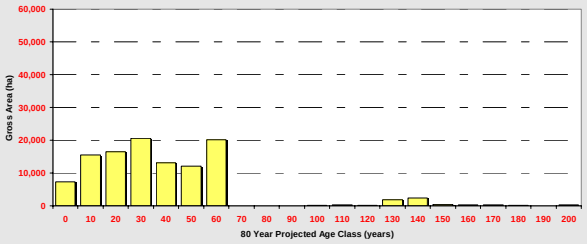
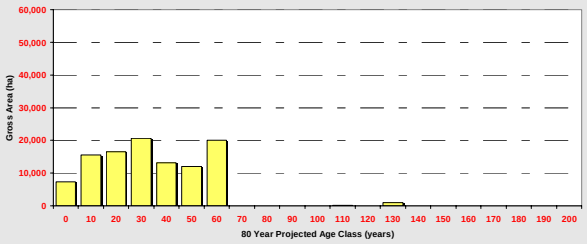
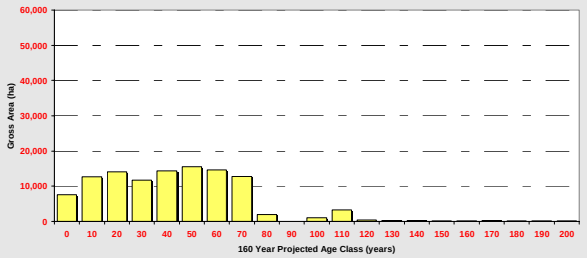
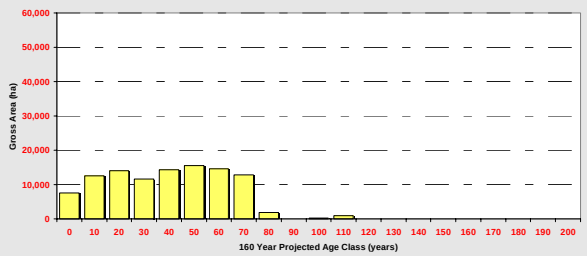
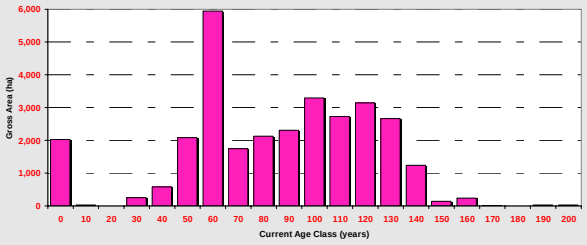
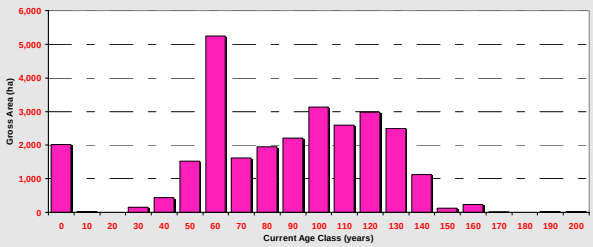
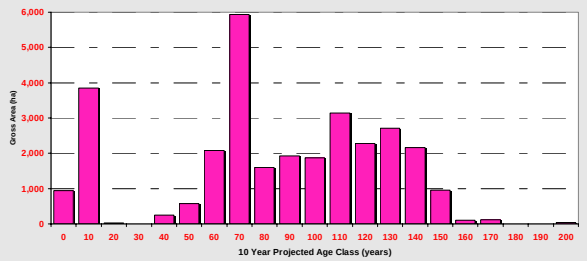
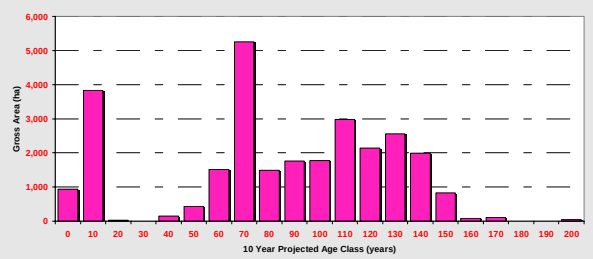
GROSS LANDBASE	NET PRODUCTIVE LANDBASE
Current	**Current**
	
Year 10 Projection	**Year 10 Projection**
	
Year 40 Projection	**Year 40 Projection**
	
Year 80 Projection	**Year 80 Projection**
	
Year 160 Projection	**Year 160 Projection**
	

FIGURE 6-3: FUTURE FOREST SUMMARY[2]: PURE DECIDUOUS AGE CLASS

GROSS LANDBASE	NET PRODUCTIVE LANDBASE
Current	**Current**
	
Year 10 Projection	**Year 10 Projection**
	
Year 40 Projection	**Year 40 Projection**
	
Year 80 Projection	**Year 80 Projection**
	
Year 160 Projection	**Year 160 Projection**
	

[2] *Future forest analysis does not account for structure retention left after harvesting*

FIGURE 6-4: FUTURE FOREST SUMMARY[3]: MIXEDWOOD AGE CLASS

GROSS LANDBASE	NET PRODUCTIVE LANDBASE
Current	**Current**
	
Year 10 Projection	**Year 10 Projection**
	
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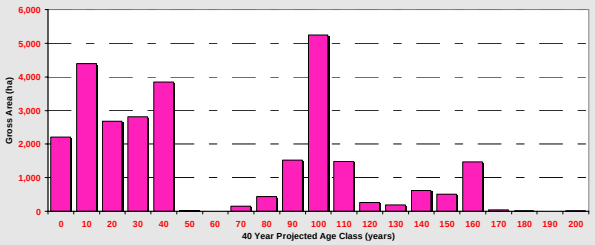
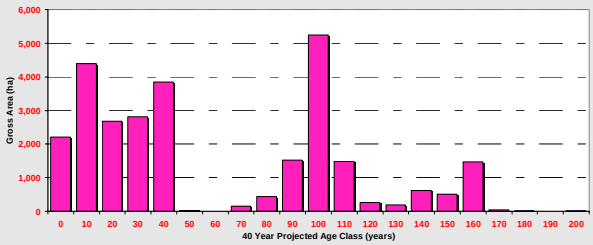
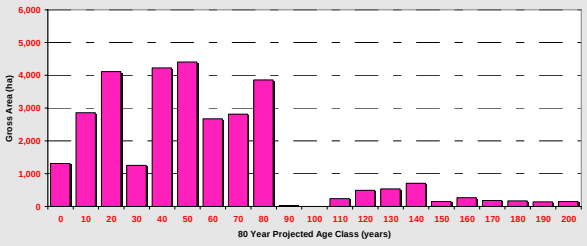
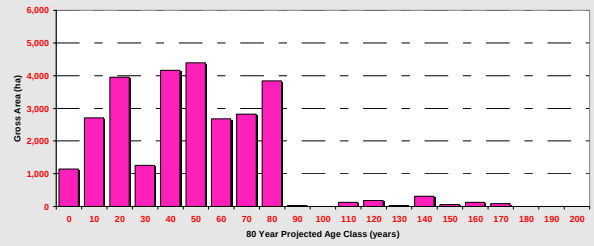
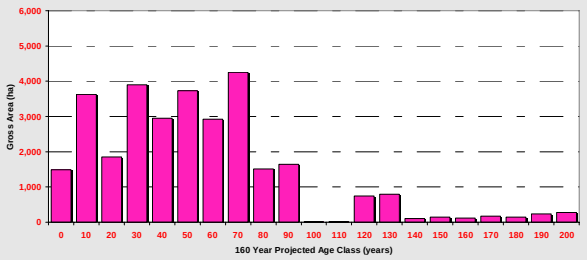
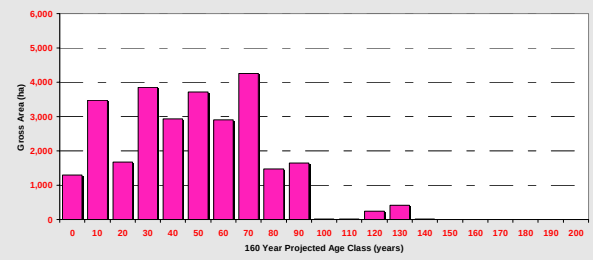
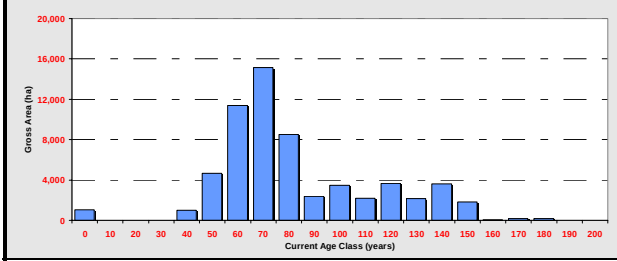
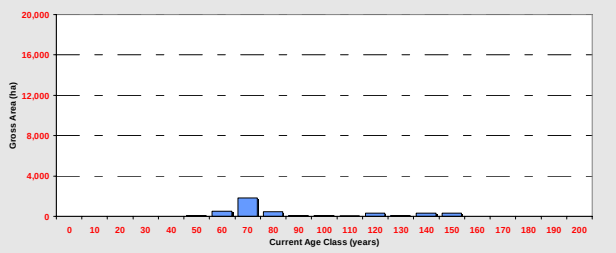
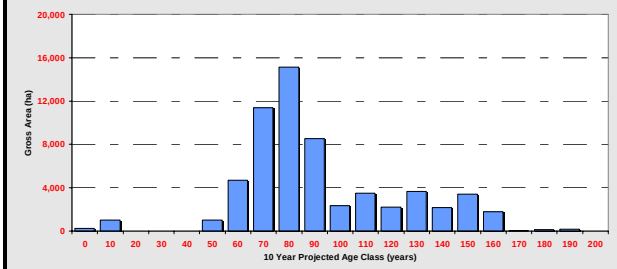
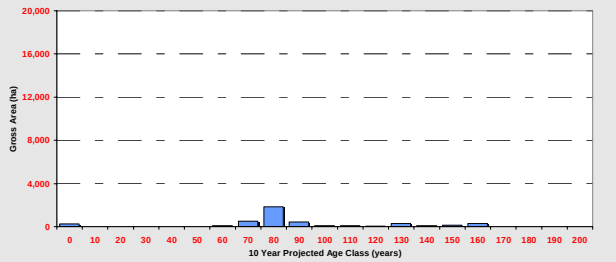
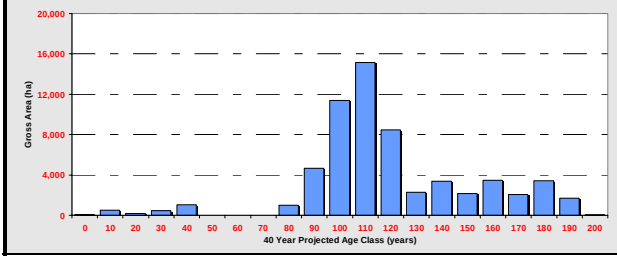
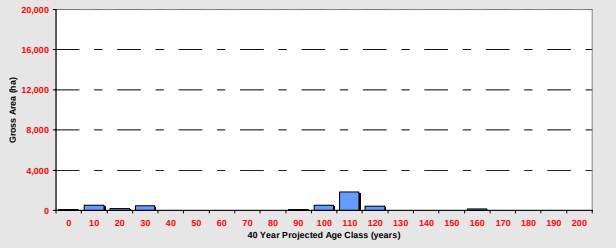
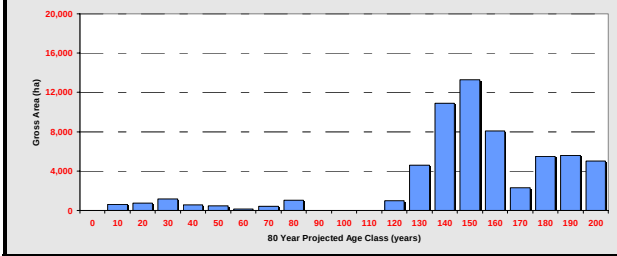
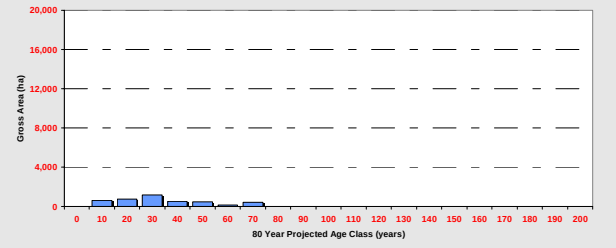
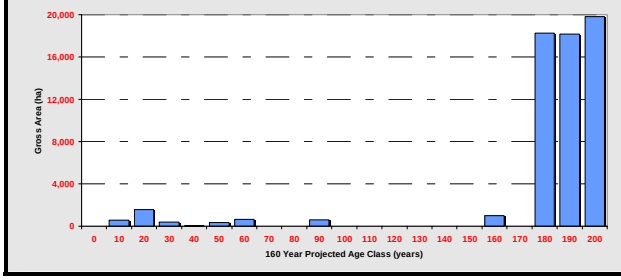
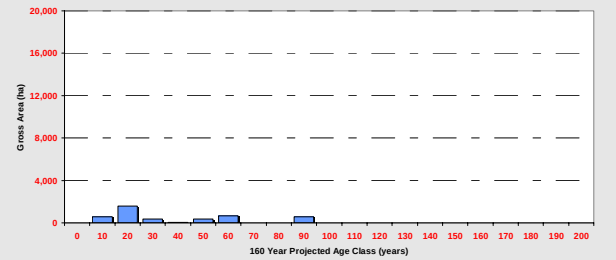
	
Year 80 Projection	**Year 80 Projection**
	
Year 160 Projection	**Year 160 Projection**
	

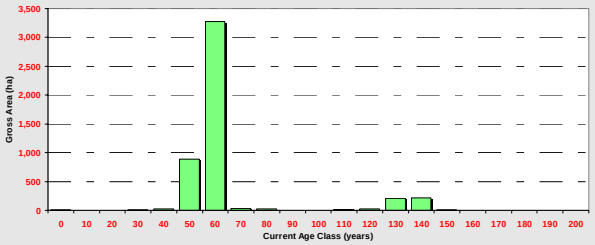
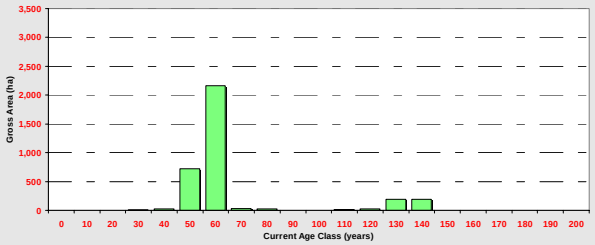
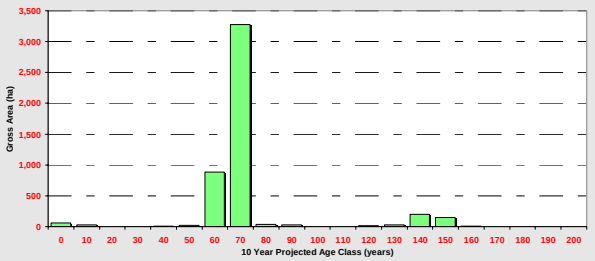
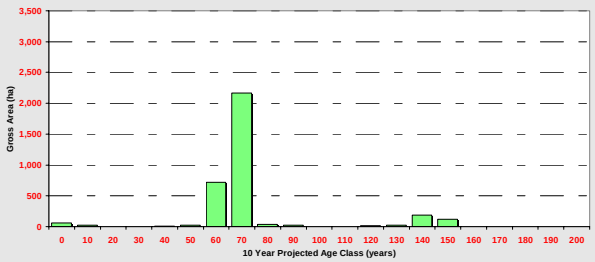
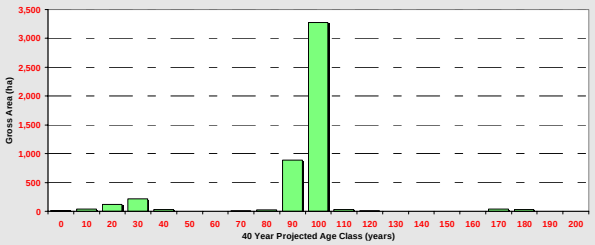
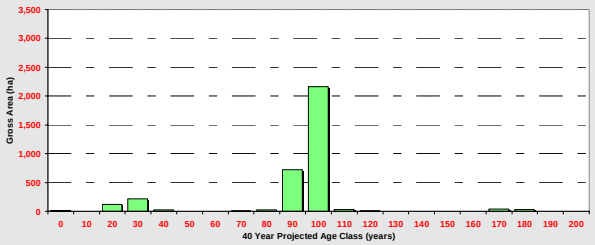
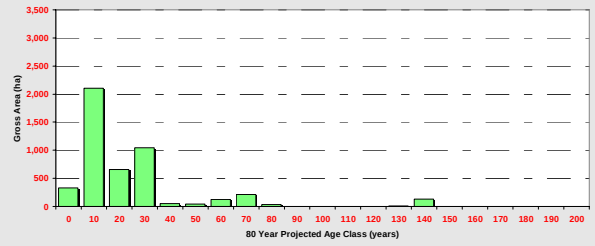
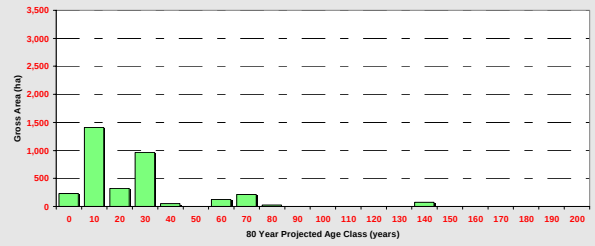
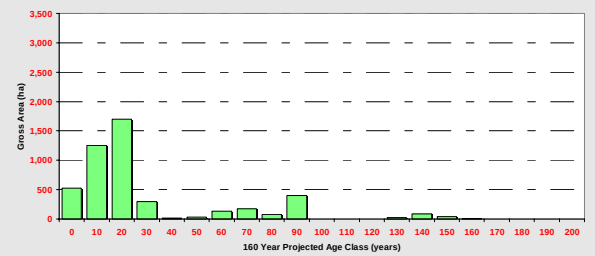
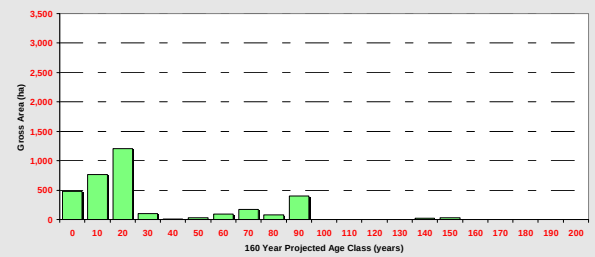
[3] *Future forest analysis does not account for structure retention left after harvesting*

FIGURE 6-5: FUTURE FOREST SUMMARY[4]: PURE CONIFER - SB AGE CLASS

GROSS LANDBASE	NET PRODUCTIVE LANDBASE
Current	**Current**
	
Year 10 Projection	**Year 10 Projection**
	
Year 40 Projection	**Year 40 Projection**
	
Year 80 Projection	**Year 80 Projection**
	
Year 160 Projection	**Year 160 Projection**
	

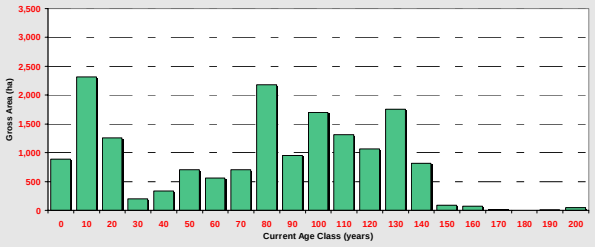
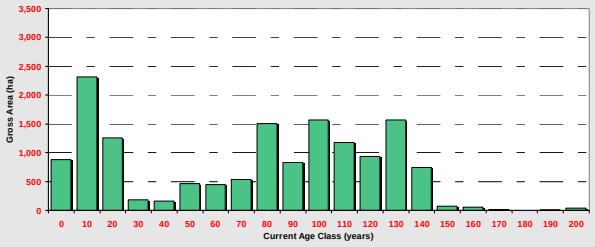
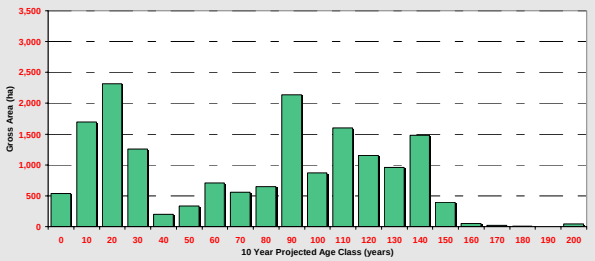
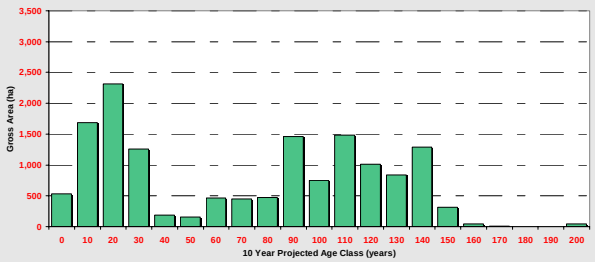
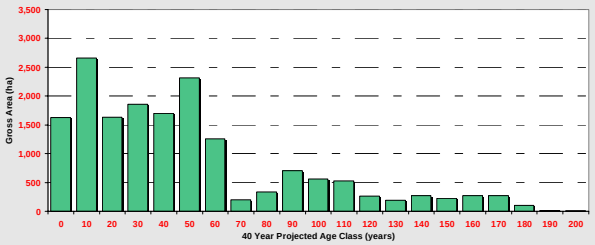
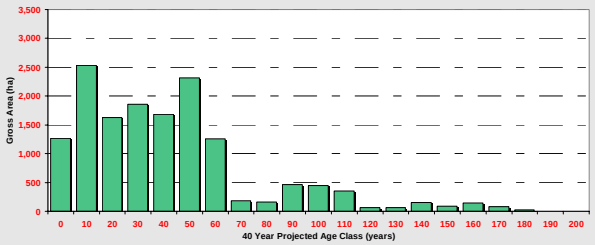
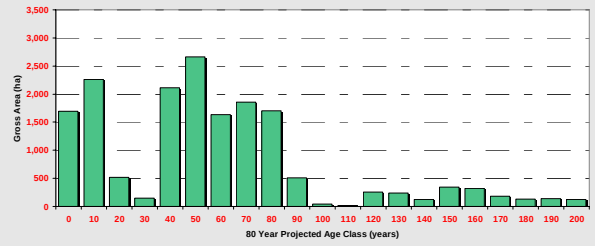
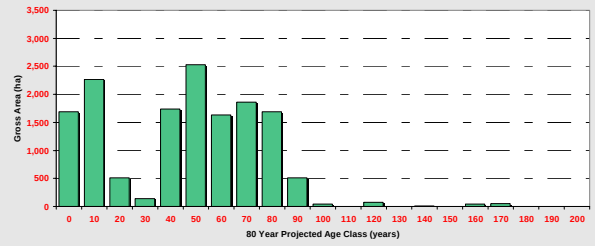
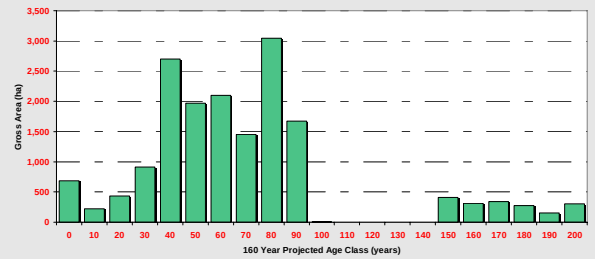
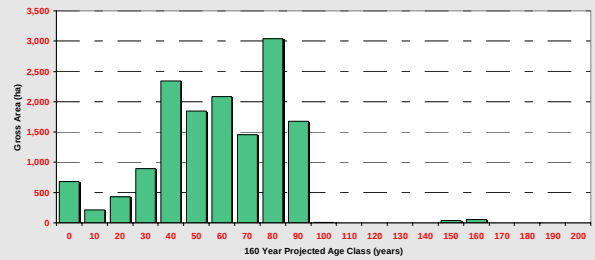
[4] *Future forest analysis does not account for structure retention left after harvesting*

FIGURE 6-6: FUTURE FOREST SUMMARY[5]: PURE CONIFER - PINE AGE CLASS

GROSS LANDBASE	NET PRODUCTIVE LANDBASE
Current	**Current**
	
Year 10 Projection	**Year 10 Projection**
	
Year 40 Projection	**Year 40 Projection**
	
Year 80 Projection	**Year 80 Projection**
	
Year 160 Projection	**Year 160 Projection**
	

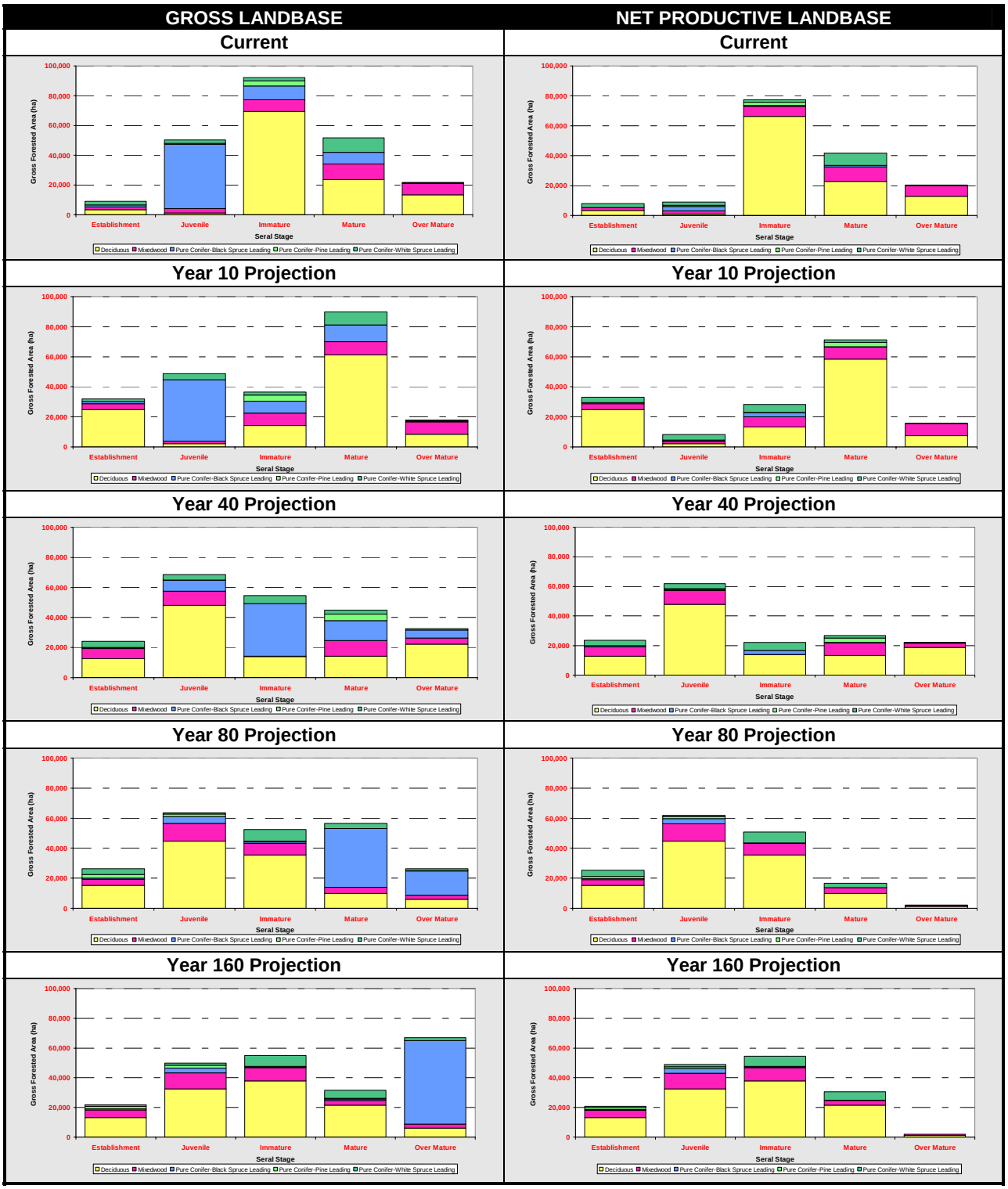
[5] *Future forest analysis does not account for structure retention left after harvesting*

FIGURE 6-7: FUTURE FOREST SUMMARY[6]: PURE CONIFER - SW AGE CLASS

GROSS LANDBASE	NET PRODUCTIVE LANDBASE
Current	**Current**
	
Year 10 Projection	**Year 10 Projection**
	
Year 40 Projection	**Year 40 Projection**
	
Year 80 Projection	**Year 80 Projection**
	
Year 160 Projection	**Year 160 Projection**
	

[6] *Future forest analysis does not account for structure retention left after harvesting*

FIGURE 6-8: FUTURE FOREST SUMMARY[7]: COVER TYPE AND SERAL STAGE



[7] *Future forest analysis does not account for structure retention left after harvesting.*

MAP 6-1: CURRENT – GROSS AGE CLASS DISTRIBUTION

MAP 6-2: 10 YEAR PROJECTION – GROSS AGE CLASS DISTRIBUTION

MAP 6-3: 40 YEAR PROJECTION – GROSS AGE CLASS DISTRIBUTION

MAP 6-4: 80 YEAR PROJECTION – GROSS AGE CLASS DISTRIBUTION

MAP 6-5: 160 YEAR PROJECTION – GROSS AGE CLASS DISTRIBUTION

MAP 6-6: CURRENT – NET AGE CLASS DISTRIBUTION

MAP 6-7: 10 YEAR PROJECTION – NET AGE CLASS DISTRIBUTION

MAP 6-8: 40 YEAR PROJECTION – NET AGE CLASS DISTRIBUTION

MAP 6-9: 80 YEAR PROJECTION – NET AGE CLASS DISTRIBUTION

MAP 6-10: 160 YEAR PROJECTION – NET AGE CLASS DISTRIBUTION

6.2 SERAL STAGE STRATEGY IMPLEMENTATION AND ANALYSIS

Appendix B details the seral stage strategy developed specifically for this FMA Area. The strategy focuses on the retention of effective, high quality late seral stage stands across the entire landbase. The minimum percentage of high quality, late seral stage stands retained on the net operable landbase (as a percentage of the gross forested area) are as follows:

- 2% for the mixedwood cover group by operating area;
- 1.5% for the pine leading conifer cover group by operating area;
- 1.0% for the deciduous cover group by operating area;
- 0.5% for the white spruce leading conifer cover group by operating area.

Significant effort was placed on the selection and spatial identification of the highest quality stands throughout the planning horizon, these stands are illustrated on Map 6-11.

Reporting carried out on the PFMS late seral stage strategy includes:

- The operable and non-operable area by age class, cover group and seral stage at different points in time: Table 6-1 through Table 6-9;
- The seral stage trend over the entire planning horizon for each seral stage and cover group by FMA and operating area: Figure 6-9 through Figure 6-13;
- The seral stage distribution over time are illustrated in Map 6-12 through Map 6-16 (full size maps can be found in Appendix I, Map I-6 to I-10);
- Forest class patches based on five seral stage groupings (establishment, juvenile, immature, mature, over-mature) and six patch size classes (0 – 25 ha, 25.1 – 50 ha, 50.1 – 100 ha, 100.1 – 200 ha, 200.1 – 400 ha, >400 ha). Patch sizes of these groups were determined for the current forest, 10, 40, 80 and 160 years into the future. The FMA wide seral stage patch size summary is presented in Table 6-10;
- Summaries of the late seral stage present over the planning horizon: Section 6.2.1.

Note:

- All high quality operable late seral stage stands are harvested during the planning horizon.

- When a stand was identified as a candidate for high quality late seral stage retention and was also identified as a planned cutblock, the stand was retained for late seral stage and removed from the planned cutblock layer.

- At the end of the planning horizon, for the Joint and Tolko FMAs combined, the total gross forested area in late seral stage is 124,200 ha.

- The seral stage analysis in this section does not include operable deciduous stands within grazing lease areas.

MAP 6-11: HIGH QUALITY LATE SERAL STAGE STANDS IDENTIFIED FOR RETENTION

TABLE 6-1: COVER GROUP AGE CLASS AND SERAL STAGE SUMMARY – CURRENT (FMA)

Age Class[8]	Yield Curve Group										Total	
	C-SW		C-PL		C-SB		MIX		DEC			
	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable
0	877	16	0	6	17	1,015	2,012	16	3,386	41	6,293	1,094
10	1,572	0	0	0	0	0	30	0	0	0	1,602	0
15	745	0	0	0	0	0	0	0	0	0	745	0
20	1,258	0	0	0	20	0	5	0	133	5	1,416	5
30	185	17	7	0	0	0	164	88	950	88	1,306	192
40	158	176	20	0	4	1,007	460	121	2,069	137	2,712	1,443
50	473	230	877	11	70	4,600	1,702	385	10,319	839	13,441	6,066
55	0	0	0	0	0	0	0	0	0	0	0	0
60	452	110	3,215	58	517	10,885	5,583	356	53,887	2,339	63,655	13,747
65	0	0	0	0	0	0	0	0	0	0	0	0
70	554	153	35	1	1,841	13,308	1,656	84	11,777	374	15,863	13,920
75	0	0	0	0	0	0	0	0	0	0	0	0
80	1,984	198	26	1	461	8,058	1,983	140	4,975	245	9,428	8,642
90	832	125	0	0	81	2,285	2,210	98	5,988	224	9,111	2,732
95	0	0	0	0	0	0	0	0	0	0	0	0
100	1,571	123	1	0	75	3,403	3,126	173	3,769	152	8,542	3,851
110	1,174	137	16	0	44	2,163	2,589	137	2,133	70	5,957	2,507
120	940	126	26	0	309	3,342	2,985	152	4,389	230	8,650	3,850
125	0	0	0	0	0	0	0	0	0	0	0	0
130	1,567	191	206	1	88	2,074	2,504	158	2,227	80	6,593	2,503
140	748	72	216	3	334	3,281	1,131	111	336	23	2,764	3,490
150	75	13	10	0	343	1,496	122	21	39	0	590	1,529
160	66	4	0	0	1	27	234	9	0	1	301	42
170	13	3	0	0	16	145	11	0	0	0	41	148
175	0	0	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	176	0	0	0	0	0	176
190	7	0	0	0	0	3	21	2	0	0	28	5
200	43	6	0	0	0	0	21	1	0	0	63	7
EST	2,449	16	0	6	17	1,015	2,042	16	3,386	41	7,895	1,094
JUV	2,188	17	904	11	2,994	40,144	2,331	594	1,083	92	9,501	40,859
IMM	1,638	670	3,276	60	428	8,909	7,239	440	66,275	3,315	78,856	13,393
MAT	8,816	972	44	0	783	7,022	9,909	548	22,740	842	42,291	9,384
OMAT	204	26	432	3	0	179	7,030	454	12,893	556	20,559	1,218
Subtotal	*15,295*	*1,700*	*4,656*	*80*	*4,223*	*57,269*	*28,551*	*2,052*	*106,376*	*4,846*	**159,101**	**65,948**

8 Age classes 0 and 10 for the deciduous cover group were altered to coincide with the seral stage classes. Age class 0 = 0 to 10 years and age class 10 = 11 to 15. For Deciduous, the EST (establishment) seral stage includes year 0 to 10 and JUV (juvenile) starts at 11. For all cover groups, age class 15 includes ages 16 through 19 to coincide with the seral stage classification.

TABLE 6-2: COVER GROUP AGE CLASS AND SERAL STAGE SUMMARY – CURRENT (BIRCH)

Age Class[9]	Yield Curve Group										Total	
	C-SW		C-PL		C-SB		MIX		DEC			
	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable
0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	9	0	9	0
30	0	0	0	0	0	0	4	0	305	13	309	13
40	0	0	0	0	0	0	12	0	444	14	456	14
50	6	0	0	0	0	0	15	1	2,074	86	2,095	87
55	0	0	0	0	0	0	0	0	0	0	0	0
60	38	0	0	0	0	85	37	0	4,628	97	4,703	183
65	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	26	0	0	0	0	0	26
75	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	10	0	0	0	0	0	10
90	1	1	0	0	0	0	136	0	409	15	546	16
95	0	0	0	0	0	0	0	0	0	0	0	0
100	10	0	0	0	0	0	9	0	0	0	19	0
110	0	0	0	0	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0	0	0	0	0
125	0	0	0	0	0	0	0	0	0	0	0	0
130	0	0	0	0	0	4	0	0	0	0	0	4
140	0	0	0	0	0	11	0	0	0	0	0	11
150	0	0	0	0	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	0	0	0	0	0	0
170	0	0	0	0	0	0	0	0	0	0	0	0
175	0	0	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0	0	0
190	0	0	0	0	0	0	0	0	0	0	0	0
200	0	0	0	0	0	0	0	0	0	0	0	0
EST	0	0	0	0	0	0	0	0	0	0	0	0
JUV	0	0	0	0	0	121	31	1	314	13	345	135
IMM	44	0	0	0	0	0	37	0	7,146	198	7,227	198
MAT	11	1	0	0	0	15	145	0	409	15	566	31
OMAT	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	*56*	*1*	*0*	*0*	*0*	*136*	*213*	*1*	*7,869*	*226*	**8,138**	**364**

9 Age classes 0 and 10 for the deciduous cover group were altered to coincide with the seral stage classes. Age class 0 = 0 to 10 years and age class 10 = 11 to 15. For Deciduous, the EST (establishment) seral stage includes year 0 to 10 and JUV (juvenile) starts at 11. For all cover groups, age class 15 includes ages 16 through 19 to coincide with the seral stage classification.

TABLE 6-3: COVER GROUP AGE CLASS AND SERAL STAGE SUMMARY – CURRENT (SALT)

Age Class[10]	Yield Curve Group										Total	
	C-SW		C-PL		C-SB		MIX		DEC			
	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable
0	8	0	0	0	2	0	719	0	613	0	1,342	0
10	306	0	0	0	0	0	0	0	0	0	306	0
15	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	15	0	1	0	16	2	33	2
30	16	17	0	0	0	0	7	4	197	3	220	25
40	61	136	0	0	0	0	127	54	155	14	342	204
50	110	59	0	0	0	5	120	25	813	81	1,043	169
55	0	0	0	0	0	0	0	0	0	0	0	0
60	70	9	115	2	93	2,151	1,157	91	16,557	803	17,993	3,056
65	0	0	0	0	0	0	0	0	0	0	0	0
70	28	6	2	0	692	2,110	75	5	3,309	144	4,105	2,265
75	0	0	0	0	0	0	0	0	0	0	0	0
80	35	0	0	0	61	502	32	2	503	12	630	517
90	28	7	0	0	1	123	71	7	87	5	187	142
95	0	0	0	0	0	0	0	0	0	0	0	0
100	160	30	0	0	0	111	349	31	360	50	869	222
110	117	26	0	0	4	15	394	25	171	7	686	73
120	148	26	0	0	154	538	1,747	117	2,993	200	5,043	881
125	0	0	0	0	0	0	0	0	0	0	0	0
130	312	43	0	0	10	181	991	97	410	59	1,723	379
140	197	40	0	0	66	487	687	31	213	9	1,163	566
150	21	9	0	0	160	361	92	2	0	0	274	372
160	0	0	0	0	1	1	0	0	0	1	1	2
170	0	0	0	0	0	0	0	0	0	0	0	0
175	0	0	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0	0	0
190	0	0	0	0	0	0	0	0	0	0	0	0
200	0	0	0	0	0	0	0	0	0	0	0	0
EST	314	0	0	0	2	0	719	0	613	0	1,648	0
JUV	16	17	0	0	863	4,890	255	84	214	5	1,348	4,996
IMM	268	210	117	2	158	664	1,232	96	17,524	897	19,300	1,870
MAT	998	172	0	0	238	1,030	846	65	3,899	161	5,980	1,429
OMAT	21	9	0	0	0	0	3,517	247	4,146	327	7,685	582
Subtotal	*1,617*	*408*	*117*	*2*	*1,261*	*6,583*	*6,569*	*492*	*26,397*	*1,391*	**35,961**	**8,877**

10 Age classes 0 and 10 for the deciduous cover group were altered to coincide with the seral stage classes. Age class 0 = 0 to 10 years and age class 10 = 11 to 15. For Deciduous, the EST (establishment) seral stage includes year 0 to 10 and JUV (juvenile) starts at 11. For all cover groups, age class 15 includes ages 16 through 19 to coincide with the seral stage classification.

TABLE 6-4: COVER GROUP AGE CLASS AND SERAL STAGE SUMMARY – CURRENT (UTIKUMA)

Age Class[11]	Yield Curve Group										Total	
	C-SW		C-PL		C-SB		MIX		DEC			
	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable
0	772	16	0	4	11	1,015	959	16	1,776	14	3,518	1,064
10	1,230	0	0	0	0	0	0	0	0	0	1,230	0
15	670	0	0	0	0	0	0	0	0	0	670	0
20	1,219	0	0	0	0	0	3	0	17	0	1,240	0
30	168	0	7	0	0	0	13	3	96	3	283	6
40	19	3	20	0	4	997	108	25	188	14	339	1,040
50	311	158	260	9	68	4,441	998	246	2,221	316	3,857	5,169
55	0	0	0	0	0	0	0	0	0	0	0	0
60	208	67	1,472	52	421	8,101	3,280	196	22,100	826	27,482	9,242
65	0	0	0	0	0	0	0	0	0	0	0	0
70	133	121	12	1	1,049	10,698	788	47	5,585	151	7,567	11,018
75	0	0	0	0	0	0	0	0	0	0	0	0
80	462	36	16	1	348	7,030	1,106	68	2,141	170	4,072	7,305
90	511	24	0	0	38	1,904	643	16	546	32	1,739	1,976
95	0	0	0	0	0	0	0	0	0	0	0	0
100	1,304	82	1	0	71	3,276	2,237	81	1,576	45	5,189	3,485
110	1,010	62	16	0	15	1,973	2,042	85	1,624	53	4,707	2,172
120	746	99	26	0	119	2,468	1,158	27	1,396	29	3,445	2,623
125	0	0	0	0	0	0	0	0	0	0	0	0
130	1,122	79	64	1	39	1,582	1,388	50	1,814	21	4,427	1,733
140	549	32	106	3	268	2,470	424	79	85	4	1,432	2,588
150	44	2	3	0	56	976	20	13	39	0	163	991
160	56	2	0	0	0	26	234	9	0	0	290	37
170	13	3	0	0	16	145	11	0	0	0	41	148
175	0	0	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	176	0	0	0	0	0	176
190	0	0	0	0	0	3	0	0	0	0	0	3
200	0	0	0	0	0	0	0	0	0	0	0	0
EST	2,002	16	0	4	11	1,015	959	16	1,776	14	4,748	1,064
JUV	2,056	0	287	9	1,928	33,171	1,121	274	113	3	5,506	33,457
IMM	671	348	1,500	54	205	7,716	4,068	243	24,509	1,156	30,953	9,518
MAT	5,703	413	44	0	379	5,199	6,028	249	8,272	354	20,426	6,215
OMAT	114	7	174	3	0	179	3,235	179	6,534	153	10,056	521
Subtotal	*10,546*	*784*	*2,004*	*70*	*2,523*	*47,281*	*15,412*	*961*	*41,204*	*1,679*	**71,689**	**50,775**

11 Age classes 0 and 10 for the deciduous cover group were altered to coincide with the seral stage classes. Age class 0 = 0 to 10 years and age class 10 = 11 to 15. For Deciduous, the EST (establishment) seral stage includes year 0 to 10 and JUV (juvenile) starts at 11. For all cover groups, age class 15 includes ages 16 through 19 to coincide with the seral stage classification.

TABLE 6-5: COVER GROUP AGE CLASS AND SERAL STAGE SUMMARY – CURRENT (WHITEMUD)

Age Class[12]	Yield Curve Group										Total	
	C-SW		C-PL		C-SB		MIX		DEC			
	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable
0	98	0	0	2	4	0	334	1	997	27	1,433	30
10	36	0	0	0	0	0	30	0	0	0	66	0
15	75	0	0	0	0	0	0	0	0	0	75	0
20	39	0	0	0	5	0	0	0	90	3	134	3
30	2	0	0	0	0	0	141	81	351	68	494	149
40	78	38	0	0	0	10	214	42	1,282	95	1,574	184
50	46	13	618	2	2	155	569	113	5,211	356	6,446	640
55	0	0	0	0	0	0	0	0	0	0	0	0
60	137	34	1,628	4	3	548	1,108	68	10,602	613	13,477	1,267
65	0	0	0	0	0	0	0	0	0	0	0	0
70	393	27	21	0	101	474	794	31	2,882	78	4,190	611
75	0	0	0	0	0	0	0	0	0	0	0	0
80	1,487	162	10	0	52	516	846	70	2,332	62	4,727	810
90	291	94	0	0	41	259	1,360	75	4,945	171	6,639	599
95	0	0	0	0	0	0	0	0	0	0	0	0
100	97	11	0	0	4	16	531	61	1,833	56	2,465	144
110	46	48	0	0	25	176	153	27	339	11	564	262
120	46	2	0	0	37	337	80	8	0	0	163	347
125	0	0	0	0	0	0	0	0	0	0	0	0
130	133	69	142	0	39	307	125	11	3	0	442	387
140	2	0	109	0	0	313	20	1	38	10	170	324
150	9	2	7	0	127	158	11	5	0	0	154	165
160	10	2	0	0	0	0	0	0	0	0	10	2
170	0	0	0	0	0	0	0	0	0	0	0	0
175	0	0	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0	0	0
190	7	0	0	0	0	0	21	2	0	0	28	2
200	43	6	0	0	0	0	21	1	0	0	63	7
EST	133	0	0	2	4	0	364	1	997	27	1,499	30
JUV	116	0	618	2	203	1,962	924	235	441	71	2,302	2,270
IMM	654	111	1,659	4	66	529	1,902	100	17,095	1,064	21,376	1,808
MAT	2,103	386	0	0	166	778	2,890	234	10,159	312	15,319	1,709
OMAT	69	11	258	0	0	0	277	28	2,213	77	2,818	116
Subtotal	*3,076*	*508*	*2,535*	*8*	*439*	*3,269*	*6,357*	*598*	*30,906*	*1,551*	**43,313**	**5,933**

12 Age classes 0 and 10 for the deciduous cover group were altered to coincide with the seral stage classes. Age class 0 = 0 to 10 years and age class 10 = 11 to 15. For Deciduous, the EST (establishment) seral stage includes year 0 to 10 and JUV (juvenile) starts at 11. For all cover groups, age class 15 includes ages 16 through 19 to coincide with the seral stage classification.

TABLE 6-6: COVER GROUP AGE CLASS AND SERAL STAGE SUMMARY – 10 YEAR PROJECTION (FMA)

Age Class[13]	Yield Curve Group										Total	
	C-SW		C-PL		C-SB		MIX		DEC			
	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable
0	534	0	58	0	269	0	939	0	24,800	9	26,600	9
10	1,183	9	23	6	18	1,015	3,059	16	1,948	32	6,230	1,078
15	502	6	0	0	0	0	781	0	109	0	1,392	6
20	2,317	0	0	0	0	0	30	0	0	0	2,347	0
30	1,258	0	0	0	20	0	5	0	133	5	1,416	5
40	185	17	7	0	0	0	164	88	950	88	1,306	192
50	158	176	20	0	4	1,007	460	121	2,069	137	2,712	1,443
55	0	0	0	0	0	0	0	0	0	0	0	0
60	473	230	877	11	70	4,600	1,702	385	10,278	839	13,400	6,066
65	0	0	0	0	0	0	0	0	0	0	0	0
70	452	110	3,215	58	517	10,885	5,583	356	51,713	2,339	61,481	13,747
75	0	0	0	0	0	0	0	0	0	0	0	0
80	492	153	35	1	1,836	13,308	1,521	84	4,660	374	8,544	13,920
90	1,940	198	26	1	461	8,058	1,789	140	2,109	245	6,325	8,642
95	0	0	0	0	0	0	0	0	0	0	0	0
100	749	125	0	0	81	2,285	1,772	98	2,411	224	5,013	2,732
110	1,480	123	1	0	75	3,403	2,976	173	1,515	152	6,047	3,851
120	1,015	137	16	0	44	2,163	2,140	138	889	70	4,103	2,508
125	0	0	0	0	0	0	0	0	0	0	0	0
130	837	126	26	0	307	3,342	2,563	152	1,546	230	5,279	3,850
140	1,292	191	201	1	88	2,074	1,997	158	1,119	80	4,698	2,503
150	318	78	143	3	129	3,281	839	111	127	23	1,557	3,496
160	43	13	7	0	302	1,496	79	21	0	0	430	1,529
170	18	4	0	0	1	27	113	9	0	1	133	42
175	0	0	0	0	0	0	0	0	0	0	0	0
180	1	3	0	0	0	145	0	0	0	0	1	148
190	0	0	0	0	0	176	0	0	0	0	0	176
200	47	0	0	0	0	3	39	2	0	0	86	5
EST	1,717	9	81	6	287	1,015	3,998	16	24,800	9	30,883	1,055
JUV	4,077	6	27	0	2,909	37,859	1,440	209	2,190	37	10,643	38,111
IMM	1,269	534	4,127	70	200	7,852	7,284	741	13,296	1,064	26,177	10,260
MAT	7,805	1,053	43	1	828	10,220	8,058	495	58,483	2,957	75,216	14,726
OMAT	427	98	378	3	0	324	7,771	591	7,607	780	16,182	1,795
Subtotal	*15,295*	*1,700*	*4,656*	*80*	*4,223*	*57,269*	*28,551*	*2,052*	*106,376*	*4,846*	**159,101**	**65,948**

[13] *Age classes 0 and 10 for the deciduous cover group were altered to coincide with the seral stage classes. Age class 0 = 0 to 10 years and age class 10 = 11 to 15. For Deciduous, the EST (establishment) seral stage includes year 0 to 10 and JUV (juvenile) starts at 11. For all cover groups, age class 15 includes ages 16 through 19 to coincide with the seral stage classification.*

TABLE 6-7: COVER GROUP AGE CLASS AND SERAL STAGE SUMMARY – 40 YEAR PROJECTION (FMA)

Age Class[14]	Yield Curve Group										Total	
	C-SW		C-PL		C-SB		MIX		DEC			
	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable
0	1,624	0	20	0	100	0	2,236	0	12,665	0	16,644	0
10	2,663	0	44	0	488	0	4,409	0	5,787	0	13,390	0
15	0	0	0	0	0	0	0	0	0	0	0	0
20	1,634	0	120	0	161	0	2,679	0	20,079	0	24,674	0
30	1,859	0	214	0	442	0	2,819	0	22,122	0	27,456	0
40	1,685	16	23	6	18	1,015	3,840	16	13,721	41	19,287	1,094
50	1,560	0	0	0	0	0	30	0	0	0	1,590	0
55	757	0	0	0	0	0	0	0	0	0	757	0
60	1,078	0	0	0	20	0	5	0	133	5	1,236	5
65	181	0	0	0	0	0	0	0	0	0	181	0
70	185	17	7	0	0	0	164	88	950	88	1,306	192
75	0	0	0	0	0	0	0	0	0	0	0	0
80	158	176	20	0	4	1,007	460	121	2,069	137	2,712	1,443
90	473	230	877	11	70	4,600	1,702	385	10,278	839	13,400	6,066
95	0	0	0	0	0	0	0	0	0	0	0	0
100	452	110	3,215	58	517	10,885	5,583	356	17,423	2,339	27,191	13,747
110	372	153	30	1	1,836	13,308	1,509	84	0	374	3,748	13,920
120	64	198	10	1	409	8,058	262	140	583	245	1,328	8,642
125	0	0	0	0	0	0	0	0	0	0	0	0
130	63	125	0	0	1	2,285	186	98	566	224	817	2,732
140	151	123	0	0	0	3,403	624	175	0	152	775	3,853
150	86	140	0	0	4	2,163	506	138	0	70	596	2,511
160	144	126	0	0	152	3,342	1,474	152	0	230	1,770	3,850
170	80	191	42	1	0	2,074	38	158	0	80	159	2,503
175	0	0	0	0	0	0	0	0	0	0	0	0
180	27	78	33	3	0	3,426	10	111	0	23	70	3,640
190	0	13	0	0	0	1,671	0	21	0	0	0	1,705
200	0	4	0	0	0	30	15	9	0	1	15	45
EST	4,287	0	64	0	588	0	6,645	0	12,665	0	24,248	0
JUV	3,493	0	357	6	716	6,623	9,368	16	47,988	0	61,922	6,645
IMM	5,445	33	27	0	2,762	32,251	169	88	13,854	46	22,258	32,418
MAT	1,734	1,116	4,133	72	157	13,267	9,254	945	13,296	1,064	28,574	16,464
OMAT	337	551	75	3	0	5,128	3,114	1,002	18,573	3,737	22,099	10,421
Subtotal	*15,295*	*1,700*	*4,656*	*80*	*4,223*	*57,269*	*28,551*	*2,052*	*106,376*	*4,846*	**159,101**	**65,948**

[14] *Age classes 0 and 10 for the deciduous cover group were altered to coincide with the seral stage classes. Age class 0 = 0 to 10 years and age class 10 = 11 to 15. For Deciduous, the EST (establishment) seral stage includes year 0 to 10 and JUV (juvenile) starts at 11. For all cover groups, age class 15 includes ages 16 through 19 to coincide with the seral stage classification.*

TABLE 6-8: COVER GROUP AGE CLASS AND SERAL STAGE SUMMARY – 80 YEAR PROJECTION (FMA)

Age Class[15]	Yield Curve Group										Total	
	C-SW		C-PL		C-SB		MIX		DEC			
	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable
0	1,692	0	329	0	18	0	1,314	0	15,265	0	18,619	0
10	2,262	0	2,103	0	590	0	2,864	0	7,593	0	15,412	0
15	0	0	0	0	0	0	0	0	0	0	0	0
20	517	0	654	0	750	0	4,117	0	16,457	0	22,495	0
30	144	0	1,046	0	1,193	0	1,257	0	20,599	0	24,239	0
40	2,111	0	50	0	559	0	4,231	0	13,082	0	20,034	0
50	1,717	0	1	0	160	0	2,157	0	6,259	0	10,294	0
55	945	0	43	0	328	0	2,252	0	5,787	0	9,355	0
60	648	0	12	0	73	0	1,041	0	10,337	0	12,110	0
65	986	0	108	0	89	0	1,638	0	9,743	0	12,564	0
70	1,325	0	156	0	173	0	1,880	0	44	0	3,578	0
75	534	0	58	0	269	0	939	0	0	0	1,800	0
80	1,685	16	23	6	18	1,015	3,840	16	0	41	5,566	1,094
90	281	0	0	0	0	0	30	0	0	0	310	0
95	227	0	0	0	0	0	0	0	0	0	227	0
100	39	0	0	0	5	0	0	0	3	85	47	85
110	2	17	0	0	0	0	145	88	161	111	308	216
120	74	176	0	0	0	1,007	207	280	39	137	320	1,601
125	0	0	0	0	0	0	0	0	0	0	0	0
130	6	230	0	12	0	4,600	42	495	1,006	840	1,054	6,178
140	10	110	72	60	0	10,885	327	377	0	2,339	410	13,771
150	1	344	0	1	0	13,308	59	93	0	374	60	14,119
160	42	275	0	1	0	8,058	128	140	0	245	169	8,719
170	46	138	0	0	0	2,285	82	98	0	224	128	2,745
175	0	0	0	0	0	0	0	0	0	0	0	0
180	0	127	0	0	0	5,507	0	175	0	152	0	5,961
190	0	140	0	0	0	5,589	0	138	0	70	0	5,937
200	0	126	0	0	0	5,014	0	152	0	230	0	5,522
EST	3,955	0	2,433	0	607	0	4,179	0	15,265	0	26,438	0
JUV	661	0	1,752	0	3,611	1,015	11,762	0	44,650	0	62,435	1,015
IMM	7,733	0	400	6	5	1,007	7,751	0	35,465	0	51,353	1,013
MAT	2,858	549	0	0	0	39,137	4,015	104	9,787	41	16,660	39,831
OMAT	89	1,151	72	75	0	16,110	845	1,948	1,210	4,805	2,216	24,089
Subtotal	*15,295*	*1,700*	*4,656*	*80*	*4,223*	*57,269*	*28,551*	*2,052*	*106,376*	*4,846*	**159,101**	**65,948**

[15] *Age classes 0 and 10 for the deciduous cover group were altered to coincide with the seral stage classes. Age class 0 = 0 to 10 years and age class 10 = 11 to 15. For Deciduous, the EST (establishment) seral stage includes year 0 to 10 and JUV (juvenile) starts at 11. For all cover groups, age class 15 includes ages 16 through 19 to coincide with the seral stage classification.*

TABLE 6-9: COVER GROUP AGE CLASS AND SERAL STAGE SUMMARY – 160 YEAR PROJECTION (FMA)

AGE CLASS[16]	YIELD CURVE GROUP										TOTAL	
	C-SW		C-PL		C-SB		MIX		DEC			
	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable	Operable	Non-Operable
0	772	0	1,188	0	5	0	3,365	0	13,300	0	18,630	0
10	131	0	585	0	582	0	1,737	0	6,850	0	9,886	0
15	0	0	0	0	0	0	0	0	0	0	0	0
20	435	0	1,697	0	1,563	0	1,850	0	14,059	0	19,604	0
30	915	0	297	0	393	0	3,899	0	11,674	0	17,178	0
40	2,700	0	15	0	35	0	2,948	0	14,359	0	20,056	0
50	971	0	12	0	128	0	2,000	0	6,886	0	9,996	0
55	997	0	16	0	234	0	1,729	0	8,665	0	11,641	0
60	720	0	62	0	361	0	2,137	0	7,965	0	11,245	0
65	1,380	0	68	0	297	0	781	0	6,680	0	9,207	0
70	657	0	149	0	3	0	1,695	0	6,630	0	9,135	0
75	799	0	21	0	15	0	2,561	0	6,194	0	9,589	0
80	3,043	0	75	0	20	0	1,516	0	1,945	0	6,599	0
90	1,675	0	86	0	93	0	536	0	0	0	2,390	0
95	0	0	312	0	494	0	1,107	0	0	0	1,913	0
100	5	0	0	0	0	0	8	0	230	840	242	840
110	0	0	0	0	0	0	12	0	940	2,339	951	2,339
120	0	0	0	0	0	0	24	495	0	374	24	869
125	0	0	0	0	0	0	225	0	0	0	225	0
130	0	0	11	12	0	0	416	377	0	245	427	633
140	0	0	23	60	0	0	7	93	0	224	31	377
150	39	370	35	1	0	0	0	140	0	152	74	663
160	57	251	2	7	0	1,015	0	115	0	111	60	1,499
170	0	344	0	0	0	0	0	175	0	230	0	748
175	0	0	0	0	0	0	0	0	0	0	0	0
180	0	275	0	0	0	18,248	0	138	0	85	0	18,746
190	0	155	0	0	0	18,184	0	240	0	111	0	18,690
200	0	304	0	0	0	19,823	0	280	0	137	0	20,543
EST	903	0	1,774	0	587	0	5,102	0	13,300	0	21,666	0
JUV	1,350	0	2,021	0	3,142	0	10,697	0	32,583	0	49,793	0
IMM	7,424	0	392	0	494	0	8,903	0	37,874	0	55,087	0
MAT	5,522	0	398	0	0	1,015	3,178	0	21,450	0	30,547	1,015
OMAT	96	1,700	71	80	0	56,254	672	2,052	1,169	4,846	2,008	64,933
Subtotal	*15,295*	*1,700*	*4,656*	*80*	*4,223*	*57,269*	*28,551*	*2,052*	*106,376*	*4,846*	**159,101**	**65,948**

[16] *Age classes 0 and 10 for the deciduous cover group were altered to coincide with the seral stage classes. Age class 0 = 0 to 10 years and age class 10 = 11 to 15. For Deciduous, the EST (establishment) seral stage includes year 0 to 10 and JUV (juvenile) starts at 11. For all cover groups, age class 15 includes ages 16 through 19 to coincide with the seral stage classification.*

FIGURE 6-9: SERAL STAGE AREA SUMMARY – FMA

Seral Stage	Current Forest		Future Forest Year 10		Future Forest Year 40		Future Forest Year 80		Future Forest Year 160	
	Gross Area (ha)	% of Gross Area	Gross Area (ha)	% of Gross Area	Gross Area (ha)	% of Gross Area	Gross Area (ha)	% of Gross Area	Gross Area (ha)	% of Gross Area
Establishment	8,988	3%	31,938	12%	24,248	9%	26,438	10%	21,666	8%
Juvenile	50,360	19%	48,755	19%	68,567	26%	63,450	24%	49,793	19%
Immature	92,249	35%	36,437	14%	54,675	21%	52,366	20%	55,087	21%
Mature	51,675	20%	89,943	34%	45,039	17%	56,491	22%	31,562	12%
Over Mature	21,777	8%	17,978	7%	32,520	12%	26,304	10%	66,941	26%
Non-Forested	36,227	14%	36,227	14%	36,227	14%	36,227	14%	36,227	14%
Total	**261,277**	**100%**	**261,277**	**100%**	**261,277**	**100%**	**261,277**	**100%**	**261,277**	**100%**

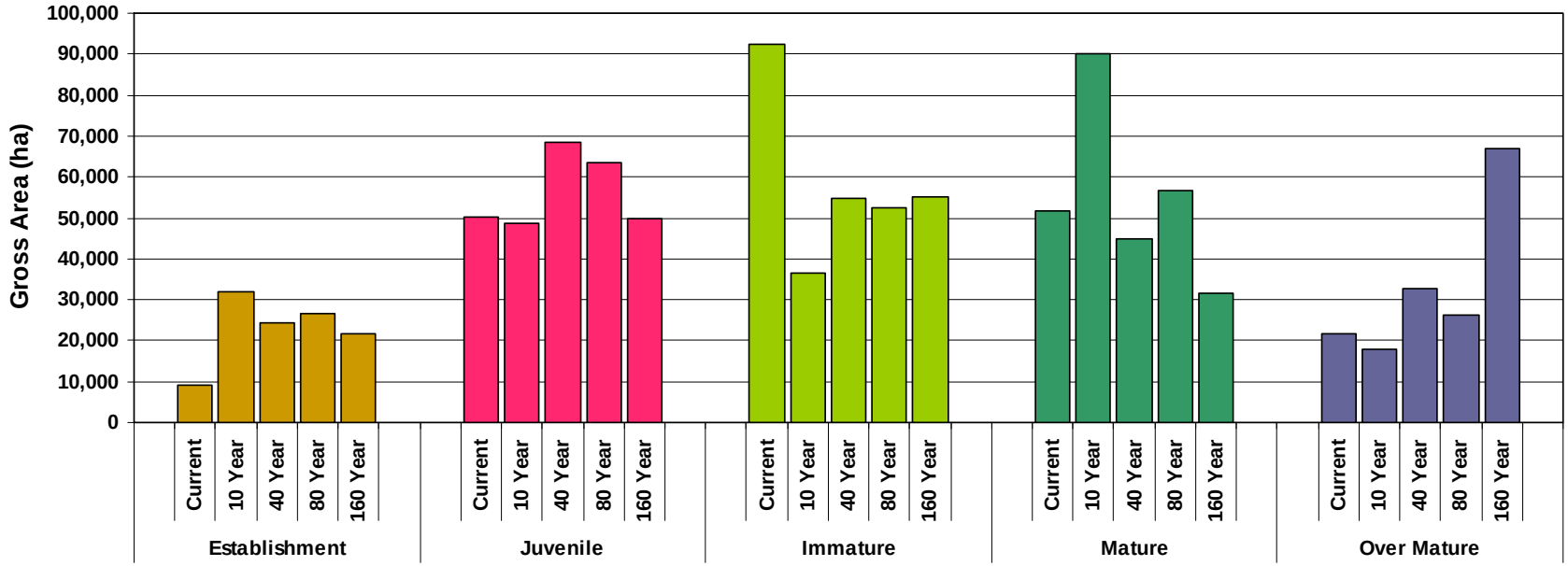


FIGURE 6-10: SERAL STAGE AREA SUMMARY – BIRCH OPERATING AREA

Seral Stage	Current Forest		Future Forest Year 10		Future Forest Year 40		Future Forest Year 80		Future Forest Year 160	
	Gross Area (ha)	% of Gross Area	Gross Area (ha)	% of Gross Area	Gross Area (ha)	% of Gross Area	Gross Area (ha)	% of Gross Area	Gross Area (ha)	% of Gross Area
Establishment	0	0%	425	5%	61	1%	423	5%	44	0%
Juvenile	480	5%	146	2%	455	5%	6,731	76%	1,550	17%
Immature	7,425	83%	3,034	34%	142	2%	900	10%	6,432	72%
Mature	597	7%	4,880	55%	3,050	34%	153	2%	71	1%
Over Mature	0	0%	16	0%	4,795	54%	294	3%	404	5%
Non-Forested	404	5%	404	5%	404	5%	404	5%	404	5%
Total	**8,906**	**100%**	**8,906**	**100%**	**8,906**	**100%**	**8,906**	**100%**	**8,906**	**100%**

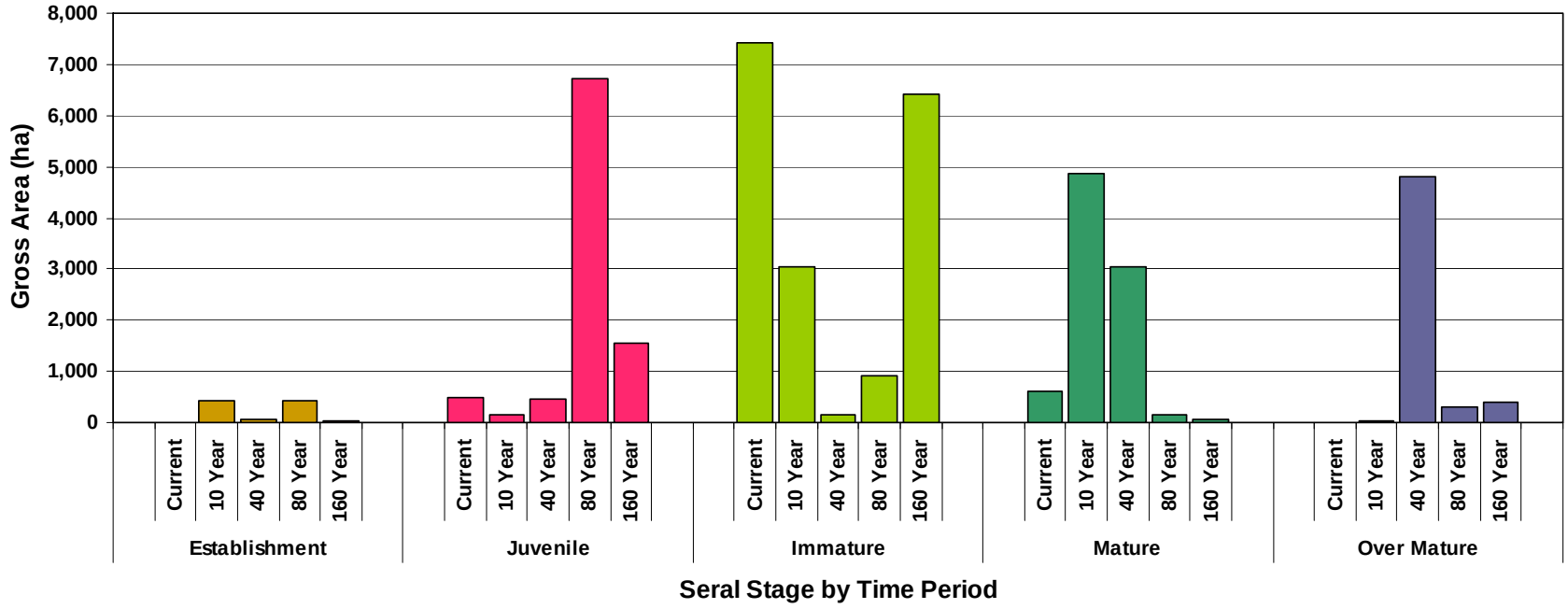


FIGURE 6-11: SERAL STAGE AREA SUMMARY – WHITEMUD OPERATING AREA

Seral Stage	Current Forest		Future Forest Year 10		Future Forest Year 40		Future Forest Year 80		Future Forest Year 160	
	Gross Area (ha)	% of Gross Area	Gross Area (ha)	% of Gross Area	Gross Area (ha)	% of Gross Area	Gross Area (ha)	% of Gross Area	Gross Area (ha)	% of Gross Area
Establishment	1,529	3%	9,069	16%	3,418	6%	6,845	12%	5,304	9%
Juvenile	4,572	8%	3,132	5%	18,306	31%	21,103	36%	14,669	25%
Immature	23,184	40%	12,334	21%	6,715	12%	9,889	17%	13,500	23%
Mature	17,028	29%	20,443	35%	14,393	25%	6,790	12%	9,169	16%
Over Mature	2,934	5%	4,269	7%	6,414	11%	4,620	8%	6,604	11%
Non-Forested	9,124	16%	9,124	16%	9,124	16%	9,124	16%	9,124	16%
Total	**58,370**	**100%**	**58,370**	**100%**	**58,370**	**100%**	**58,370**	**100%**	**58,370**	**100%**

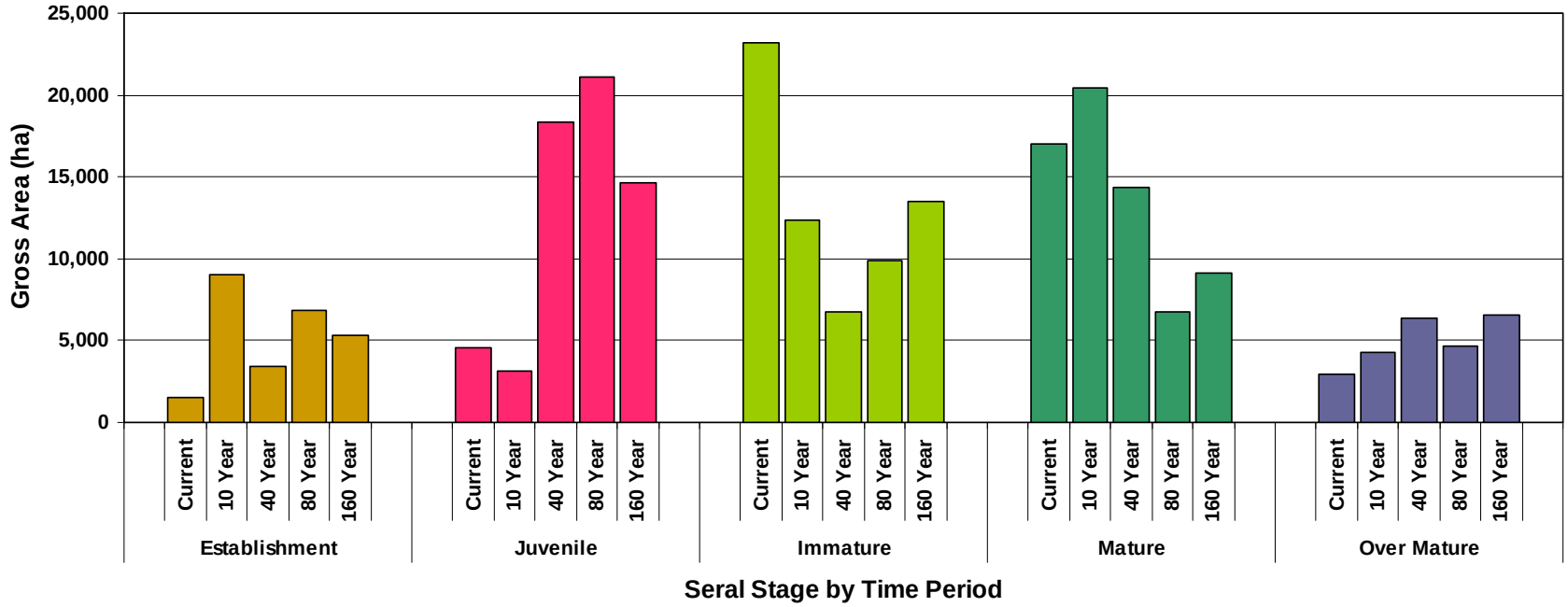


FIGURE 6-12: SERAL STAGE AREA SUMMARY – SALT OPERATING AREA

Seral Stage	Current Forest		Future Forest Year 10		Future Forest Year 40		Future Forest Year 80		Future Forest Year 160	
	Gross Area (ha)	% of Gross Area	Gross Area (ha)	% of Gross Area	Gross Area (ha)	% of Gross Area	Gross Area (ha)	% of Gross Area	Gross Area (ha)	% of Gross Area
Establishment	1,648	3%	7,473	15%	7,229	15%	5,690	12%	5,924	12%
Juvenile	6,344	13%	6,714	14%	15,555	32%	14,228	29%	12,933	26%
Immature	21,170	43%	3,503	7%	10,357	21%	11,496	23%	8,612	18%
Mature	7,409	15%	21,274	43%	4,869	10%	9,201	19%	8,060	16%
Over Mature	8,267	17%	5,873	12%	6,827	14%	4,222	9%	9,308	19%
Non-Forested	4,195	9%	4,195	9%	4,195	9%	4,195	9%	4,195	9%
Total	**49,032**	**100%**	**49,032**	**100%**	**49,032**	**100%**	**49,032**	**100%**	**49,032**	**100%**

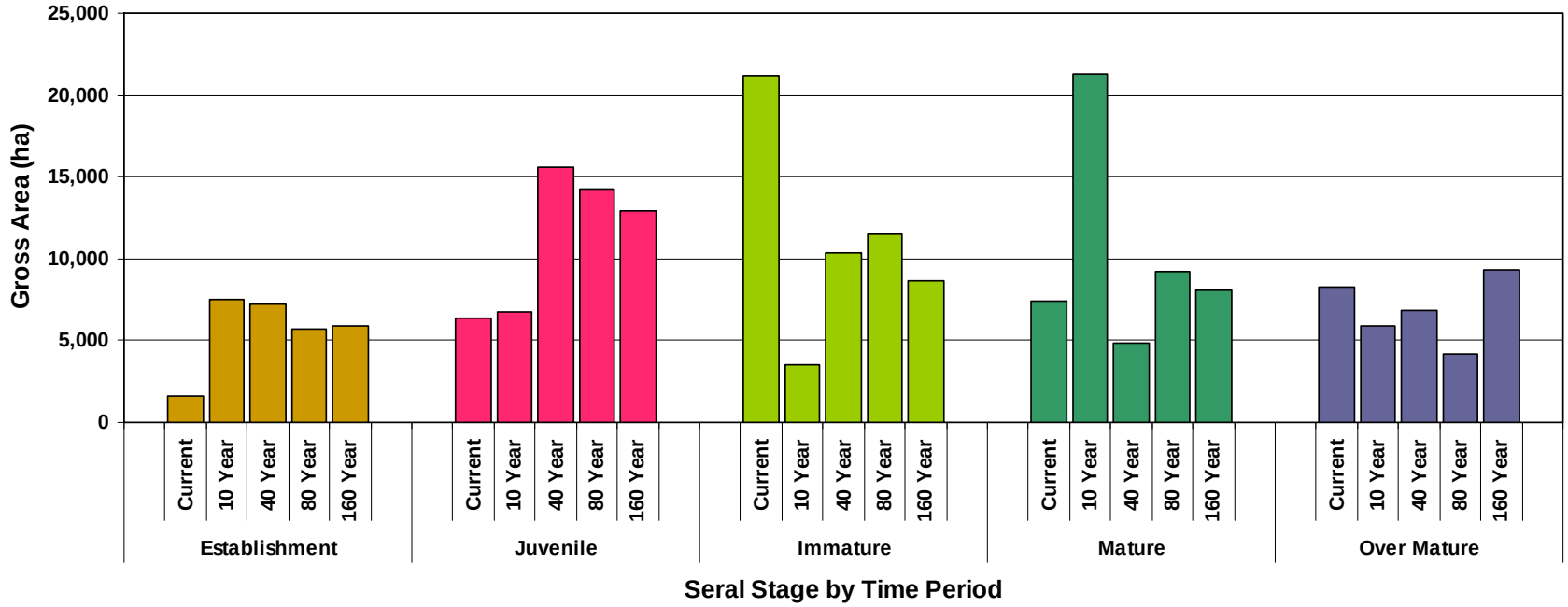
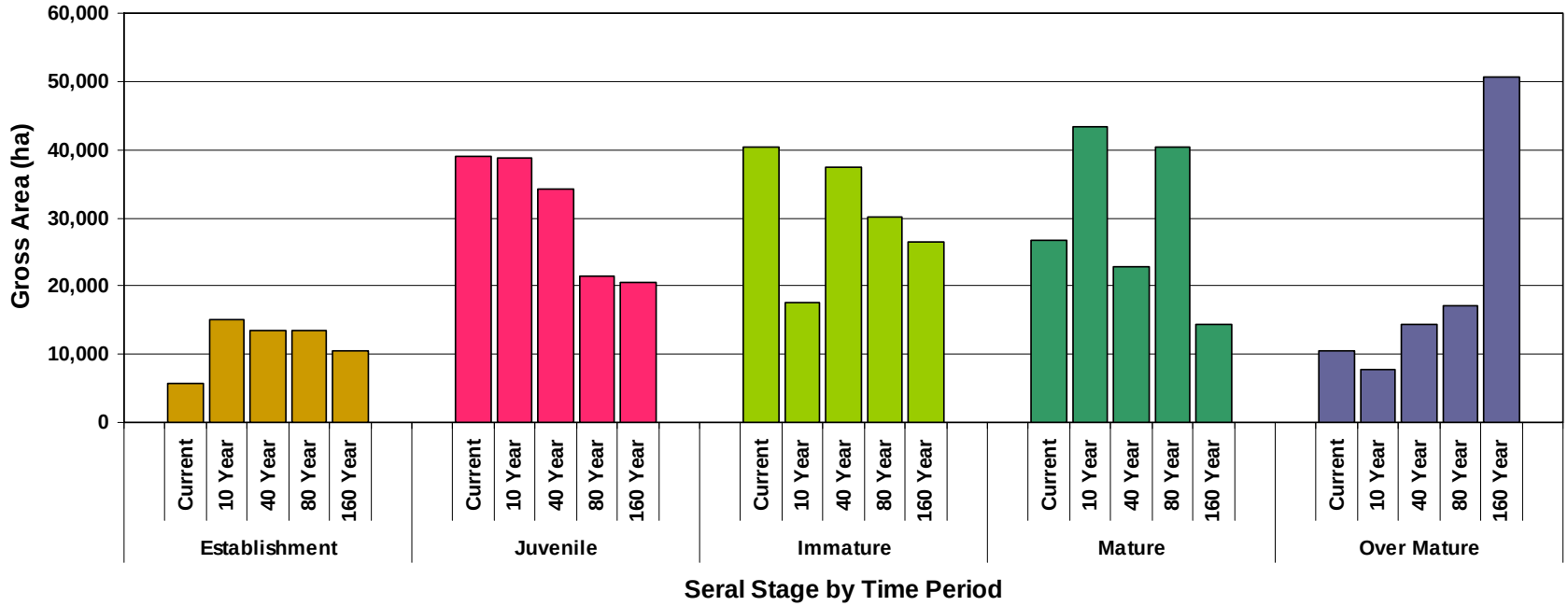


FIGURE 6-13: SERAL STAGE AREA SUMMARY – UTIKUMA OPERATING AREA

Seral Stage	Current Forest		Future Forest Year 10		Future Forest Year 40		Future Forest Year 80		Future Forest Year 160	
	Gross Area (ha)	% of Gross Area	Gross Area (ha)	% of Gross Area	Gross Area (ha)	% of Gross Area	Gross Area (ha)	% of Gross Area	Gross Area (ha)	% of Gross Area
Establishment	5,812	4%	14,970	10%	13,541	9%	13,480	9%	10,393	7%
Juvenile	38,963	27%	38,763	27%	34,250	24%	21,387	15%	20,640	14%
Immature	40,470	28%	17,566	12%	37,462	26%	30,082	21%	26,544	18%
Mature	26,641	18%	43,345	30%	22,727	16%	40,347	28%	14,262	10%
Over Mature	10,577	7%	7,820	5%	14,485	10%	17,168	12%	50,625	35%
Non-Forested	22,505	16%	22,505	16%	22,505	16%	22,505	16%	22,505	16%
Total	**144,969**	**100%**	**144,969**	**100%**	**144,969**	**100%**	**144,969**	**100%**	**144,969**	**100%**



MAP 6-12: CURRENT - SERAL STAGE

MAP 6-13: 10 YEAR PROJECTION - SERAL STAGE

MAP 6-14: 40 YEAR PROJECTION - SERAL STAGE

MAP 6-15: 80 YEAR PROJECTION - SERAL STAGE

MAP 6-16: 160 YEAR PROJECTION - SERAL STAGE

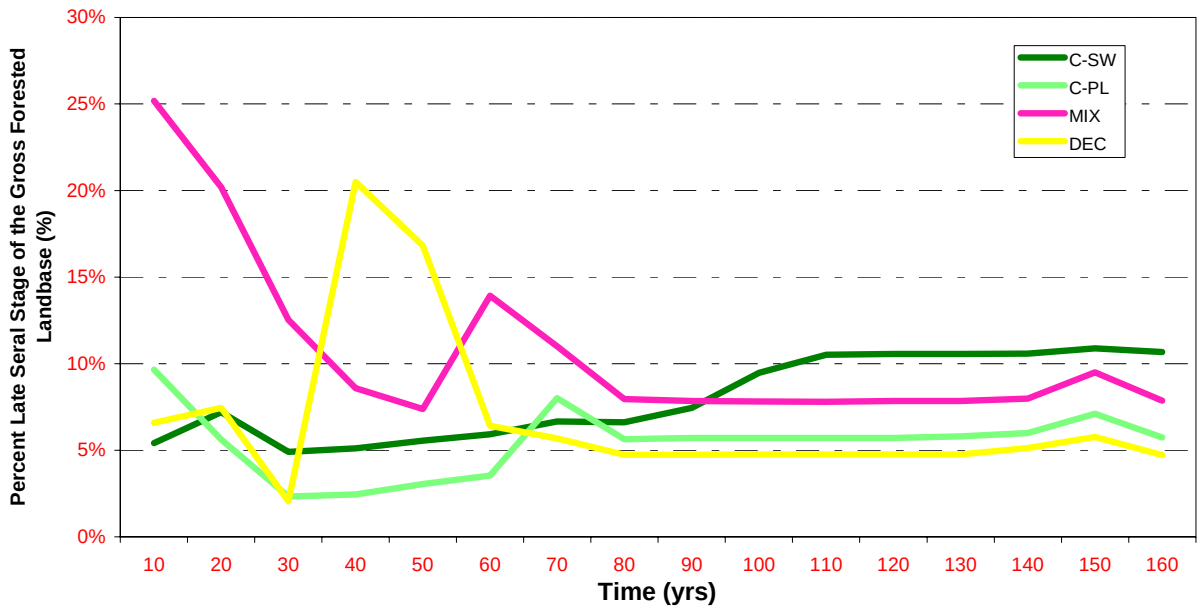
TABLE 6-10: SERAL STAGE PATCH SIZE SUMMARY

Seral Stage	Patch Size (ha)	Current Forest					Future Forest 10 Years					Future Forest 40 Years					Future Forest 80 Years					Future Forest 160 Years				
		Max (ha)	Mean (ha)	Min (ha)	Count	Gross Area (ha)	Max (ha)	Mean (ha)	Min (ha)	Count	Gross Area (ha)	Max (ha)	Mean (ha)	Min (ha)	Count	Gross Area (ha)	Max (ha)	Mean (ha)	Min (ha)	Count	Gross Area (ha)	Max (ha)	Mean (ha)	Min (ha)	Count	Gross Area (ha)
Establishment	0-25	25	8	0	562	4,699	25	6	0	2,050	12,623	25	3	0	3,247	10,889	25	4	0	2,792	11,899	25	4	0	2,371	9,814
	25.1-50	48	33	25	55	1,809	50	35	25	190	6,699	50	34	25	113	3,889	49	33	25	93	3,073	50	34	25	88	2,963
	50.1-100	91	67	52	17	1,147	100	69	50	99	6,871	100	70	50	47	3,270	97	71	51	52	3,697	98	71	50	42	2,970
	100.1-200	174	174	174	1	174	169	121	101	15	1,821	196	142	101	19	2,697	199	137	100	25	3,415	195	139	108	14	1,950
	200.1-400	245	226	208	2	453	365	280	202	5	1,400	361	290	243	6	1,741	340	254	219	7	1,776	360	275	201	7	1,927
	> 400	706	706	706	1	706	734	631	459	4	2,523	821	588	400	3	1,763	602	516	448	5	2,579	598	511	409	4	2,043
Juvenile	0-25	25	4	0	3,206	14,036	25	5	0	3,178	14,542	25	3	0	5,347	15,802	25	3	0	5,466	19,029	25	3	0	5,304	16,860
	25.1-50	50	34	25	169	5,810	50	35	25	181	6,276	50	35	25	204	7,232	50	35	25	257	8,988	50	35	25	249	8,773
	50.1-100	99	71	50	95	6,759	99	71	50	96	6,790	100	71	50	144	10,194	98	69	50	156	10,727	100	70	50	125	8,779
	100.1-200	197	138	101	49	6,741	193	142	101	53	7,531	200	143	100	72	10,261	195	131	100	45	5,886	191	129	100	49	6,297
	200.1-400	394	265	204	26	6,879	345	261	206	19	4,950	387	275	205	32	8,785	388	279	204	14	3,902	382	279	200	14	3,908
	> 400	25	4	0	3,206	14,036	25	5	0	3,178	14,542	25	3	0	5,347	15,802	25	3	0	5,466	19,029	25	3	0	5,304	16,860
Immature	0-25	25	4	0	3,836	16,230	25	4	0	3,260	13,330	25	5	0	3,287	15,171	25	2	0	6,173	14,628	25	3	0	5,216	18,098
	25.1-50	50	36	25	168	6,028	49	35	25	126	4,353	50	35	25	223	7,730	50	36	25	198	7,036	50	35	25	211	7,323
	50.1-100	99	68	50	98	6,624	99	71	50	66	4,668	100	68	50	136	9,267	100	71	50	90	6,349	99	70	50	86	6,054
	100.1-200	200	142	102	44	6,267	199	140	102	28	3,906	199	141	101	58	8,176	199	140	100	53	7,396	199	139	101	41	5,690
	200.1-400	393	287	206	29	8,319	377	269	200	10	2,687	364	261	202	22	5,738	359	265	202	25	6,634	369	278	202	22	6,126
	> 400	5,719	1,284	409	38	48,780	2,706	937	400	8	7,493	907	614	409	14	8,593	1,522	688	407	15	10,323	3,434	983	416	12	11,796
Mature	0-25	25	4	0	3,208	12,411	25	3	0	4,844	15,970	25	4	0	3,838	15,178	25	4	0	3,848	16,108	25	2	0	4,193	10,227
	25.1-50	50	35	25	147	5,110	50	35	25	192	6,715	50	35	25	134	4,735	50	35	25	199	6,932	50	36	25	154	5,480
	50.1-100	99	72	50	86	6,155	99	71	50	108	7,715	99	70	50	79	5,496	100	71	50	98	6,933	98	70	51	67	4,706
	100.1-200	198	141	102	35	4,926	197	137	101	59	8,076	199	135	100	41	5,552	200	146	102	52	7,577	199	139	101	33	4,579
	200.1-400	375	254	201	24	6,095	372	280	202	34	9,515	391	278	204	13	3,620	389	273	204	28	7,641	362	260	201	9	2,338
	> 400	2,864	1,132	412	15	16,978	2,600	932	410	45	41,951	2,843	871	403	12	10,456	1,067	665	406	17	11,299	1,323	846	459	5	4,231
Over Mature	0-25	25	3	0	2,185	6,312	25	2	0	3,480	6,706	25	2	0	5,329	11,627	25	2	0	5,137	9,344	25	2	0	5,590	13,122
	25.1-50	50	34	25	75	2,554	49	34	25	80	2,749	49	34	25	124	4,234	50	36	25	86	3,122	50	35	25	158	5,563
	50.1-100	99	72	50	37	2,674	99	65	50	40	2,591	100	71	50	54	3,818	98	69	50	63	4,365	98	70	51	96	6,709
	100.1-200	197	149	103	21	3,132	199	139	102	17	2,367	193	139	103	23	3,187	199	142	101	21	2,972	187	134	102	55	7,384
	200.1-400	388	283	202	10	2,834	295	273	251	2	546	397	297	225	8	2,379	380	276	203	12	3,311	393	274	201	29	7,941
	> 400	1,787	712	426	6	4,270	1,281	1,006	640	3	3,018	2,391	1,455	416	5	7,275	934	638	401	5	3,191	4,634	1,049	423	25	26,223

6.7.1 LATE SERAL STAGE ANALYSIS

Figure 6-14 shows the percent of late seral stage present for the C-SW, C-PL, MIX, and DEC cover groups throughout the 160 year planning horizon for the Tolko and Joint FMA combined.

FIGURE 6-14: LATE SERAL STAGE AREA BY COVER GROUP RETAINED ON THE GROSS LANDBASE FOR THE 160 YEAR PLANNING HORIZON – BOTH FMAs

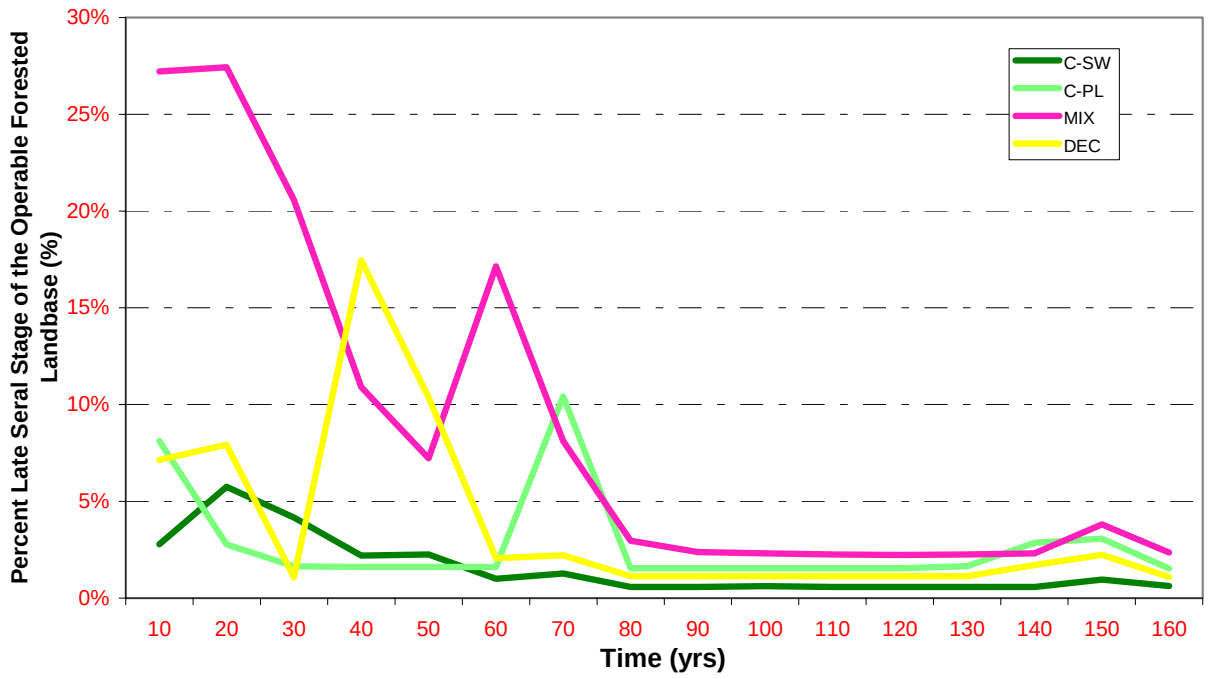


Cover Group	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	PH AVG
% C-SW	5	7	5	5	6	6	7	7	7	9	11	11	11	11	11	11	8
% C-PL	10	6	2	2	3	4	8	6	6	6	6	6	6	6	7	6	5
% MIX	25	20	13	9	7	14	11	8	8	8	8	8	8	8	10	8	11
% DEC	7	7	2	21	17	6	6	5	5	5	5	5	5	5	6	5	7

Figure 6-15 displays the amount of late seral stage present on the operable landbase throughout the 160 year planning horizon. The amount of late seral stage area to be retained is at or above the targets for all points in time. A drop in the total amount of area in late seral stage is observed on the operable landbase but this decrease is offset by the amount of area on the non-operable area that becomes late seral stage during the planning horizon. Figure 6-19 to Figure 6-25 displays the amount of area in late seral stage for the gross and operable landbase for the entire FMA, and further breaks it down by cover type.

The structure retention component of this DFMP compliments the strategy of retaining late seral stage on the landbase. The structure left after harvesting should contribute late seral stage characteristics at an earlier age then would be expected if no structure is left following harvest. This will result in more area in the late seral stage class then is predicted and reported.

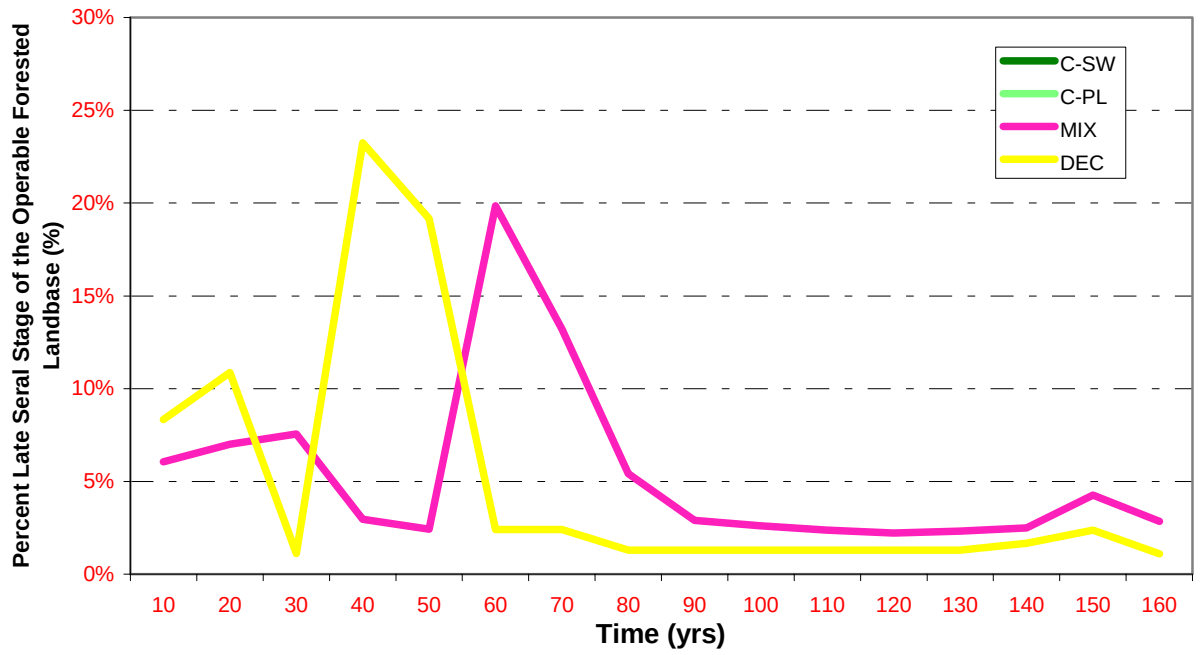
FIGURE 6-15: LATE SERAL STAGE AREA BY COVER GROUP RETAINED ON THE OPERABLE LANDBASE FOR THE 160 YEAR PLANNING HORIZON - FMA



Cover Group	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	PH AVG
% C-SW	2.8	5.8	4.2	2.2	2.2	1.0	1.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6	1.0	0.6	1.6
% C-PL	8.1	2.8	1.6	1.6	1.6	1.6	10.4	1.5	1.5	1.5	1.5	1.5	1.7	2.8	3.1	1.5	2.8
% MIX	27.2	27.4	20.6	10.9	7.2	17.1	8.1	3.0	2.4	2.3	2.3	2.2	2.2	2.3	3.8	2.4	8.8
% DEC	7.2	7.9	1.1	17.5	10.4	2.1	2.2	1.1	1.1	1.1	1.1	1.1	1.1	1.7	2.2	1.1	3.8

* Note: This figure only depicts the late seral stage on the operable portion of the landbase. Figure 6-14 depicts the entire amount of late seral stage on the forested landbase over time.

FIGURE 6-16: LATE SERAL STAGE AREA BY COVER GROUP RETAINED ON THE OPERABLE LANDBASE FOR THE 160 YEAR PLANNING HORIZON – WHITEMUD/BIRCH

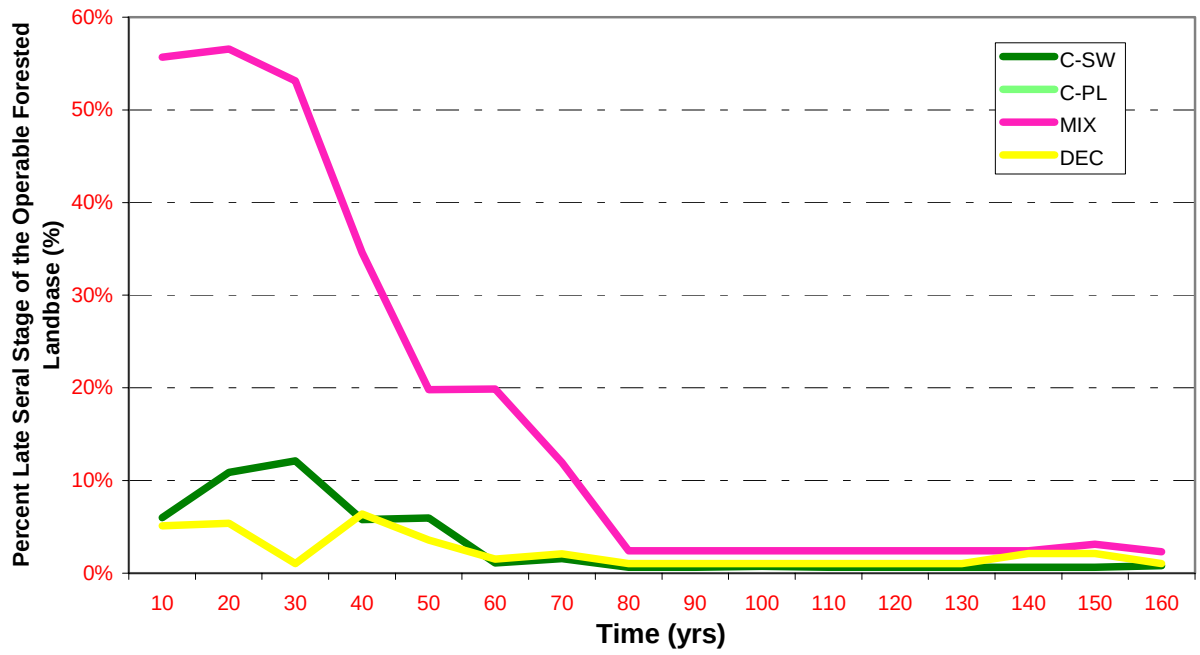


Cover Group	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	PH AVG
% C-SW	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
% C-PL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
% MIX	6.1	7.0	7.5	3.0	2.4	19.8	13.2	5.4	2.9	2.6	2.4	2.2	2.3	2.5	4.3	2.8	5.4
% DEC	8.3	10.9	1.1	23.3	19.2	2.4	2.4	1.3	1.3	1.3	1.3	1.3	1.3	1.7	2.4	1.1	5.0

* Note: This figure only depicts the late seral stage on the operable portion of the landbase. Figure 6-14 depicts the entire amount of late seral stage on the forested landbase over time.

** Note: Whitemud and Birch have been joined together, and the C-SW cover group has been joined with Salt, and the C-PL cover group has been further joined with Utikuma.

FIGURE 6-17: LATE SERAL STAGE AREA BY COVER GROUP RETAINED ON THE OPERABLE LANDBASE FOR THE 160 YEAR PLANNING HORIZON – SALT

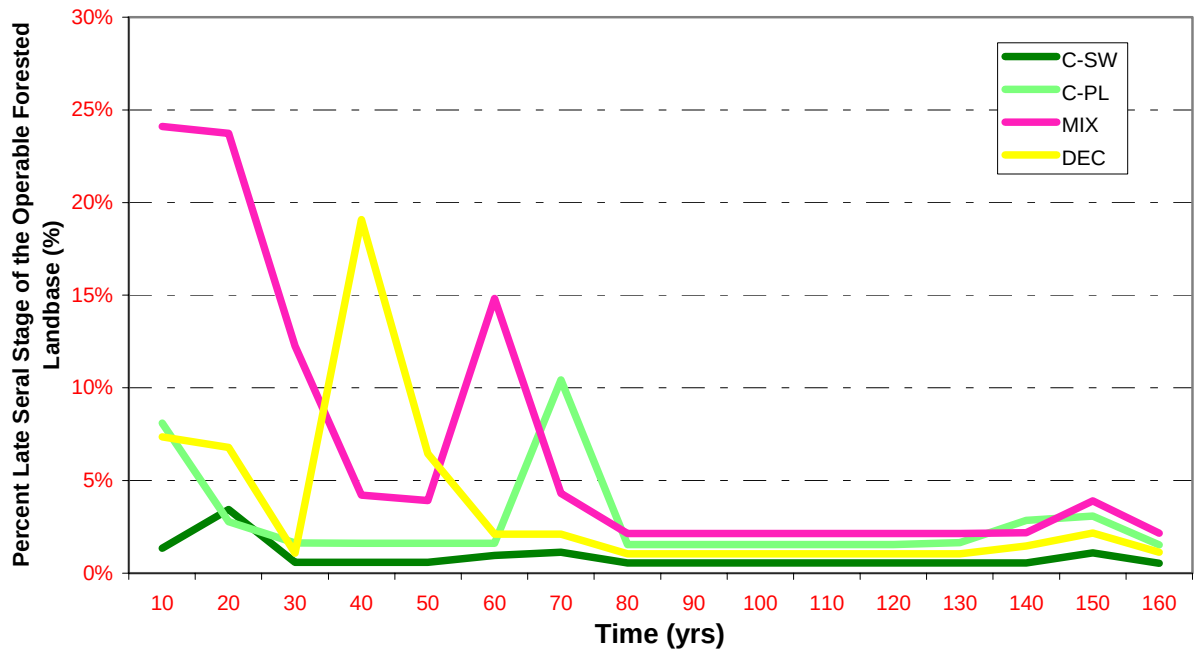


Cover Group	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	PH AVG
% C-SW	6.0	10.9	12.1	5.8	5.9	1.1	1.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.8	3.1
% C-PL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
% MIX	55.7	56.6	53.1	34.6	19.8	19.9	12.0	2.4	2.4	2.4	2.4	2.4	2.4	2.4	3.1	2.3	17.1
% DEC	5.1	5.4	1.1	6.4	3.6	1.5	2.1	1.1	1.1	1.1	1.1	1.1	1.1	2.1	2.1	1.1	2.3

* Note: This figure only depicts the late seral stage on the operable portion of the landbase. Figure 6-14 depicts the entire amount of late seral stage on the forested landbase over time.

** Note: The C-SW from Whitemud and Birch is included in Salt. The C-PL cover group from Salt has been joined with Utikuma.

FIGURE 6-18: LATE SERAL STAGE AREA BY COVER GROUP RETAINED ON THE OPERABLE LANDBASE FOR THE 160 YEAR PLANNING HORIZON – UTIKUMA



Cover Group	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	PH AVG
% C-SW	1.4	3.4	0.6	0.6	0.6	1.0	1.1	0.6	0.6	0.6	0.6	0.6	0.6	0.6	1.1	0.5	0.9
% C-PL	8.1	2.8	1.6	1.6	1.6	1.6	10.4	1.5	1.5	1.5	1.5	1.5	1.7	2.8	3.1	1.5	2.8
% MIX	24.1	23.7	12.3	4.2	3.9	14.8	4.3	2.1	2.1	2.1	2.1	2.1	2.1	2.2	3.9	2.2	6.8
% DEC	7.4	6.8	1.1	19.1	6.4	2.1	2.1	1.0	1.0	1.0	1.0	1.0	1.0	1.5	2.2	1.1	3.5

* Note: This figure only depicts the late seral stage on the operable portion of the landbase. Figure 6-14 depicts the entire amount of late seral stage on the forested landbase over time.

** Note: The C-SW from Whitemud and Birch, and the C-PL from Whitemud, Birch and Salt are included in Utikuma.

FIGURE 6-19: AMOUNT OF LATE SERAL STAGE PRESENT ON THE GROSS FORESTED LANDBASE OVER TIME – ALL COVERTYPES

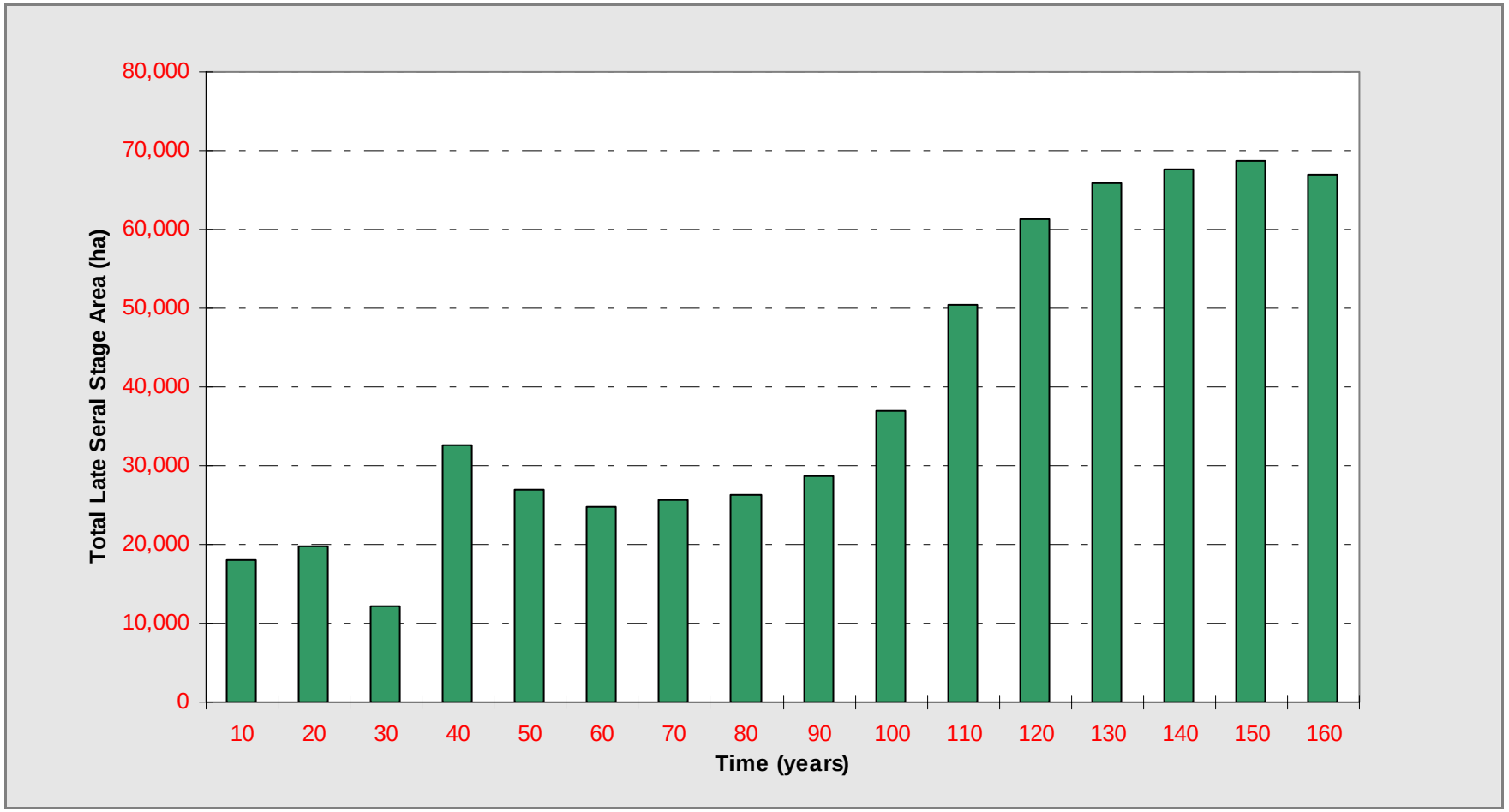


FIGURE 6-20: AMOUNT OF LATE SERAL STAGE PRESENT ON THE OPERABLE FORESTED LANDBASE OVER TIME– ALL COVERTYPES

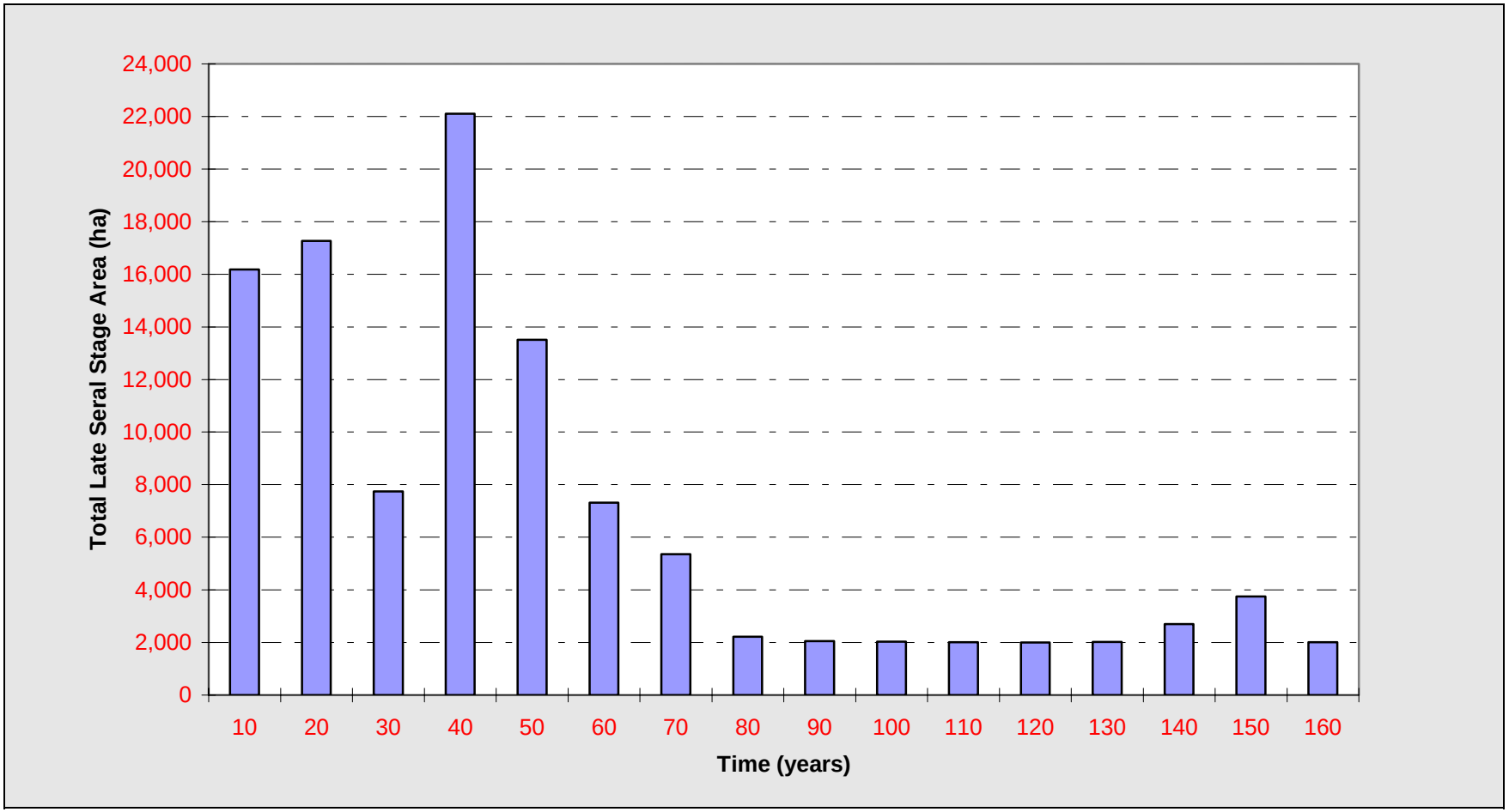


FIGURE 6-21: AMOUNT OF LATE SERAL STAGE PRESENT ON THE FORESTED LANDBASE OVER TIME – CONIFER WHITE SPRUCE

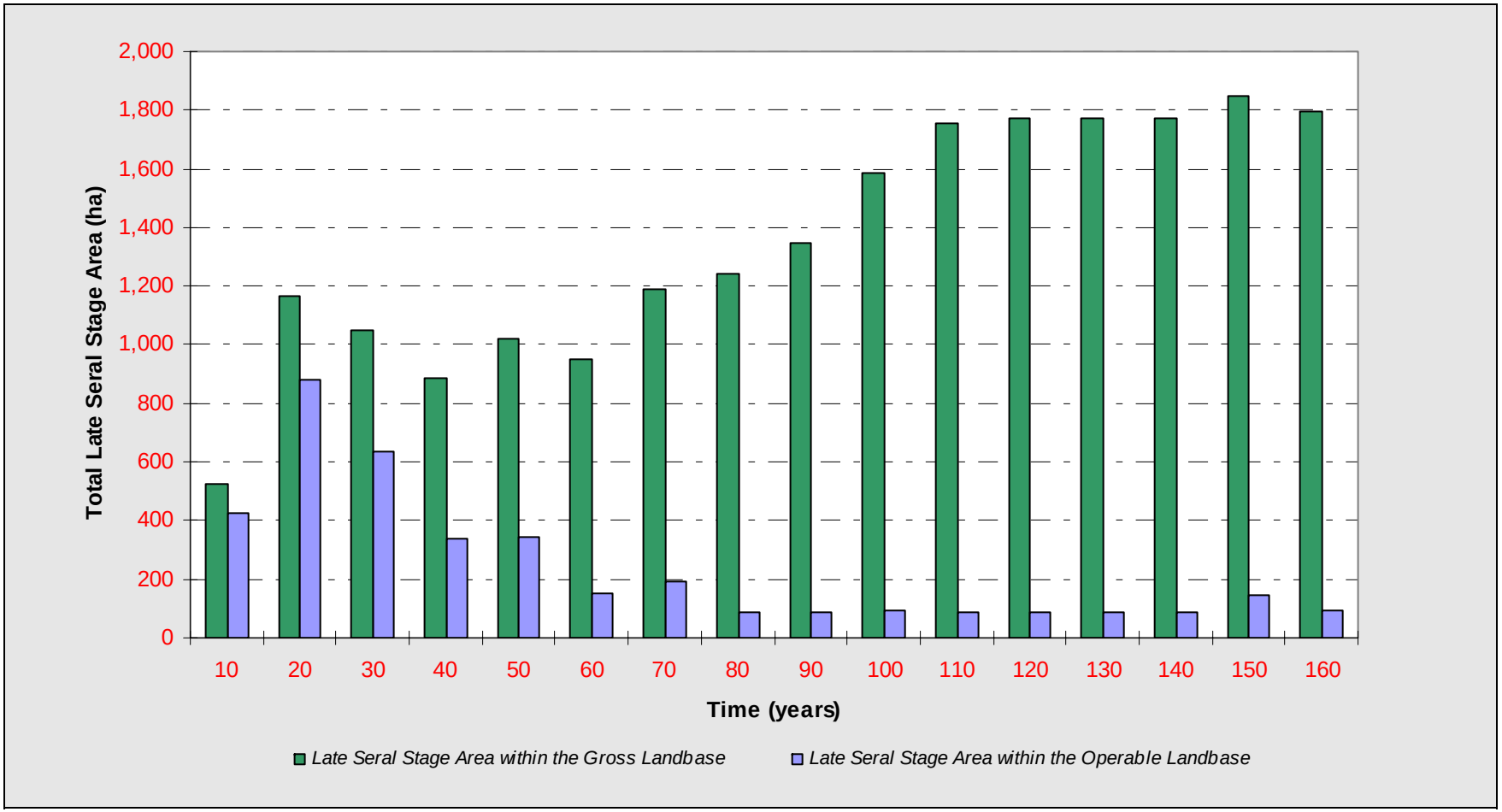


FIGURE 6-22: AMOUNT OF LATE SERAL STAGE PRESENT ON THE FORESTED LANDBASE OVER TIME – CONIFER PINE

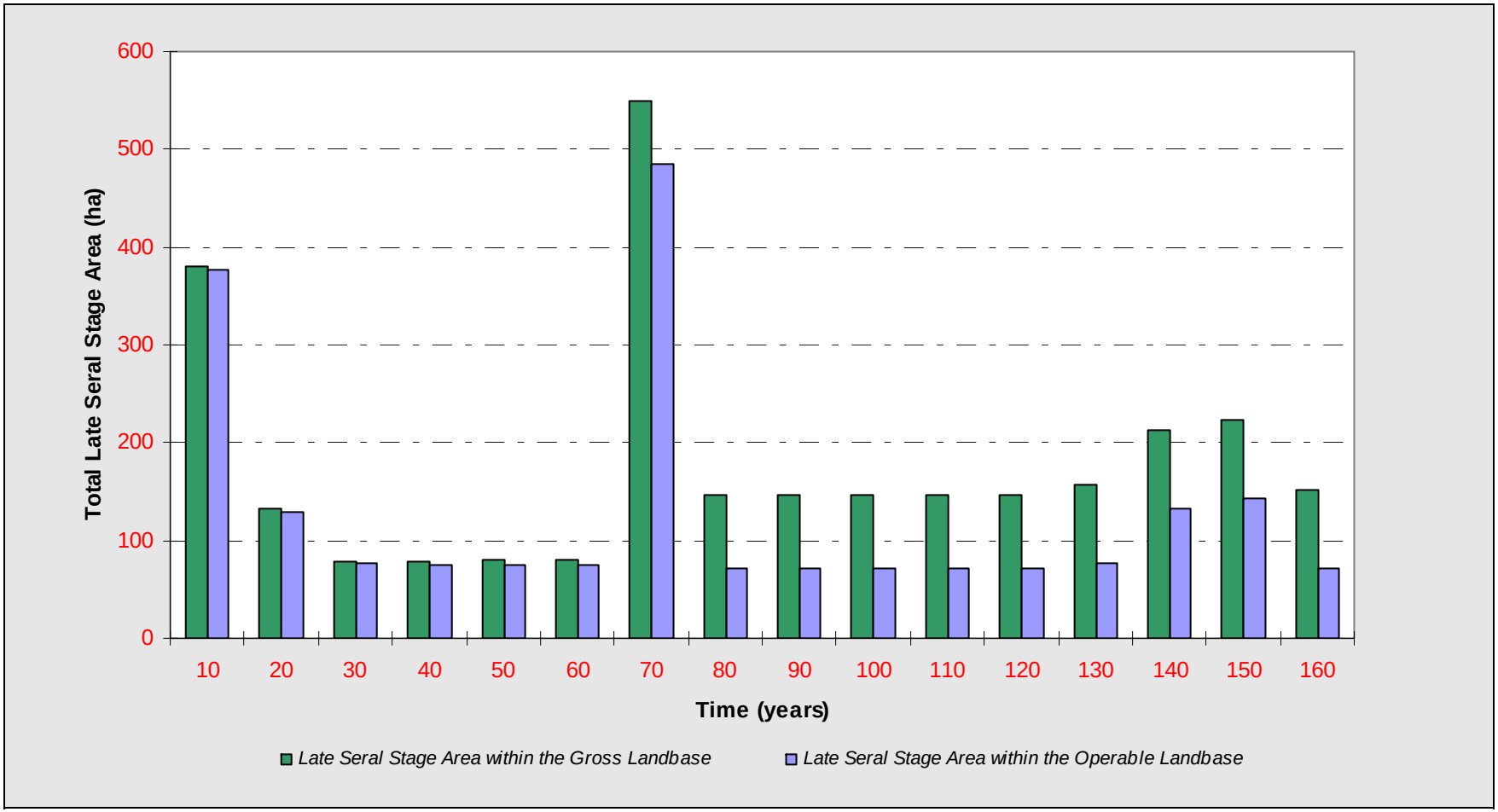


FIGURE 6-23: AMOUNT OF LATE SERAL STAGE PRESENT ON THE FORESTED LANDBASE OVER TIME – CONIFER BLACK SPRUCE

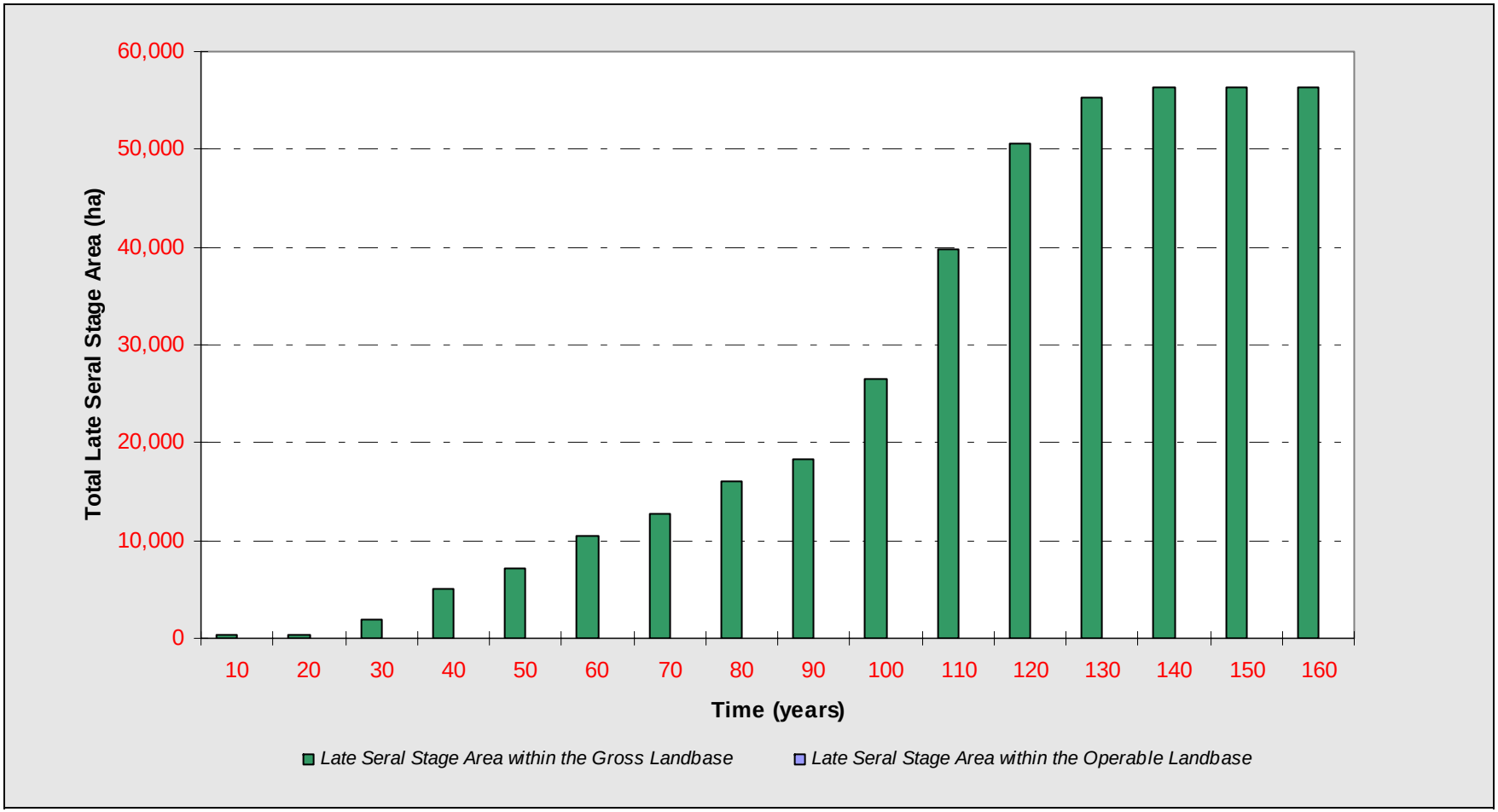


FIGURE 6-24: AMOUNT OF LATE SERAL STAGE PRESENT ON THE FORESTED LANDBASE OVER TIME – MIXEDWOOD

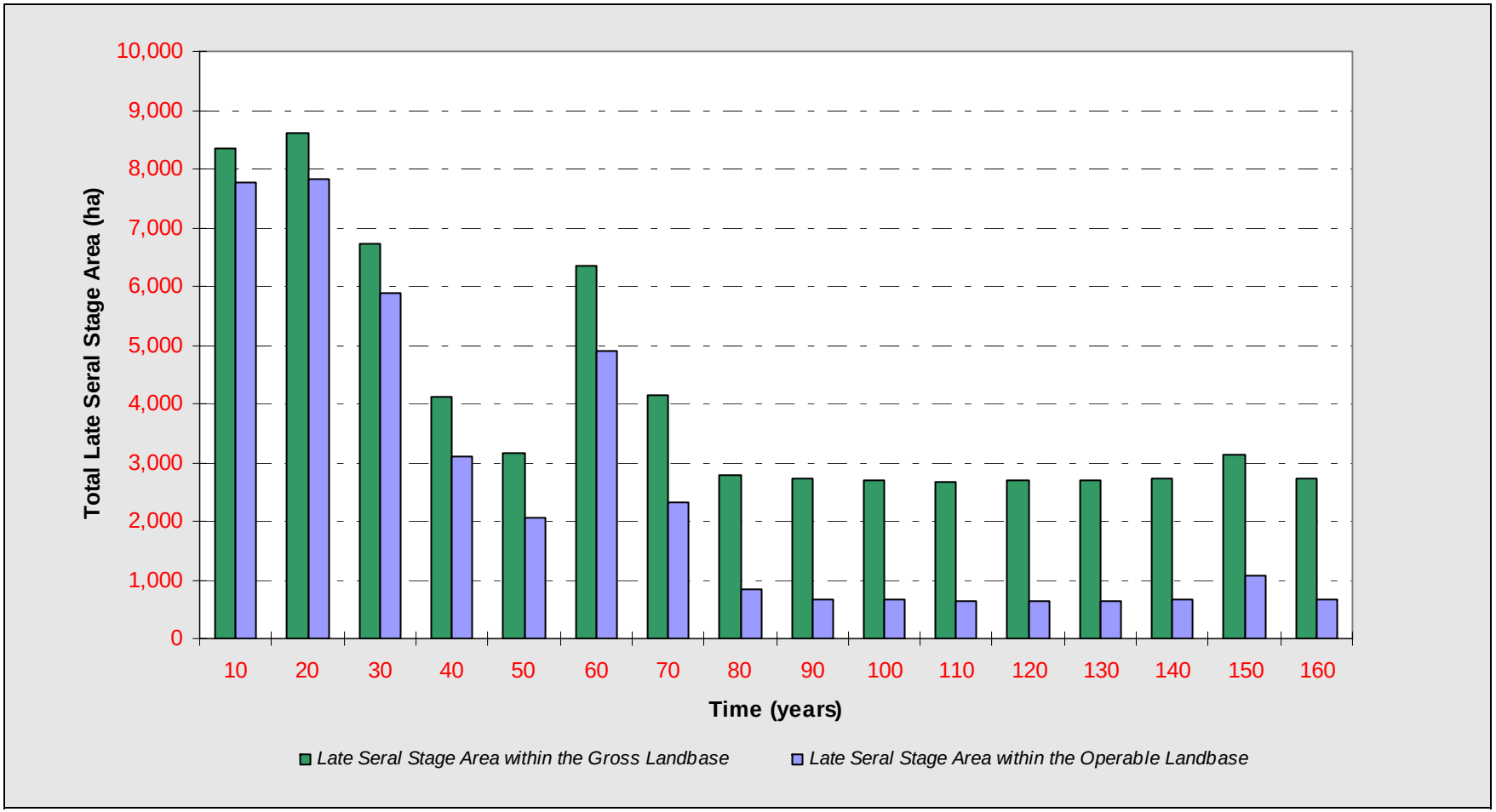


FIGURE 6-25: AMOUNT OF LATE SERAL STAGE PRESENT ON THE FORESTED LANDBASE OVER TIME – DECIDUOUS

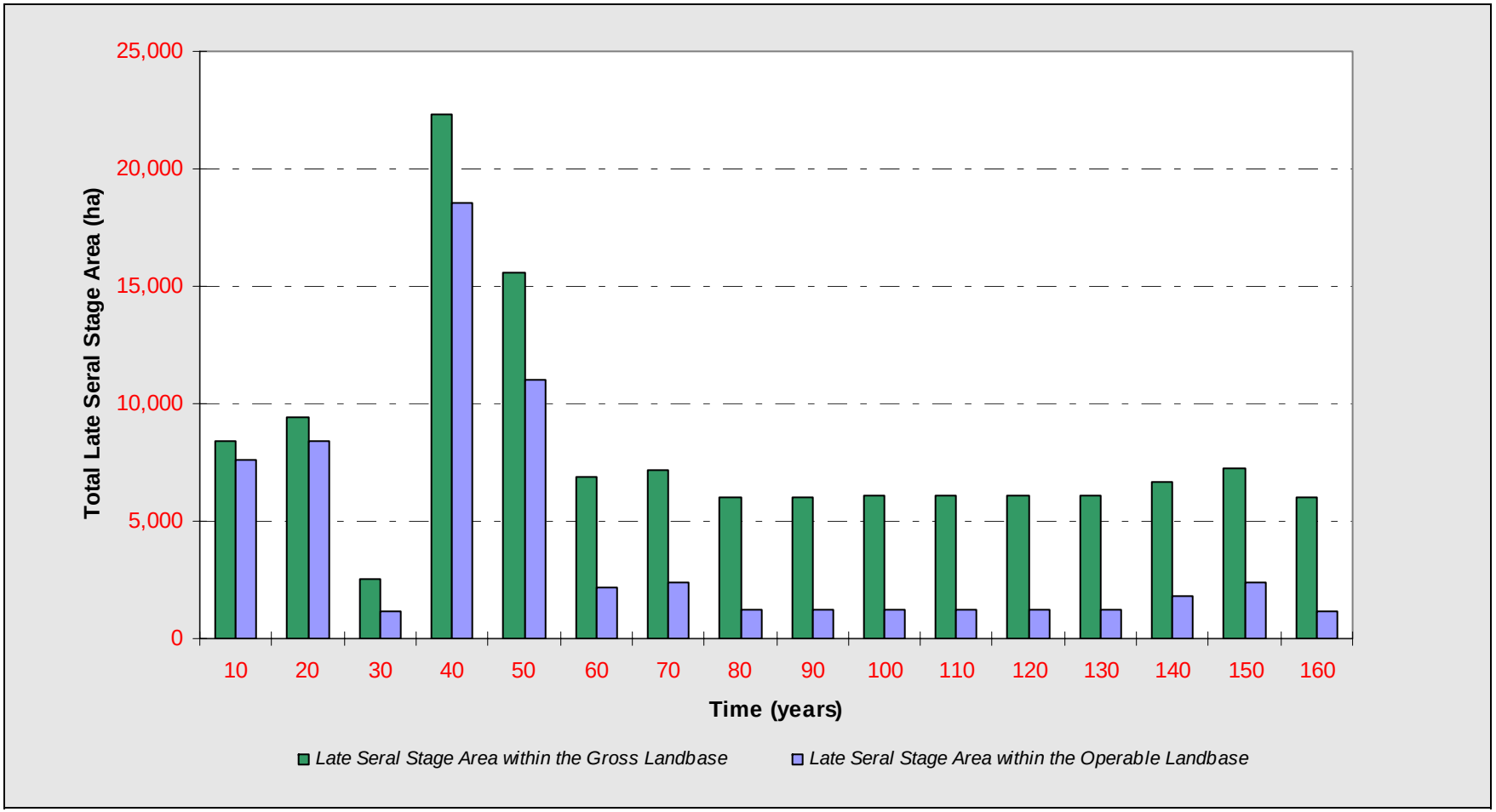
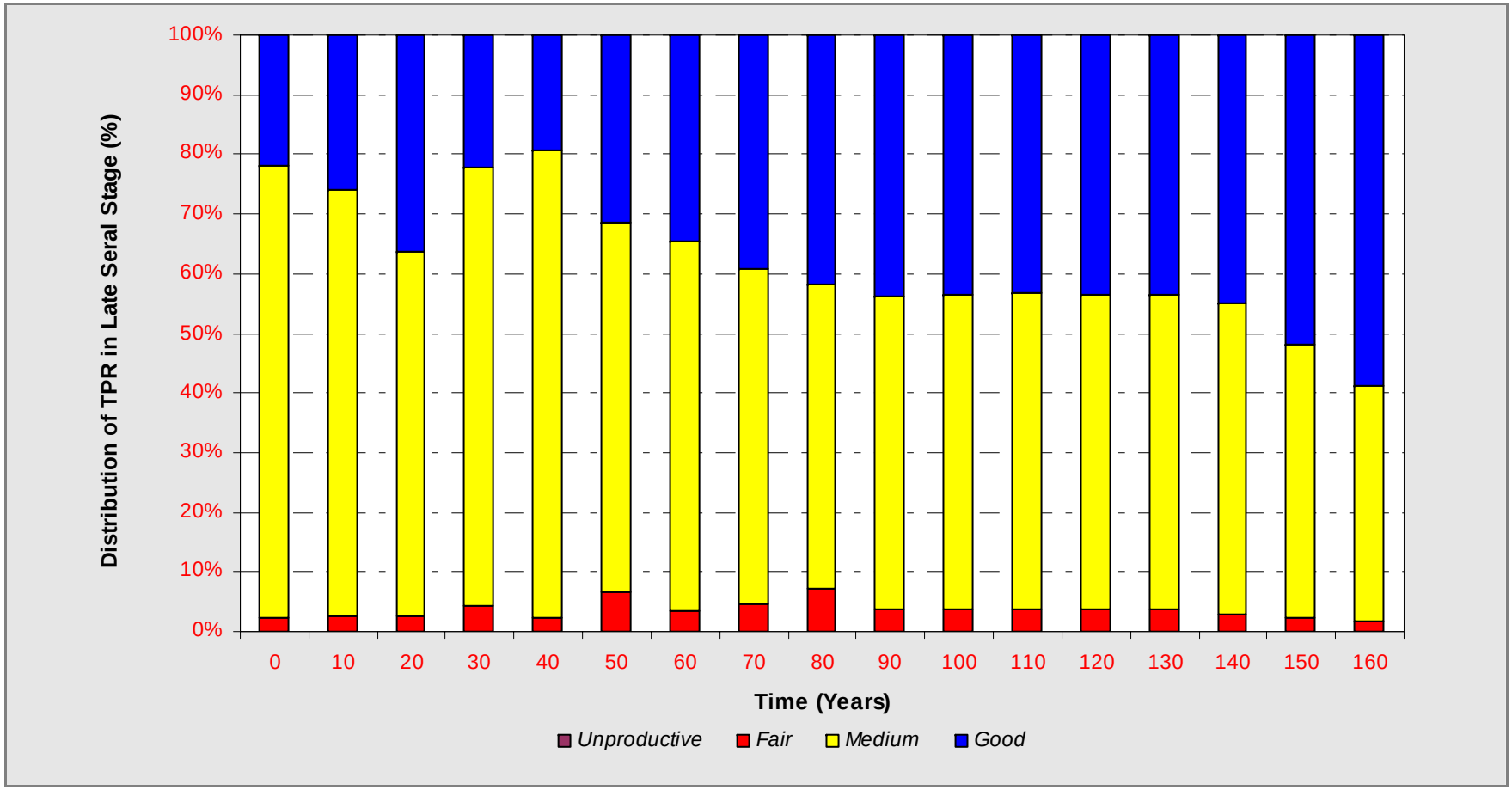


Figure 6-26 displays that late seral stage area retained on the operable landbase are comprised of a representative distribution of Timber Productivity Rating. In the later part of the planning horizon, more of the retained area is has a good Timber Productivity Rating.

FIGURE 6-26: DISTRIBUTION OF THE TIMBER PRODUCTIVITY RATING OF LATE SERAL STAGE STANDS THROUGH TIME ON THE OPERABLE LANDBASE



6.3 HARVEST AREA PATCH SIZE ANALYSIS

The contiguous harvest area patch size analysis is presented in Table 6-11 Based on the PFMS harvest sequence, harvest patches were developed by dissolving boundaries of polygons that were sequenced adjacent to another harvested polygon within a designated time period. These harvest patches were then classified into six patch size classes (0 – 25 ha, 25.1 – 50 ha, 50.1 – 100 ha, 100.1 – 200 ha, 200.1 – 400 ha, >400 ha) and three time periods (1 – 10 Years, 11 – 20 Years, 1 – 20 Years).

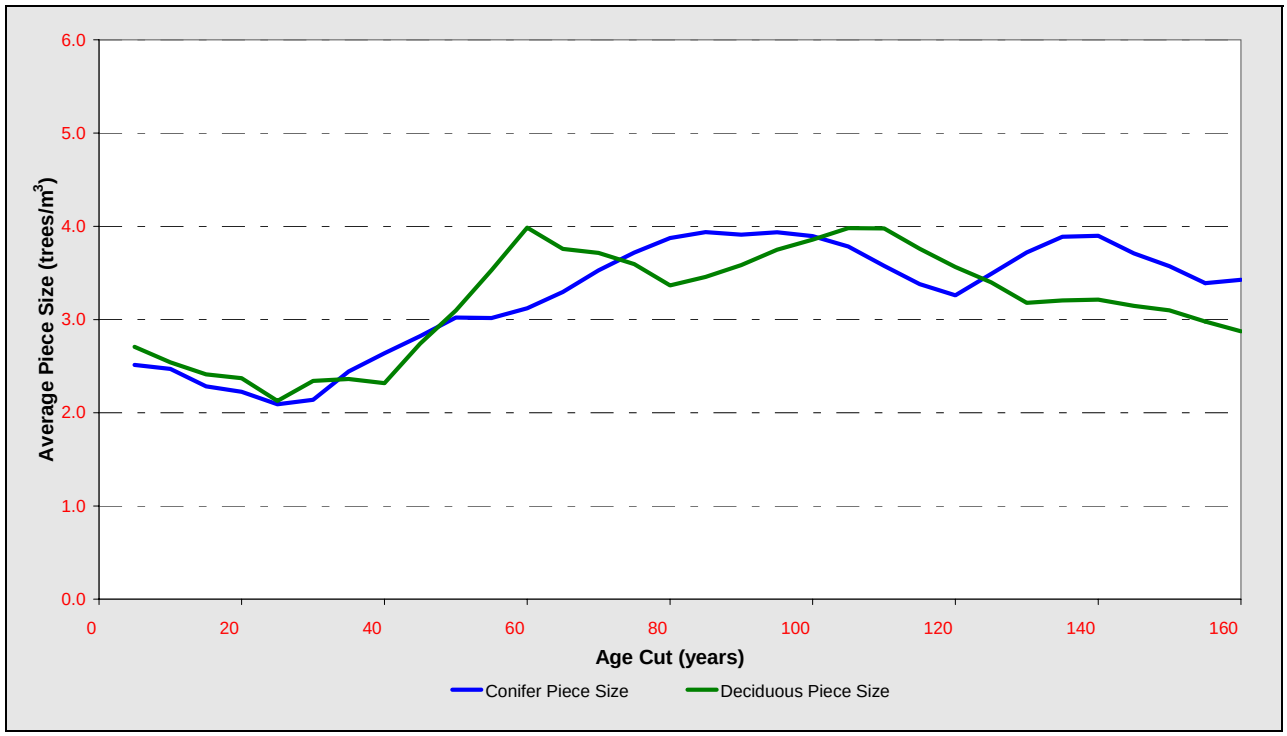
TABLE 6-11: CONTIGUOUS HARVEST AREA PATCH SIZE ANALYSIS

Patch Size	1 - 10 Years					11 – 20 Years					1 – 20 Years				
	Max. (ha)	Mean (ha)	Min. (ha)	Count	Sum (ha)	Max. (ha)	Mean (ha)	Min. (ha)	Count	Sum (ha)	Max. (ha)	Mean (ha)	Min. (ha)	Count	Sum (ha)
0 – 25 ha	25	6	0	1,827	11,214	25	5	0	1,689	8,519	25	6	0	2,776	15,933
25.1 – 50 ha	50	36	25	169	6,022	50	34	25	82	2,795	50	35	25	223	7,842
50.1 – 100 ha	100	69	50	85	5,903	98	71	50	49	3,500	100	70	50	131	9,187
100.1 – 200 ha	169	121	101	15	1,819	195	144	102	28	4,040	199	133	100	55	7,312
200.1 – 400 ha	365	289	202	4	1,155	390	266	200	8	2,126	389	283	202	16	4,530
> 400 ha	734	606	459	3	1,817	991	586	442	7	4,103	1,198	746	448	11	8,208

6.4 PIECE SIZE ANALYSIS

The PFMS piece size trends are presented in Figure 6-27 for both conifer and deciduous species. Piece size summaries were determined using a projected height for each time period that was calculated using projected stand age of the period and the Provincial site index equation given in the Alberta Vegetation Inventory Standards Manual Version 2.2 (ASRD 1997). This projected height was then used to assign a sampling stratum for each stand in each period. Stratum volume and density tables were matched to the sampling strata to determine an average piece size in each time period. Note that because heights were projected into the future in order to determine sampling strata, piece size calculations beyond 20 years may not be very reliable.

FIGURE 6-27: PIECE SIZE TRENDS OVER TIME (20 YEAR MOVING AVERAGE)



6.5 TRAPLINE ANALYSIS

Based on the PFMS, a seral stage analysis was done for each trapline area on the FMA to determine how the PFMS harvest sequence will effect the seral stage distribution of each trapline over time. The analysis assesses the total gross area with the gross forested area broken out by five seral stage groupings (establishment, juvenile, immature, mature, over-mature) and five future forest projections (current, 10 year, 40 year, 80 year, 160 year). The seral stage summary by trapline showing the percentage of gross area within each seral stage by trapline is given in Table 6-12.

TABLE 6-12: SERAL STAGE SUMMARY BY TRAPLINE[17]

Trapline Number	Gross Trapline Area Within FMA (ha)	Total Trapline Area (ha)	% of Trapline Within FMA	Non-Forested (% Gross Area)	Current Forest (% of Gross Area)					Future Forest 10 Years (% of Gross Area)					Future Forest 40 Years (% of Gross Area)					Future Forest 80 Years (% of Gross Area)					Future Forest 160 Years (% of Gross Area)				
					EST	JUV	IMM	MAT	OMAT	EST	JUV	IMM	MAT	OMAT	EST	JUV	IMM	MAT	OMAT	EST	JUV	IMM	MAT	OMAT	EST	JUV	IMM	MAT	OMAT
22	8,204	26,563	31	10	3	26	20	27	14	18	26	8	31	7	6	22	38	15	7	4	19	23	29	14	4	20	12	17	36
34	36,884	39,495	93	10	6	20	30	25	8	11	22	15	33	8	13	28	23	20	6	9	15	23	27	15	10	17	18	11	34
43	2,671	13,362	20	14	0	33	26	11	16	15	32	12	20	6	9	20	34	16	6	13	13	15	34	11	3	10	22	13	38
111	1,980	5,953	33	7	4	20	59	6	3	2	22	5	60	4	1	8	22	5	56	2	11	60	18	2	2	9	57	4	19
112	5,553	2,394	45	11	2	20	50	15	3	6	18	9	53	3	1	22	21	10	35	3	14	44	25	4	9	11	39	8	22
118	526	8,427	6	43	0	16	41	0	0	0	15	11	32	0	0	2	15	11	30	5	3	21	20	8	3	1	22	5	26
265	2,366	9,944	24	7	9	30	25	26	3	15	29	8	38	3	2	38	33	11	9	10	10	29	38	6	5	13	20	22	33
352	2,642	5,939	44	13	2	26	50	5	4	3	25	9	47	4	0	8	26	9	44	2	10	45	24	5	3	8	43	4	29
359	10,105	10,105	100	27	5	28	23	6	11	11	28	11	16	6	10	16	32	12	3	8	14	16	27	9	3	13	15	9	32
361	7,835	12,060	65	29	0	47	19	5	0	1	46	9	16	0	9	23	24	11	4	3	13	16	36	3	3	7	14	2	47
367	8,194	11,321	72	23	5	32	30	10	0	6	30	13	28	0	18	20	22	14	4	8	19	19	24	8	8	10	19	6	34
918	5,468	8,615	63	16	4	20	21	11	27	18	24	12	13	17	2	28	31	19	4	11	13	18	23	19	1	20	8	17	38
921	5,276	12,589	42	24	0	37	27	6	6	8	35	14	16	3	3	7	39	24	3	7	7	6	35	21	1	7	7	8	54
1228	3,962	8,911	44	12	9	21	21	33	4	13	18	11	39	6	1	35	23	13	16	4	12	29	30	13	6	12	23	15	33
1249	1,983	4,076	49	1	12	1	13	9	64	20	12	9	8	49	15	32	23	10	18	20	56	16	6	1	11	46	20	20	1
1398	6,322	19,736	32	13	11	3	41	22	10	16	7	16	34	13	3	41	12	19	12	10	36	21	9	11	10	29	20	18	9
1504	21,465	29,866	72	18	3	26	23	26	5	12	26	12	29	3	9	23	24	15	11	16	15	14	26	11	9	19	15	8	31
1560	8,663	8,663	100	5	0	11	65	9	11	17	9	14	47	9	4	42	19	15	15	17	31	25	11	12	9	29	11	25	20
1594	5,043	18,958	27	14	15	42	12	12	5	15	41	11	11	8	5	25	35	11	10	2	17	7	43	16	3	6	6	17	55
1615	1,976	5,910	33	10	1	27	53	8	1	2	19	15	53	1	1	6	20	15	48	3	8	48	27	4	3	6	46	4	31
1715	2,520	9,476	27	23	2	12	22	20	21	18	11	11	29	10	9	26	17	15	10	13	18	16	11	19	3	25	12	9	28
1765	8,531	12,149	70	6	0	32	41	17	3	4	30	14	44	2	14	29	24	20	7	20	19	16	27	11	21	12	21	6	33
1835	7,648	22,045	35	21	0	3	59	16	1	5	1	23	45	4	5	33	1	25	14	25	29	6	13	65	14	31	18	8	8
1849	4,676	10,502	45	2	2	1	16	72	7	37	0	5	33	23	6	55	24	7	6	4	47	43	3	1	1	43	9	43	1
1887	6,311	25,308	25	14	11	17	13	34	12	18	21	5	33	9	9	24	30	8	15	6	29	21	19	11	3	28	11	17	27
1918	645	11,187	6	8	0	16	18	35	22	17	4	24	36	11	5	30	14	29	13	8	37	28	3	16	9	35	24	12	12
1932	7,524	20,500	37	34	0	29	20	15	2	3	14	32	15	2	12	6	12	33	2	20	15	13	14	60	17	8	23	1	17
1947	15,260	18,898	81	11	1	14	53	13	9	11	13	4	55	6	23	29	18	7	12	12	22	28	21	6	17	18	22	15	18
2068	6,250	9,469	66	11	4	17	19	21	27	23	17	4	30	15	15	20	33	9	12	3	31	26	18	10	3	29	18	14	25
2079	3,769	20,595	18	18	3	33	19	24	4	8	34	6	28	6	15	31	18	8	11	13	11	18	29	10	5	10	22	9	37
2148	2,374	11,061	21	2	18	1	8	49	21	55	5	5	15	17	3	70	16	6	3	1	59	28	7	3	2	57	9	26	3
2177	8,983	8,983	100	6	1	12	57	6	18	12	11	10	47	15	14	39	15	12	13	15	29	18	24	8	22	28	18	11	15
2204	1,548	5,606	28	9	0	5	19	66	0	33	4	3	34	18	1	37	27	9	17	12	42	24	7	6	3	42	8	28	10
2261	1,582	2,704	59	7	19	3	6	30	36	18	15	1	31	30	15	36	9	6	28	6	44	7	28	9	3	39	21	18	13
2380	8,906	11,709	76	5	0	5	83	7	0	5	2	34	55	0	1	5	2	34	54	5	76	10	2	19	0	17	72	1	5

[17] *Total Trapline areas were derived from 1:1,000,000 provincial data. If discrepancies were noted between the trapline areas derived for net landbase purposes and the provincial data, the areas used for the net landbase were used.*

Trapline Number	Gross Trapline Area Within FMA (ha)	Total Trapline Area (ha)	% of Trapline Within FMA	Non-Forested (% Gross Area)	Current Forest (% of Gross Area)					Future Forest 10 Years (% of Gross Area)					Future Forest 40 Years (% of Gross Area)					Future Forest 80 Years (% of Gross Area)					Future Forest 160 Years (% of Gross Area)				
					EST	JUV	IMM	MAT	OMAT	EST	JUV	IMM	MAT	OMAT	EST	JUV	IMM	MAT	OMAT	EST	JUV	IMM	MAT	OMAT	EST	JUV	IMM	MAT	OMAT
2481	5,039	10,200	49	17	0	3	77	2	1	1	2	48	32	0	0	17	2	49	15	12	53	1	6	16	16	9	42	6	11
2536	6,180	7,468	83	19	0	4	73	3	1	1	2	28	49	1	2	28	1	29	21	12	43	3	20	25	10	9	38	19	5
2537	6,515	8,810	74	11	3	12	26	47	3	24	12	7	43	2	7	33	23	20	7	2	32	25	17	13	4	31	15	16	22
2561	5,988	5,988	100	11	2	7	7	62	11	27	4	6	39	14	13	30	21	13	12	3	33	30	7	17	2	32	19	17	19
2715	3,910	7,227	54	11	0	3	72	11	3	10	2	41	34	3	3	30	2	41	14	21	43	5	17	16	9	17	42	15	7

6.6 WILDLIFE HABITAT DISTRIBUTION ANALYSIS

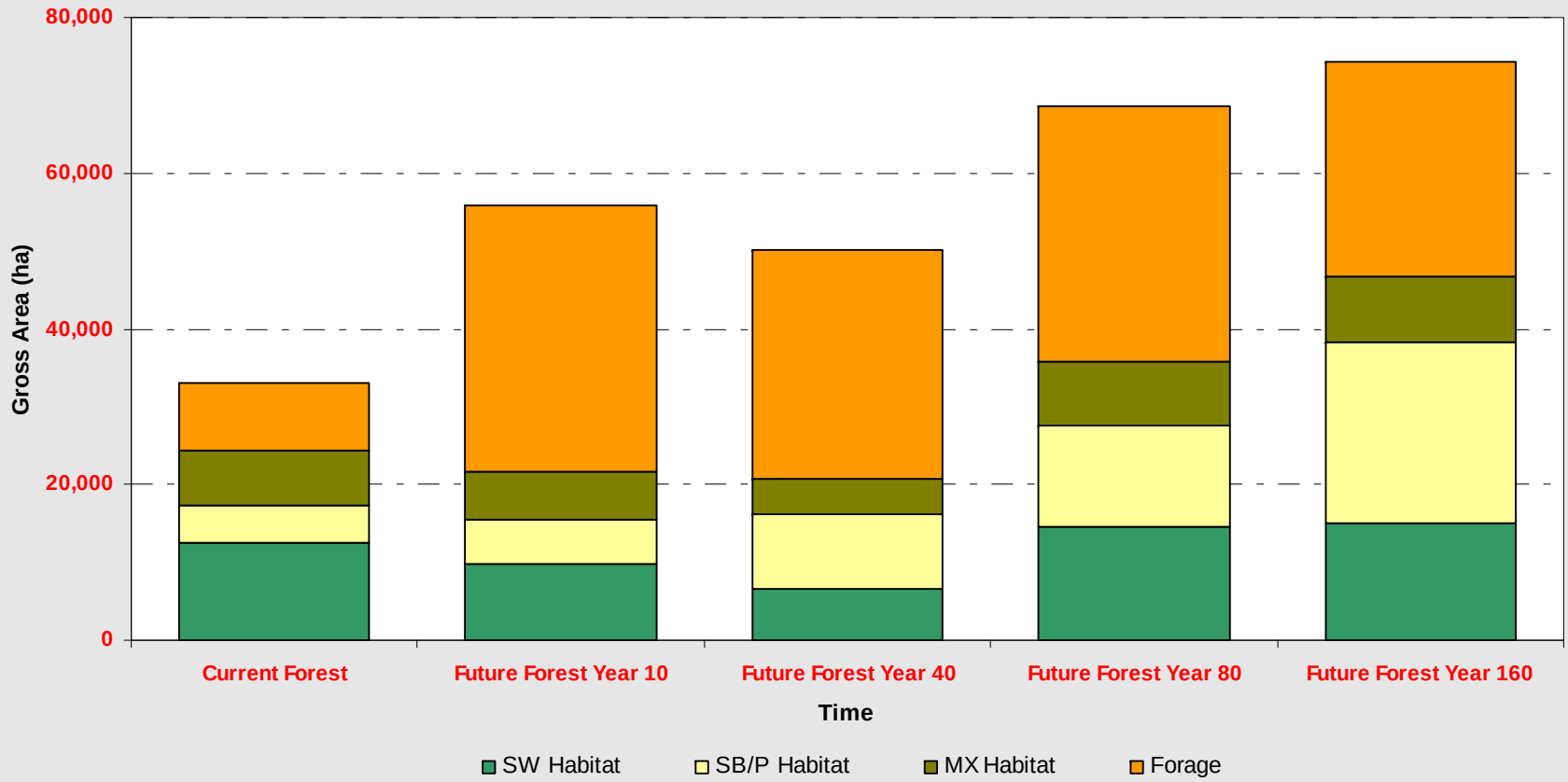
In order to predict the effect that the PFMS will have on wildlife habitat within the FMA area, an analysis of the amount of habitat of four key wildlife species was undertaken. The species included, American Marten (*Martes americana*), Moose (*Alces alces*), Pileated Woodpecker (*Dryocopus pileatus*), and Northern Goshawk (*Accipiter gentilis*). The analysis compared data from the current forest and the future forest at projections of 10 years, 40 years, 80 years, and 160 years. For each of the time periods, a set of criteria (Table 6-13) was used to determine which stands qualified as habitat for each of the species. These stands are illustrated in Map 6-17 through Map 6-36 (full size maps can be found in Appendix I, Map I-12 to I-16 and Appendix J, Map J-1 to J-15). Figure 6-28 through Figure 6-31 summarize the total habitat area for each species at the current and future states of the forest. It is important to note that the late seral strategy contributed directly to the habitat of each of these four key wildlife species. In this analysis, the grazing lease areas were not included.

TABLE 6-13: HABITAT DISTRIBUTION ANALYSIS CRITERIA

SPECIES	HABITAT CRITERIA
Moose (*Alces alces)*	♦ Crown closure between 31% and 100% (B, C or D density). ♦ Leading species of White Spruce, Black Spruce, Jack Pine or Lodgepole Pine. ♦ Tree height greater than 10m **OR** ♦ Deciduous overstorey with an understorey meeting the same specifications listed above **OR** ♦ Mixedwood stand with a crown closure between 51% and 100%(C or D density) and a tree height greater than 10m ♦ **Forage criteria:** cutblocks less than 20 years old
American Marten (*Martes americana)*	♦ Crown closure between 51% and 100% (C or D density). ♦ Canopy composition of Black Spruce, White Spruce, and/or Balsam Fir greater than 50% ♦ Tree height greater than 15m ♦ Stand age greater than 90 years **OR** ♦ Deciduous overstorey with an understorey meeting the same specifications listed above ♦ **Forage criteria:** cutblocks greater than or equal to 30 years and less than or equal to 90 years old adjacent to stands meeting the above habitat criteria
Northern Goshawk (*Accipiter gentilis*)	♦ Crown closure between 51% and 100% (C or D density). ♦ Mixedwood or deciduous dominated stand ♦ Tree height greater than 10m
Pileated Woodpecker (*Dryocopus pileatus*)	♦ Crown closure between 51% and 100% (C or D density). ♦ Canopy composition of Aspen and/or Balsam Popular greater than 50% ♦ Stand age greater than 40 years

FIGURE 6-28: MOOSE HABITAT SUMMARY

Current Forest Gross Area (ha)				Future Forest Year 10 Gross Area (ha)				Future Forest Year 40 Gross Area (ha)				Future Forest Year 80 Gross Area (ha)				Future Forest Year 160 Gross Area (ha)			
SW	SB/P	MX	FOR	SW	SB/P	MX	FOR	SW	SB/P	MX	FOR	SW	SB/P	MX	FOR	SW	SB/P	MX	FOR
12,479	4,939	6,942	8,651	9,895	5,683	6,132	34,234	6,658	9,458	4,528	29,437	14,475	13,216	8,042	32,908	15,100	23,199	8,404	27,645
33,011				55,944				50,081				68,641				74,347			



MAP 6-17: CURRENT MOOSE HABITAT DISTRIBUTION ANALYSIS

MAP 6-18: YEAR 10 MOOSE HABITAT DISTRIBUTION ANALYSIS

MAP 6-19: YEAR 40 MOOSE HABITAT DISTRIBUTION ANALYSIS

MAP 6-20: YEAR 80 MOOSE HABITAT DISTRIBUTION ANALYSIS

MAP 6-21: YEAR 160 MOOSE HABITAT DISTRIBUTION ANALYSIS

FIGURE 6-29: AMERICAN MARTEN HABITAT SUMMARY

Current Forest Gross Area (ha)			Future Forest Year 10 Gross Area (ha)			Future Forest Year 40 Gross Area (ha)			Future Forest Year 80 Gross Area (ha)			Future Forest Year 160 Gross Area (ha)		
Habitat	Forage	Total	Habitat	Forage	Total	Habitat	Forage	Total	Habitat	Forage	Total	Habitat	Forage	Total
5,549	48	5,597	4,520	406	4,926	2,147	3,467	5,614	1,643	4,370	6,013	2,647	7,414	10,061

MAP 6-22: CURRENT AMERICAN MARTEN HABITAT DISTRIBUTION ANALYSIS

MAP 6-23: YEAR 10 AMERICAN MARTEN HABITAT DISTRIBUTION ANALYSIS

MAP 6-24: YEAR 40 AMERICAN MARTEN HABITAT DISTRIBUTION ANALYSIS

MAP 6-25: YEAR 80 AMERICAN MARTEN HABITAT DISTRIBUTION ANALYSIS

MAP 6-26: YEAR 160 AMERICAN MARTEN HABITAT DISTRIBUTION ANALYSIS

FIGURE 6-30: NORTHERN GOSHAWK HABITAT SUMMARY

Current Forest Gross Area (ha) Habitat	Future Forest Year 10 Gross Area (ha) Habitat	Future Forest Year 40 Gross Area (ha) Habitat	Future Forest Year 80 Gross Area (ha) Habitat	Future Forest Year 160 Gross Area (ha) Habitat
92,197	74,980	49,534	66,354	79,998

MAP 6-27: CURRENT NORTHERN GOSHAWK HABITAT DISTRIBUTION ANALYSIS

MAP 6-28: YEAR 10 NORTHERN GOSHAWK HABITAT DISTRIBUTION ANALYSIS

MAP 6-29: YEAR 40 NORTHERN GOSHAWK HABITAT DISTRIBUTION ANALYSIS

MAP 6-30: YEAR 80 NORTHERN GOSHAWK HABITAT DISTRIBUTION ANALYSIS

MAP 6-31: YEAR 160 NORTHERN GOSHAWK HABITAT DISTRIBUTION ANALYSIS

FIGURE 6-31: PILEATED WOODPECKER HABITAT SUMMARY

Current Forest Gross Area (ha) Habitat	Future Forest Year 10 Gross Area (ha) Habitat	Future Forest Year 40 Gross Area (ha) Habitat	Future Forest Year 80 Gross Area (ha) Habitat	Future Forest Year 160 Gross Area (ha) Habitat
86,520	69,986	27,365	48,426	62,241

MAP 6-32: CURRENT PILEATED WOODPECKER HABITAT DISTRIBUTION ANALYSIS

MAP 6-33: YEAR 10 PILEATED WOODPECKER HABITAT DISTRIBUTION ANALYSIS

MAP 6-34: YEAR 40 PILEATED WOODPECKER HABITAT DISTRIBUTION ANALYSIS

MAP 6-35: YEAR 80 PILEATED WOODPECKER HABITAT DISTRIBUTION ANALYSIS

MAP 6-36: YEAR 160 PILEATED WOODPECKER HABITAT DISTRIBUTION ANALYSIS

6.7 WATERSHED ANALYSIS

Watersheds were assessed using two methods of analysis to determine what effect the PFMS harvest sequence would have on each watershed.

The first analysis presented in Table 6-14 shows how much of the gross forested area within each watershed is below certain age thresholds. The age threshold is the age at which the leaf area index of a disturbed stand recovers to pre-harvest conditions (D-10 years, DC-15 years, CD-40 years, C-Pine-25 years, C-White Spruce-40 years, C-Black Spruce-40 years).

The second analysis uses the Cumulative Watershed Disturbance and Hydrologic Recovery Simulator (ECA-Alberta), to determine what effect the PFMS harvest sequence would have on each of the 53 watersheds. ECA stands for "equivalent clearcut area" which describes the "effective" area that a recovering historic disturbance currently represents in terms of its ecological effects. The model was used to evaluate the cumulative effect of proposed forest harvesting on streamflow in a watershed.

To accomplish this, the model requires a data set of future areas disturbed by species and timber productivity rating. Using this information, along with regional long term average precipitation and streamflow data and provincial average growth/yield data (to predict rate of hydrologic recovery), the model will calculate the equivalent clearcut area and resulting change in annual streamflow. Separate long term streamflow and precipitation averages were derived for each operating area, with the Whitemud and Birch areas being combined.

The results of the watershed analysis showing percent of gross watershed area harvested, percent equivalent clearcut area, and percent change in long term average annual yield over time, for each watershed, are presented in Figure 1-1 through Figure 1-14. The relationship between percent change in long term average annual yield and equivalent clearcut area differs greatly depending on the initial streamflow and precipitation model inputs (Table 6-15). Table 6-16 summarizes this relationship between equivalent clearcut area and percent change in long term average annual yield realized in this analysis. For maps showing the percent equivalent clearcut area by watershed at 10 and 20 years in the future, refer to Map 6-37 and MAP 6-38(full size maps can be found in Appendix J, Map J-16 to J-17). Much of the material in this section is referenced from the ECA-Alberta Model.

An additional external review, assessment and analysis of risk of the Cumulative Watershed Disturbance and Hydrologic Recovery Simulator (ECA-Alberta) results presented here can be found in Appendix G.

NOTE:

- Streamflow gauging station(s), with at least 5 years of data, representing a watershed with like topography and vegetation to those of a given operating area were used to derive the long term streamflow averages, Table 6-15 displays these averages.
- Precipitation station(s) within close proximity to a given operating area were used to derive the long term precipitation averages; Table 6-15 displays these averages.
- Most streamflow gauging stations are shut down during certain times of the year and therefore, the gaps in data must be estimated to determine a year round average;

- Model accuracy depends primarily on accurate hydrologic recovery information of forest stands after disturbance, as well as representative regional streamflow and precipitation data;
- Hydrologic recovery of mixedwood stands is not simulated by this model;
- Model assumes that maximum volume growth rate represents the age at which full hydrologic recovery is obtained.
- Model calculations reflect provincial averages for unmanaged (primarily fire origin) stands;
- Deviation of regional forest growth from provincial averages may produce unreliable results for some regions;
- This analysis only represents the incremental cumulative effect of harvesting;
- Watersheds having only small fractions within the FMA may be inaccurately represented and therefore not included in this analysis;
- The objective of this model is not to produce a detailed, highly accurate simulation of streamflow, but rather a projection of streamflow changes over time assuming average climatic conditions in the region;
- ECA-Alberta describes how disturbance will affect streamflow based on long-term climatic conditions and may not represent actual changes in any given year.

TABLE 6-14: PERCENT OF GROSS FORESTED AREA BELOW AGE THRESHOLD[18] BY WATERSHED

WATERSHED #	GROSS FORESTED AREA (ha)	% OF GROSS FORESTED AREA BELOW THRESHOLD[3]		
		CURRENT	10 YEARS	20 YEARS
101-Utikuma	5,590	14	24	14
102-Utikuma	1,570	12	24	31
103-Utikuma	1,770	10	11	42
104-Utikuma	14,480	5	9	18
105-Utikuma	3,019	5	10	24
106-Utikuma	48	0	20	0
107-Utikuma	9,001	10	23	18
108-Utikuma	7,698	3	6	7
109-Utikuma	4,255	1	7	5
110-Utikuma	22,266	4	21	16
111-Utikuma	4,376	4	12	15
112-Utikuma	21,356	9	17	13
113-Utikuma	3,099	7	19	7
114-Utikuma	2,262	5	20	5
115-Utikuma	3,610	4	12	9
116-Utikuma	1,756	0	2	4
117-Utikuma	526	1	1	1
118-Utikuma	133	0	11	13
119-Utikuma	7,260	1	2	4
120-Utikuma	1,430	0	1	12
121-Utikuma	2,509	38	38	38
122-Utikuma	2,303	7	8	8
123-Utikuma	1,203	10	23	15
124-Utikuma	944	4	24	13
125-Salt	1,035	4	37	0
126-Salt	4,776	12	29	3
127-Salt	699	14	18	10
128-Salt	2,393	5	10	5
129-Salt	6,337	3	10	18
130-Salt	9,709	1	9	26
131-Salt	4,333	0	10	24
132-Salt	1,940	0	22	7
133-Salt	6,011	2	27	17
134-Salt	3,571	0	14	22
135-Salt	2,852	15	24	30
136-Salt	1,181	10	35	24
137-Whitemud	4,364	1	33	4
138-Whitemud	2,059	0	1	22
139-Whitemud	3,636	0	2	35

[18] Age Threshold; The age that leaf area index (LAI) recovers to pre-harvest conditions.
D-10 years, DC-15 years, CD-40 years, C-Pine-25 years, C-White Spruce-40 years, C-Black Spruce-40 years

WATERSHED #	GROSS FORESTED AREA (ha)	% OF GROSS FORESTED AREA BELOW THRESHOLD[3]		
		CURRENT	10 YEARS	20 YEARS
140-Whitemud	1,988	0	0	2
141-Whitemud	5,548	0	1	21
142-Whitemud	2,069	0	16	7
143-Whitemud	631	0	29	1
144-Whitemud	5,530	0	0	1
145-Whitemud & Birch	3,537	0	4	3
146-Whitemud	54	0	0	0
147-Whitemud	4,393	1	1	11
148-Whitemud	2,847	0	13	22
149-Whitemud	7,071	4	20	25
150-Whitemud	5,974	11	24	15
151-Whitemud	1,952	13	38	5
152-Whitemud	5,885	5	30	19
153-Whitemud	3,026	2	20	21
154-Whitemud	181	0	29	17
155-Birch	856	0	10	2
156-Birch	5,301	0	3	0
157-Birch	2,642	0	4	0
158-Birch	353	0	0	0

TABLE 6-15: CUMULATIVE WATERSHED DISTURBANCE AND HYDROLOGICAL RECOVERY ANALYSIS: MODEL INPUT STREAMFLOW AND PRECIPITATION PARAMETERS

OPERATING AREA	LONG TERM STREAMFLOW AVERAGE (MM/YR)	LONG TERM PRECIPITATION AVERAGE (MM/YR)
Utikuma	63	424
Salt	47	451
Whitemud & Birch	69	488

TABLE 6-16: CUMULATIVE WATERSHED DISTURBANCE AND HYDROLOGICAL RECOVERY ANALYSIS: 20 YEAR PEAK YIELD SUMMARY

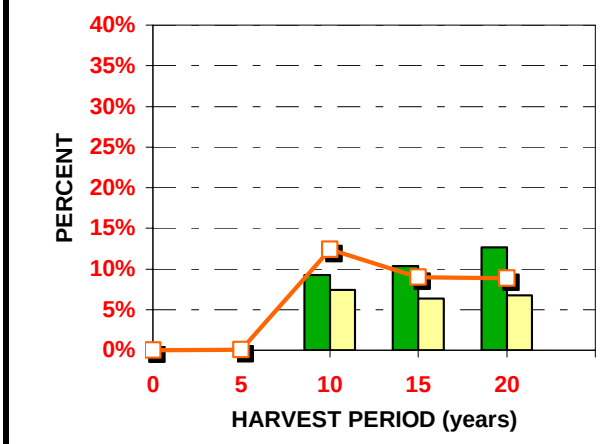
WATERSHED #	20 YEAR PEAK YIELD INCREASE ABOVE LONG TERM AVERAGE (%)	EQUIVALENT CLEARCUT AREA[19]		GROSS WATERSHED AREA (ha) WITHIN FMA
		PERCENT (%)	AREA (ha)	
101 - Utikuma	12	7	536	7,242
102 - Utikuma	8	6	116	1,948
103 - Utikuma	27	15	288	1,860
104 - Utikuma	12	8	1,336	15,962
105 - Utikuma	19	13	456	3,614
107 - Utikuma	12	9	908	9,608
108 - Utikuma	4	3	257	8,445
109 - Utikuma	4	2	126	5,293
110 - Utikuma	15	9	2,307	25,856
111 - Utikuma	12	8	392	4,774
112 - Utikuma	7	6	1,384	24,652
113 - Utikuma	7	5	210	4,360
114 - Utikuma	11	7	197	2,987
115 - Utikuma	3	2	100	4,884
116 - Utikuma	1	1	18	2,443
117 - Utikuma	6	3	27	833
119 - Utikuma	3	1	148	9,906
120 - Utikuma	4	2	38	1,812
121 - Utikuma	1	1	28	2,983
122 - Utikuma	3	2	41	2,570
123 - Utikuma	14	9	153	1,613
124 - Utikuma	4	3	32	1,116
125 - Salt	21	8	100	1,184
126 - Salt	21	9	503	5,556
127 - Salt	16	7	56	803
128 - Salt	10	4	104	2,572
129 - Salt	16	8	542	7,134
130 - Salt	29	13	1,387	10,951
131 - Salt	28	12	550	4,707
132 - Salt	35	13	253	1,956
133 - Salt	34	13	774	6,165
134 - Salt	7	3	120	3,823
135 - Salt	39	19	559	2,986
136 - Salt	29	11	128	1,196
137 - Whitemud	10	7	309	4,564
138 - Whitemud	18	10	265	2,598

[19] *Equivalent Clearcut Area describes the "effective" area that a recovering historic disturbance currently represents in terms of its ecological effects*

WATERSHED #	20 YEAR PEAK YIELD INCREASE ABOVE LONG TERM AVERAGE (%)	EQUIVALENT CLEARCUT AREA[19]		GROSS WATERSHED AREA (ha) WITHIN FMA
		PERCENT (%)	AREA (ha)	
139 - Whitemud	16	10	430	4,374
140 - Whitemud	5	3	62	2,136
141 - Whitemud	19	11	697	6,412
142 - Whitemud	17	9	202	2,164
143 - Whitemud	12	6	52	820
144 – Whitemud	1	0	36	7,175
145 – Whitemud & Birch	5	3	126	4,319
147 - Whitemud	8	5	248	5,250
148 - Whitemud	17	11	327	3,077
149 - Whitemud	19	13	1,010	7,986
150 - Whitemud	10	6	417	6,617
151 - Whitemud	43	26	548	2,108
152 - Whitemud	20	11	732	6,738
153 - Whitemud	16	8	274	3,251
155 - Birch	7	4	39	944
156 - Birch	4	2	118	5,497
157 - Birch	4	2	62	2,731

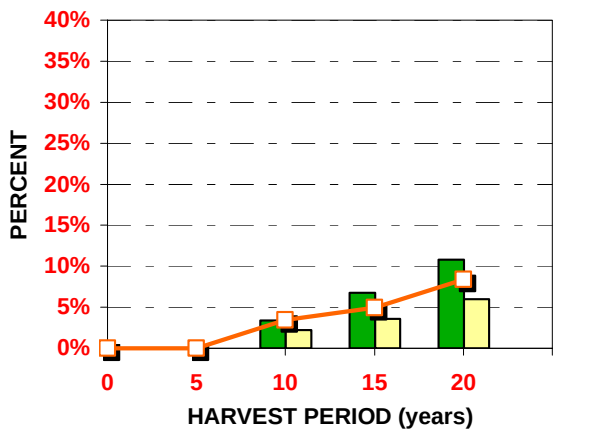
FIGURE 6-32: CUMULATIVE WATERSHED DISTURBANCE AND HYDROLOGICAL RECOVERY ANALYSIS: UTIKUMA WATERSHEDS #101 - #104

WATERSHED #101



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	0	9	10	13
Equivalent Harvest Area (%)	0	7	6	7
Yield Increase (%)	0	12	9	9

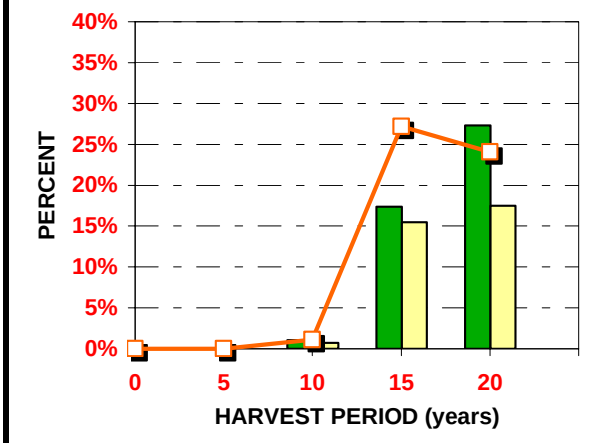
WATERSHED#102



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	0	3	7	11
Equivalent Harvest Area (%)	0	2	4	6
Yield Increase (%)	0	3	5	8

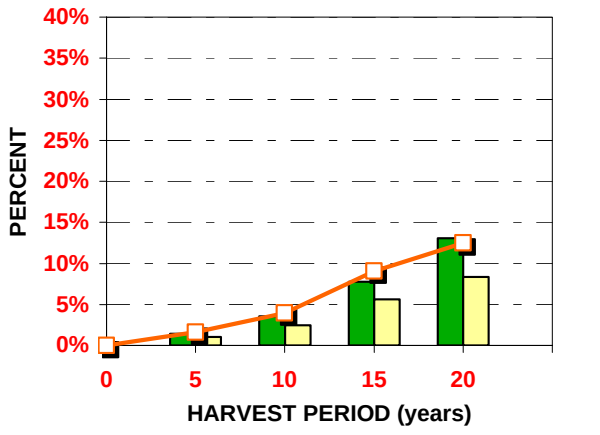
Cumulative Harvest Area (%) ECA (%) Yield Increase Above Long Term Average (%)

WATERSHED #103



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	0	1	17	27
Equivalent Harvest Area (%)	0	1	15	18
Yield Increase (%)	0	1	27	24

WATERSHED#104

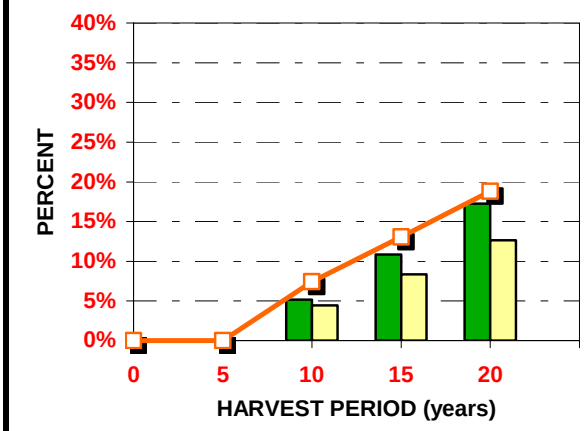


Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	1	4	8	13
Equivalent Harvest Area (%)	1	2	6	8
Yield Increase (%)	2	4	9	12

Cumulative Harvest Area (%) ECA (%) Yield Increase Above Long Term Average (%)

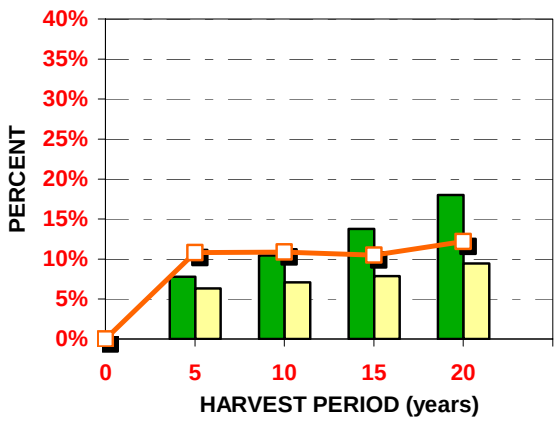
FIGURE 6-33: CUMULATIVE WATERSHED DISTURBANCE AND HYDROLOGICAL RECOVERY ANALYSIS: UTIKUMA WATERSHEDS #105 AND #107 - #108

WATERSHED #105



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	0	5	11	17
Equivalent Harvest Area (%)	0	4	8	13
Yield Increase (%)	0	7	13	19

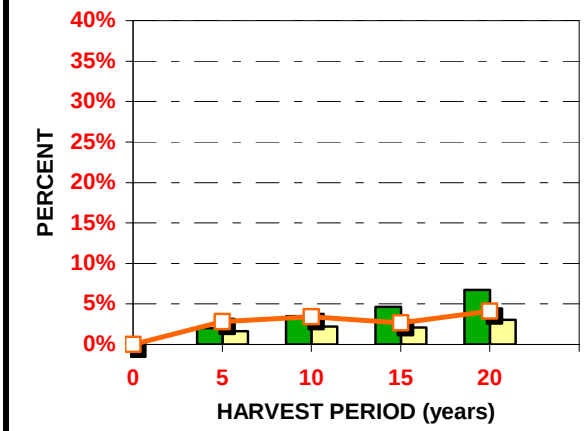
WATERSHED#107



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	8	10	14	18
Equivalent Harvest Area (%)	6	7	8	9
Yield Increase (%)	11	11	11	12

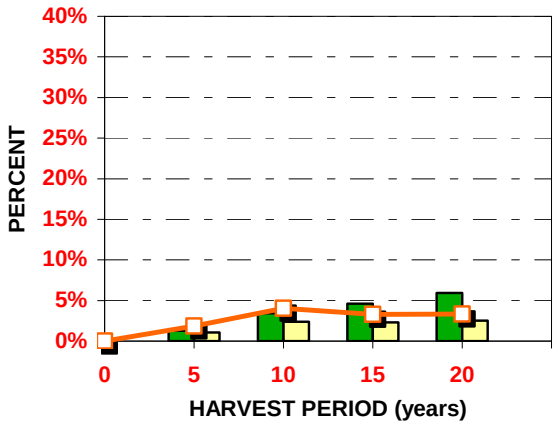
Cumulative Harvest Area (%) ECA (%) Yield Increase Above Long Term Average (%)

WATERSHED #108



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	2	4	5	7
Equivalent Harvest Area (%)	2	2	2	3
Yield Increase (%)	3	3	3	4

WATERSHED#109

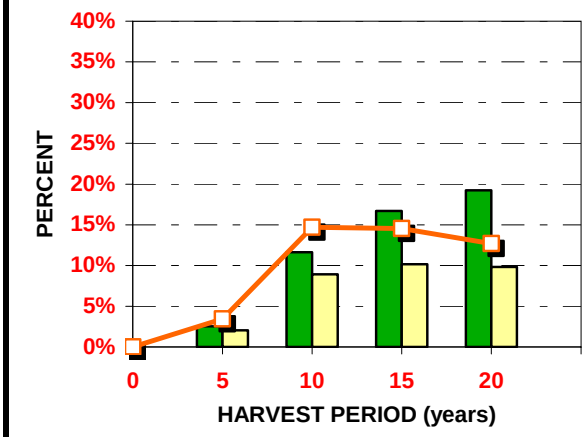


Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	1	3	5	6
Equivalent Harvest Area (%)	1	2	2	3
Yield Increase (%)	2	4	3	3

Cumulative Harvest Area (%) ECA (%) Yield Increase Above Long Term Average (%)

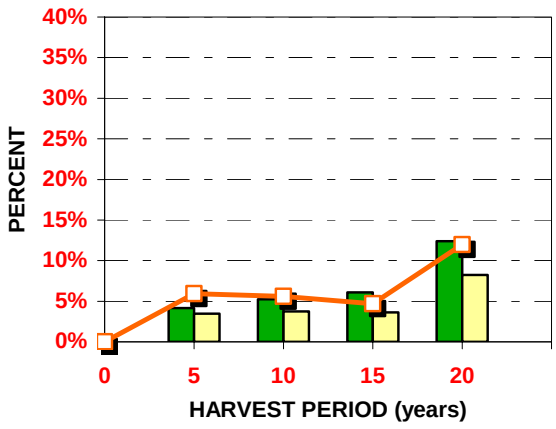
FIGURE 6-34: CUMULATIVE WATERSHED DISTURBANCE AND HYDROLOGICAL RECOVERY ANALYSIS: UTIKUMA WATERSHEDS #110 - #113

WATERSHED #110



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	3	12	17	19
Equivalent Harvest Area (%)	2	9	10	10
Yield Increase (%)	3	15	15	13

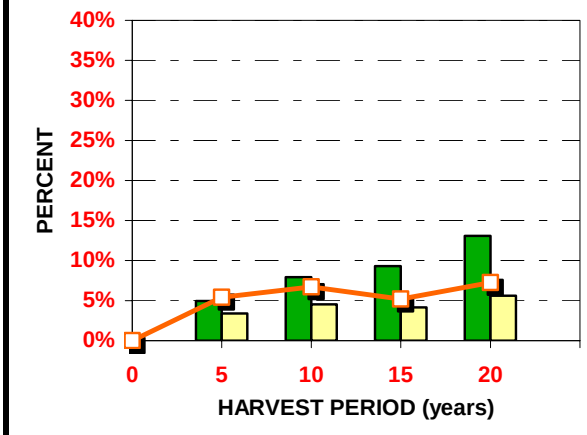
WATERSHED#111



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	4	5	6	12
Equivalent Harvest Area (%)	3	4	4	8
Yield Increase (%)	6	6	5	12

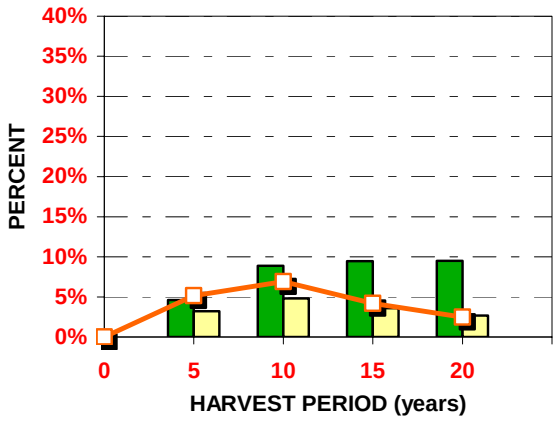
Cumulative Harvest Area (%) ECA (%) Yield Increase Above Long Term Average (%)

WATERSHED #112



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	5	8	9	13
Equivalent Harvest Area (%)	3	5	4	6
Yield Increase (%)	5	7	5	7

WATERSHED#113

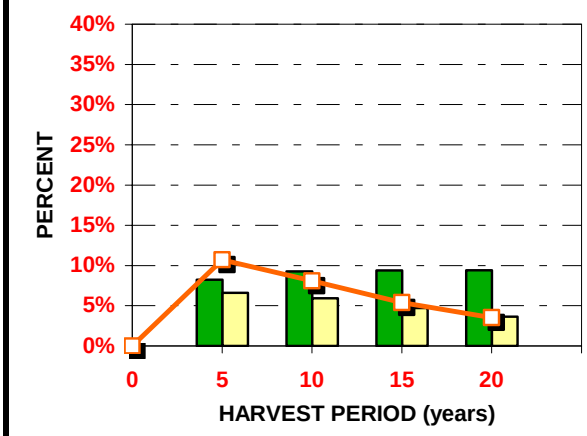


Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	5	9	9	10
Equivalent Harvest Area (%)	3	5	4	3
Yield Increase (%)	5	7	4	2

Cumulative Harvest Area (%) ECA (%) Yield Increase Above Long Term Average (%)

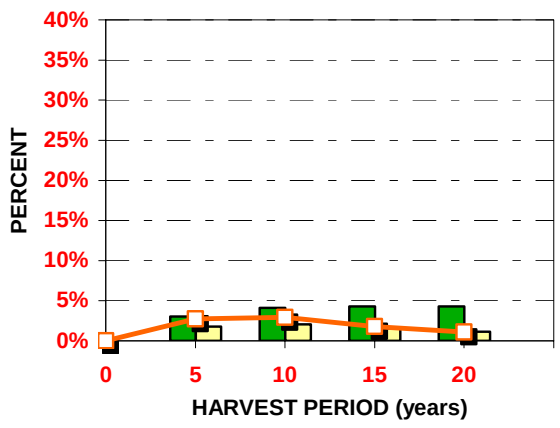
FIGURE 6-35: CUMULATIVE WATERSHED DISTURBANCE AND HYDROLOGICAL RECOVERY ANALYSIS: UTIKUMA WATERSHEDS #114 - #117

WATERSHED #114



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	8	9	9	9
Equivalent Harvest Area (%)	7	6	5	4
Yield Increase (%)	11	8	5	4

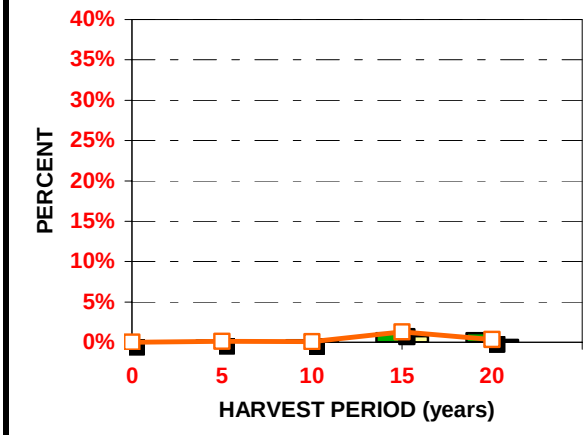
WATERSHED#115



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	3	4	4	4
Equivalent Harvest Area (%)	2	2	2	1
Yield Increase (%)	3	3	2	1

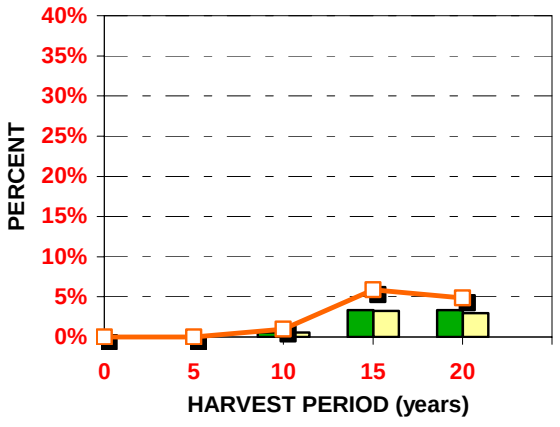
Cumulative Harvest Area (%) ECA (%) Yield Increase Above Long Term Average (%)

WATERSHED #116



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	0	0	1	1
Equivalent Harvest Area (%)	0	0	1	0
Yield Increase (%)	0	0	1	0

WATERSHED#117

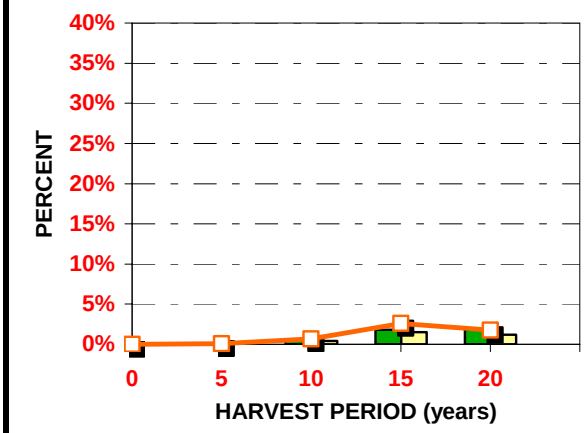


Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	0	1	3	3
Equivalent Harvest Area (%)	0	1	3	3
Yield Increase (%)	0	1	6	5

Cumulative Harvest Area (%) ECA (%) Yield Increase Above Long Term Average (%)

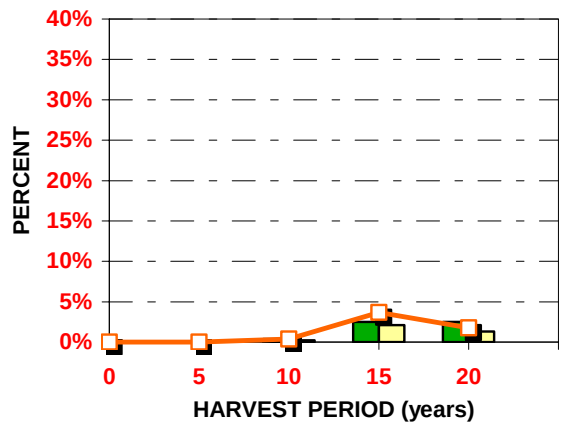
FIGURE 6-36: CUMULATIVE WATERSHED DISTURBANCE AND HYDROLOGICAL RECOVERY ANALYSIS: UTIKUMA WATERSHEDS #119 - #122

WATERSHED #119



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	0	1	2	2
Equivalent Harvest Area (%)	0	0	1	1
Yield Increase (%)	0	1	3	2

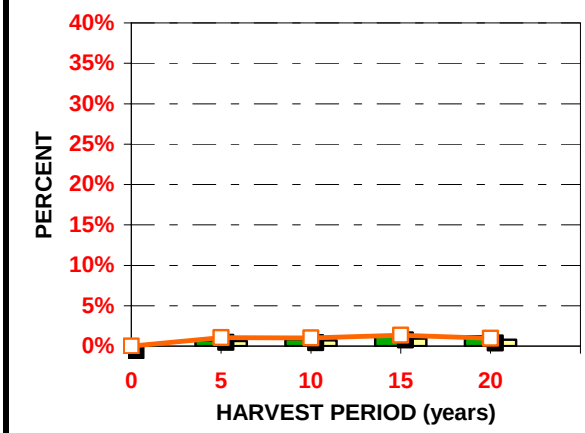
WATERSHED#120



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	0	0	3	3
Equivalent Harvest Area (%)	0	0	2	1
Yield Increase (%)	0	0	4	2

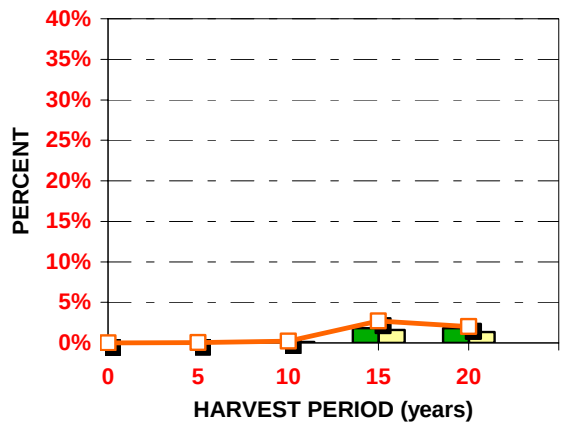
Cumulative Harvest Area (%) ECA (%) Yield Increase Above Long Term Average (%)

WATERSHED #121



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	1	1	1	1
Equivalent Harvest Area (%)	1	1	1	1
Yield Increase (%)	1	1	1	1

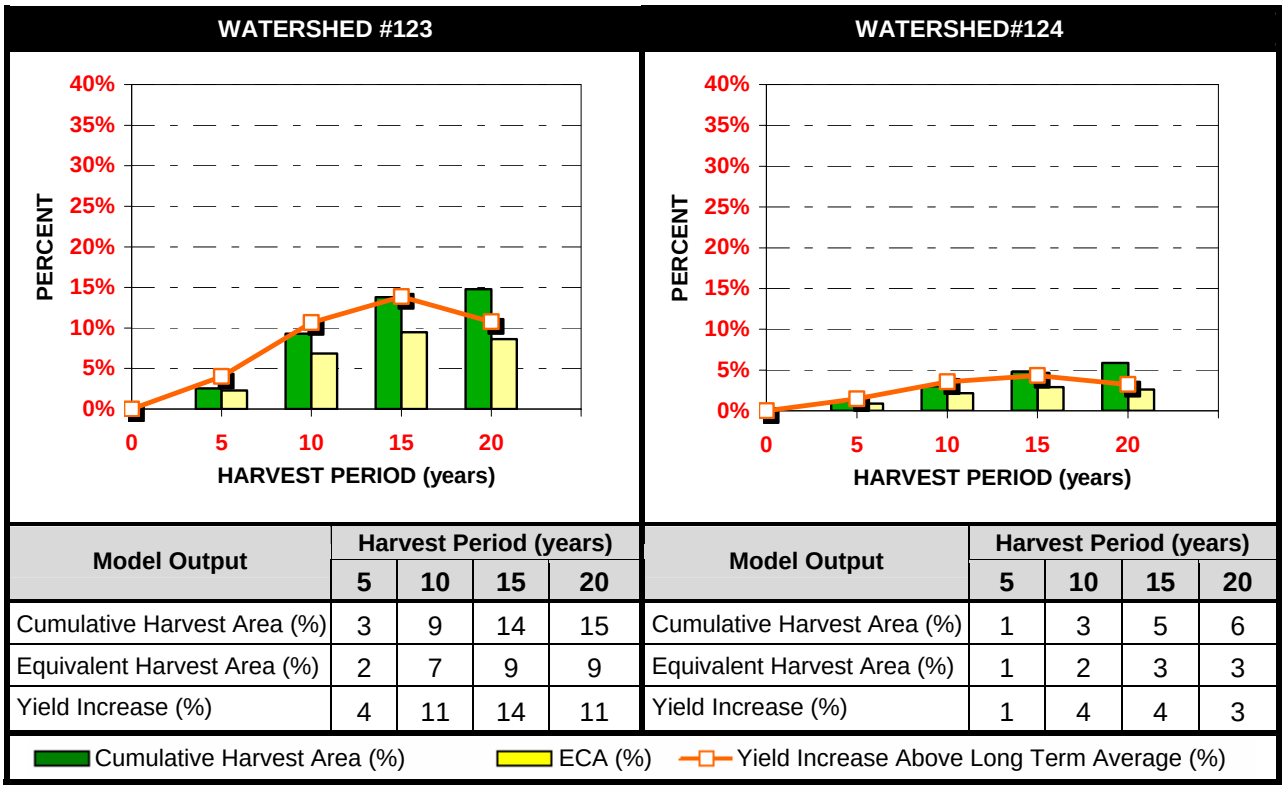
WATERSHED#122



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	0	0	2	2
Equivalent Harvest Area (%)	0	0	2	1
Yield Increase (%)	0	0	3	2

Cumulative Harvest Area (%) ECA (%) Yield Increase Above Long Term Average (%)

FIGURE 6-37: CUMULATIVE WATERSHED DISTURBANCE AND HYDROLOGICAL RECOVERY ANALYSIS: UTIKUMA WATERSHEDS #123 - #124

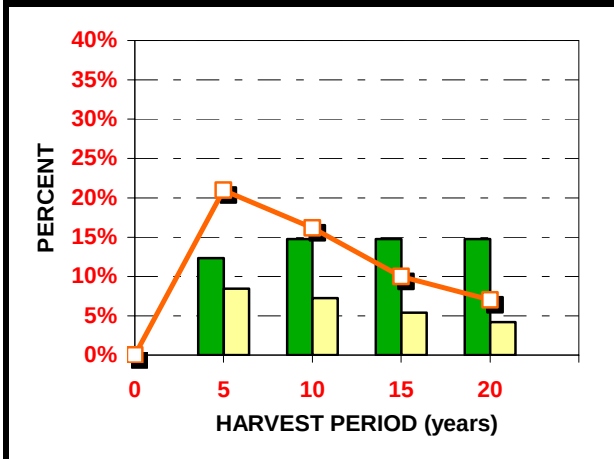


Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	3	9	14	15
Equivalent Harvest Area (%)	2	7	9	9
Yield Increase (%)	4	11	14	11

Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	1	3	5	6
Equivalent Harvest Area (%)	1	2	3	3
Yield Increase (%)	1	4	4	3

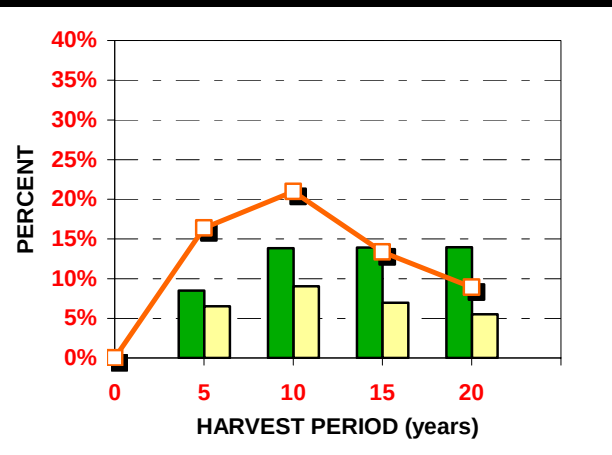
FIGURE 6-38: CUMULATIVE WATERSHED DISTURBANCE AND HYDROLOGICAL RECOVERY ANALYSIS: SALT WATERSHEDS #125 - #128

WATERSHED #125



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	12	15	15	15
Equivalent Harvest Area (%)	8	7	5	4
Yield Increase (%)	21	16	10	7

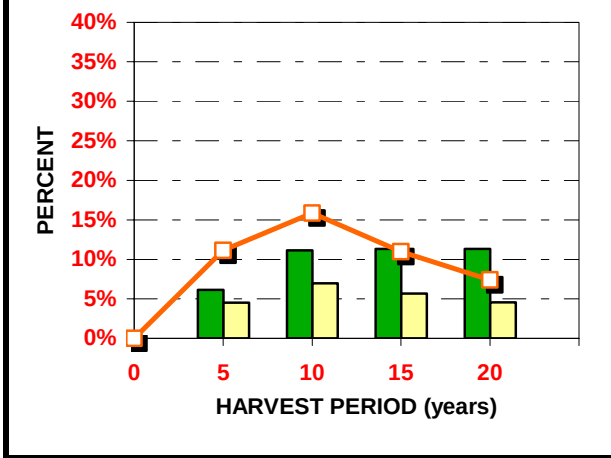
WATERSHED#126



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	8	14	14	14
Equivalent Harvest Area (%)	7	9	7	5
Yield Increase (%)	16	21	13	9

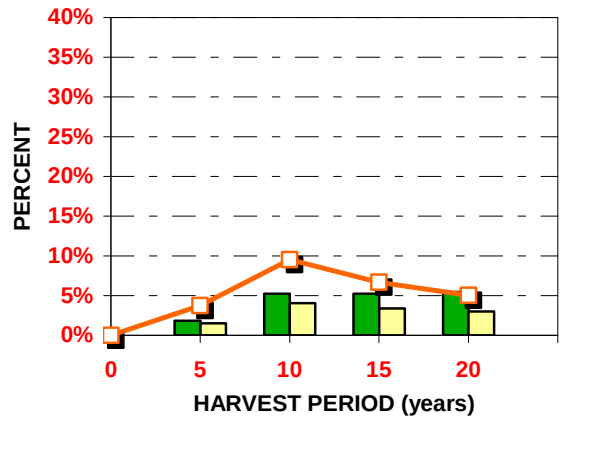
Cumulative Harvest Area (%) ECA (%) Yield Increase Above Long Term Average (%)

WATERSHED #127



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	6	11	11	11
Equivalent Harvest Area (%)	5	7	6	5
Yield Increase (%)	11	16	11	7

WATERSHED#128

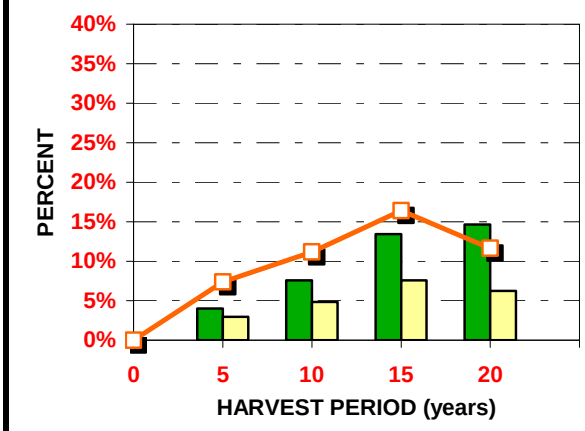


Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	2	5	5	5
Equivalent Harvest Area (%)	2	4	3	3
Yield Increase (%)	4	10	7	5

Cumulative Harvest Area (%) ECA (%) Yield Increase Above Long Term Average (%)

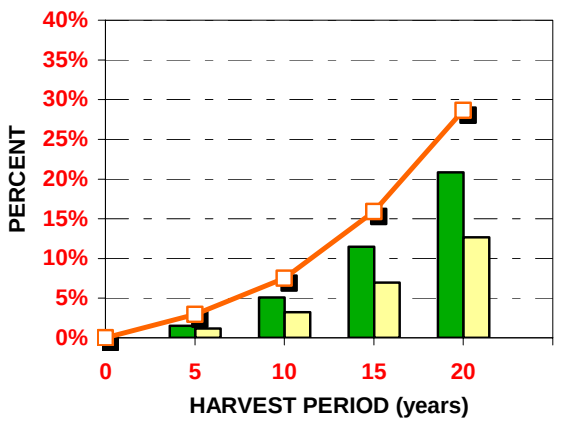
FIGURE 6-39: CUMULATIVE WATERSHED DISTURBANCE AND HYDROLOGICAL RECOVERY ANALYSIS: SALT WATERSHEDS #129 - #132

WATERSHED #129



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	4	8	13	15
Equivalent Harvest Area (%)	3	5	8	6
Yield Increase (%)	7	11	16	12

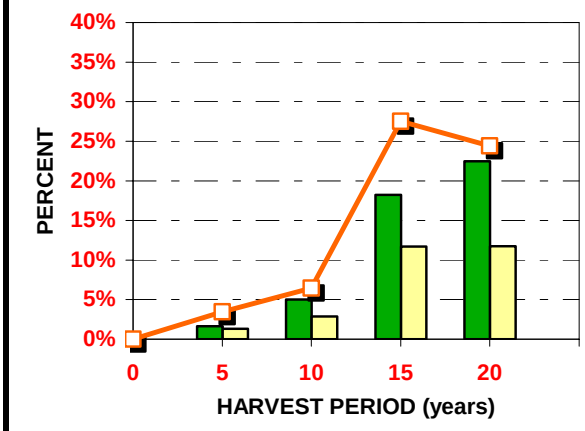
WATERSHED#130



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	2	5	11	21
Equivalent Harvest Area (%)	1	3	7	13
Yield Increase (%)	3	7	16	29

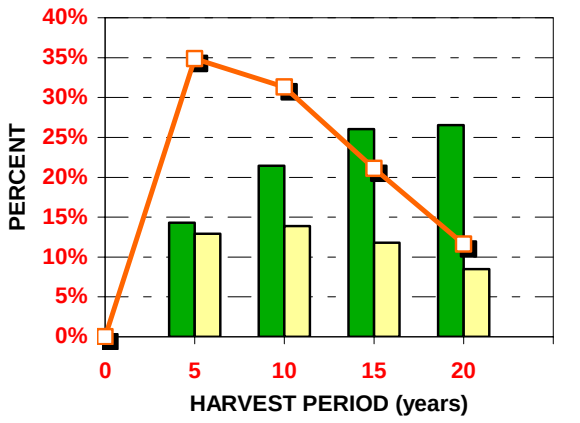
Cumulative Harvest Area (%) ECA (%) Yield Increase Above Long Term Average (%)

WATERSHED #131



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	2	5	18	22
Equivalent Harvest Area (%)	1	3	12	12
Yield Increase (%)	3	6	28	24

WATERSHED#132

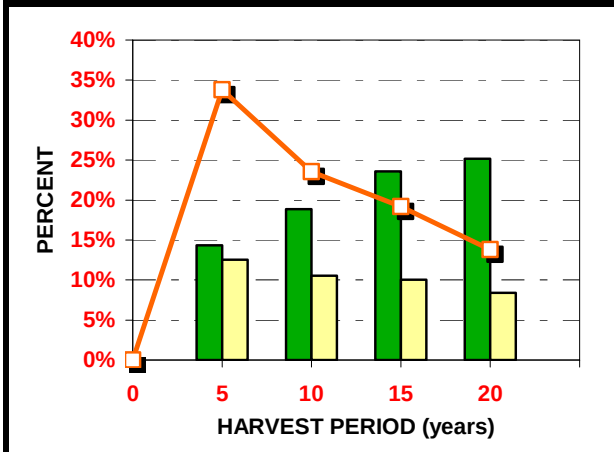


Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	14	21	26	27
Equivalent Harvest Area (%)	13	14	12	8
Yield Increase (%)	35	31	21	12

Cumulative Harvest Area (%) ECA (%) Yield Increase Above Long Term Average (%)

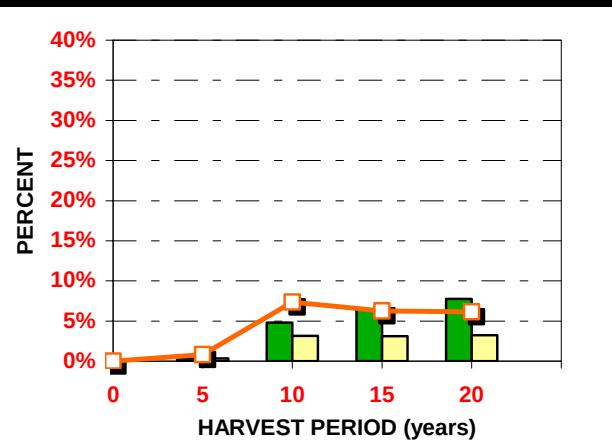
FIGURE 6-40: CUMULATIVE WATERSHED DISTURBANCE AND HYDROLOGICAL RECOVERY ANALYSIS: SALT WATERSHEDS #133 - #136

WATERSHED #133



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	14	19	24	25
Equivalent Harvest Area (%)	13	11	10	8
Yield Increase (%)	34	24	19	14

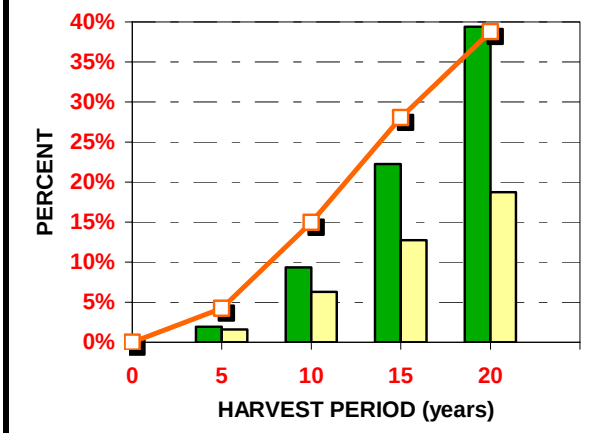
WATERSHED#134



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	0	5	6	8
Equivalent Harvest Area (%)	0	3	3	3
Yield Increase (%)	1	7	6	6

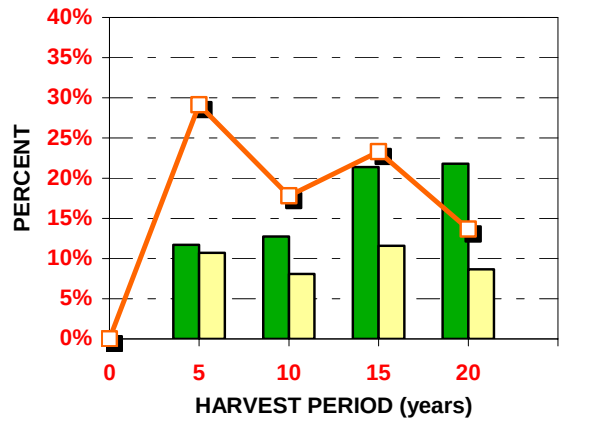
Cumulative Harvest Area (%) ECA (%) Yield Increase Above Long Term Average (%)

WATERSHED #135



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	2	9	22	39
Equivalent Harvest Area (%)	2	6	13	19
Yield Increase (%)	4	15	28	39

WATERSHED#136

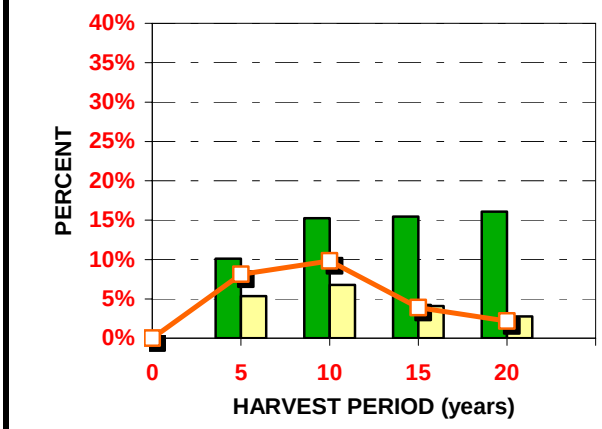


Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	12	13	21	22
Equivalent Harvest Area (%)	11	8	12	9
Yield Increase (%)	29	18	23	14

Cumulative Harvest Area (%) ECA (%) Yield Increase Above Long Term Average (%)

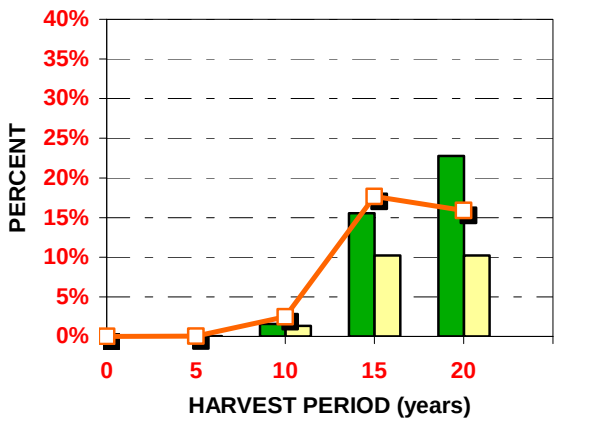
FIGURE 6-41: CUMULATIVE WATERSHED DISTURBANCE AND HYDROLOGICAL RECOVERY ANALYSIS: WHITEMUD/BIRCH WATERSHEDS #137 - #140

WATERSHED #137



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	10	15	15	16
Equivalent Harvest Area (%)	5	7	4	3
Yield Increase (%)	8	10	4	2

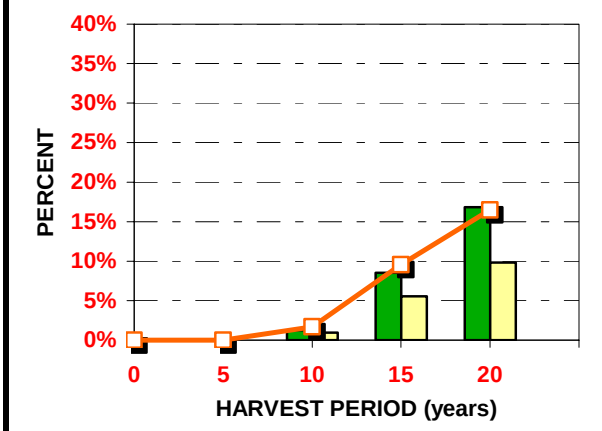
WATERSHED#138



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	0	2	16	23
Equivalent Harvest Area (%)	0	1	10	10
Yield Increase (%)	0	2	18	16

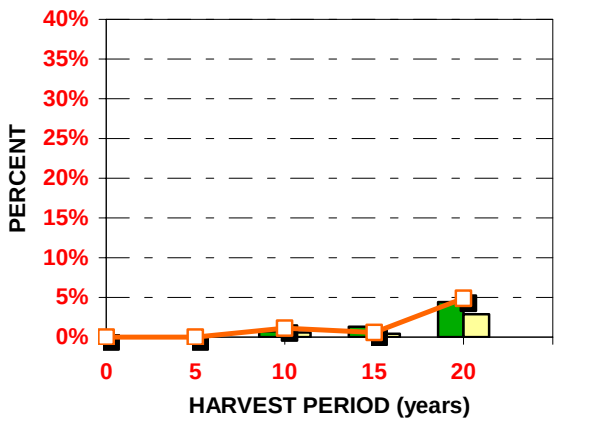
Cumulative Harvest Area (%) ECA (%) Yield Increase Above Long Term Average (%)

WATERSHED #139



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	0	1	9	17
Equivalent Harvest Area (%)	0	1	6	10
Yield Increase (%)	0	2	10	16

WATERSHED#140

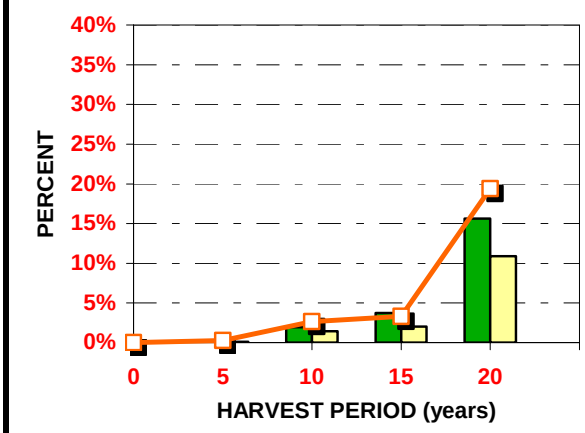


Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	0	1	1	4
Equivalent Harvest Area (%)	0	1	0	3
Yield Increase (%)	0	1	1	5

Cumulative Harvest Area (%) ECA (%) Yield Increase Above Long Term Average (%)

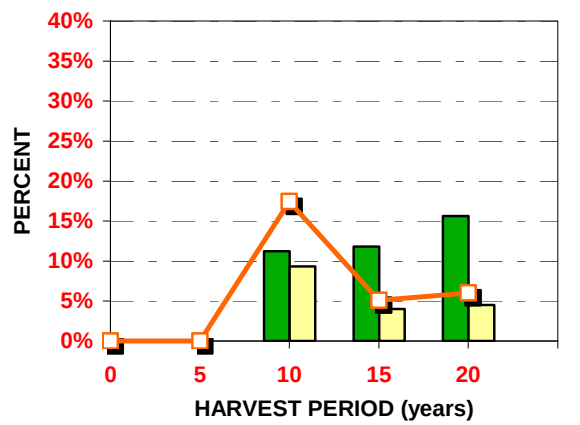
FIGURE 6-42: CUMULATIVE WATERSHED DISTURBANCE AND HYDROLOGICAL RECOVERY ANALYSIS: WHITEMUD/BIRCH WATERSHEDS #141 - #144

WATERSHED #141



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	0	2	4	16
Equivalent Harvest Area (%)	0	1	2	11
Yield Increase (%)	0	3	3	19

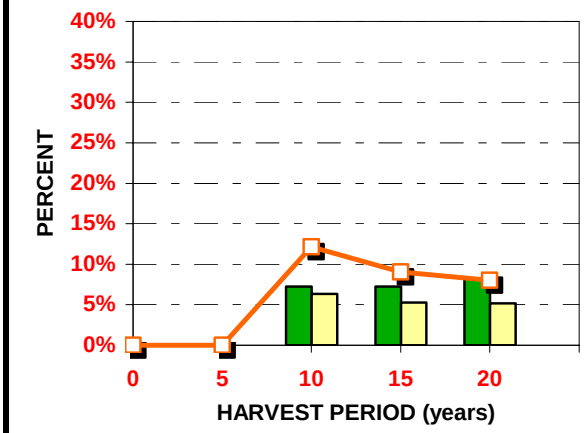
WATERSHED#142



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	0	11	12	16
Equivalent Harvest Area (%)	0	9	4	5
Yield Increase (%)	0	17	5	6

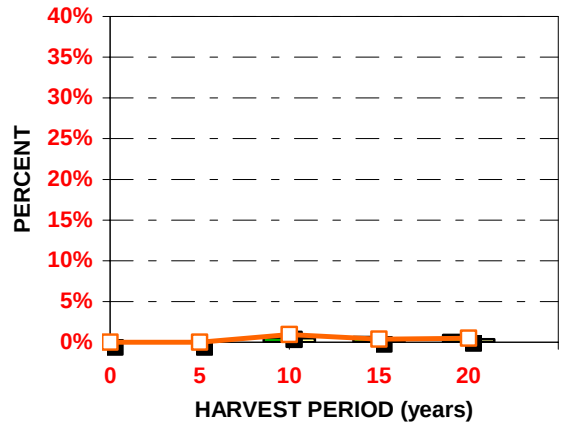
Cumulative Harvest Area (%) ECA (%) Yield Increase Above Long Term Average (%)

WATERSHED #143



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	0	7	7	8
Equivalent Harvest Area (%)	0	6	5	5
Yield Increase (%)	0	12	9	8

WATERSHED#144

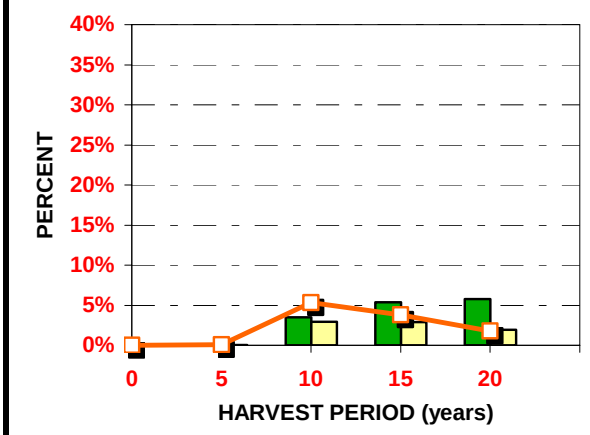


Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	0	1	1	1
Equivalent Harvest Area (%)	0	0	0	0
Yield Increase (%)	0	1	0	0

Cumulative Harvest Area (%) ECA (%) Yield Increase Above Long Term Average (%)

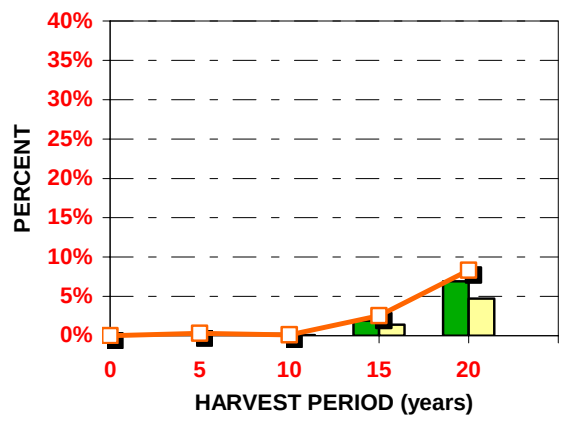
FIGURE 6-43: CUMULATIVE WATERSHED DISTURBANCE AND HYDROLOGICAL RECOVERY ANALYSIS: WHITEMUD/BIRCH WATERSHEDS #145 AND #147- #148

WATERSHED #145



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	0	4	5	6
Equivalent Harvest Area (%)	0	3	3	2
Yield Increase (%)	0	5	4	2

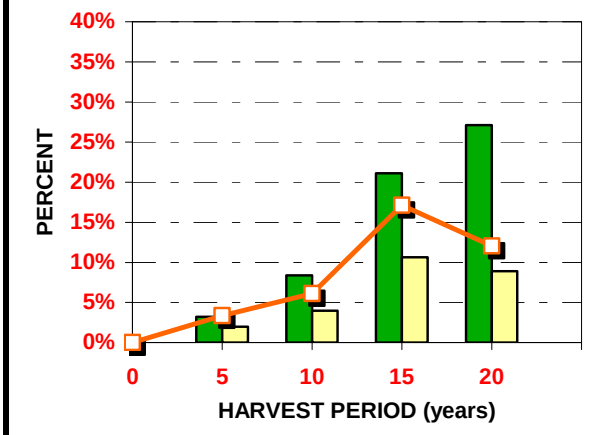
WATERSHED#147



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	0	0	2	7
Equivalent Harvest Area (%)	0	0	1	5
Yield Increase (%)	0	0	3	8

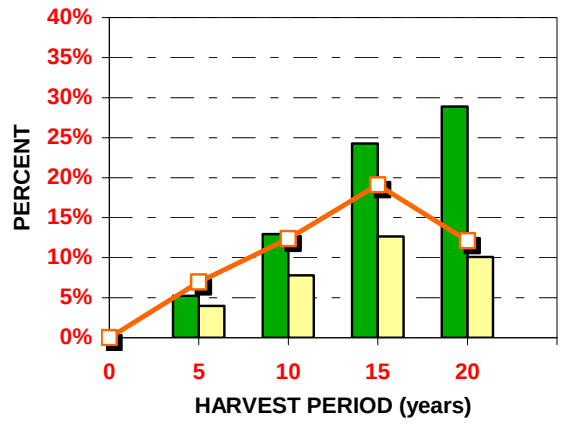
Cumulative Harvest Area (%) ECA (%) Yield Increase Above Long Term Average (%)

WATERSHED #148



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	3	8	21	27
Equivalent Harvest Area (%)	2	4	11	9
Yield Increase (%)	3	6	17	12

WATERSHED#149

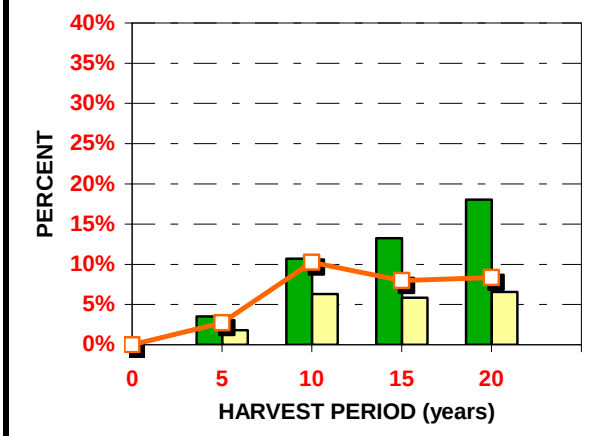


Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	5	13	24	29
Equivalent Harvest Area (%)	4	8	13	10
Yield Increase (%)	7	12	19	12

Cumulative Harvest Area (%) ECA (%) Yield Increase Above Long Term Average (%)

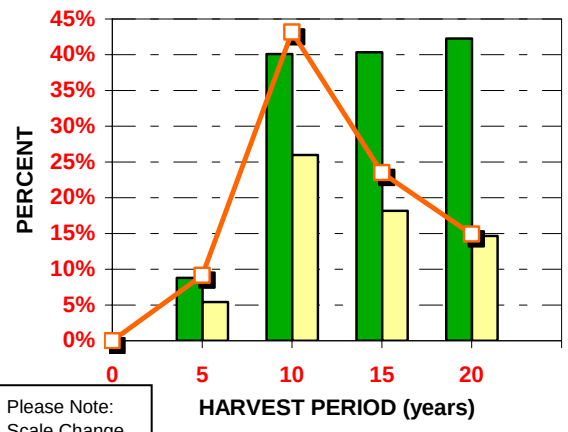
FIGURE 6-44: CUMULATIVE WATERSHED DISTURBANCE AND HYDROLOGICAL RECOVERY ANALYSIS: WHITEMUD/BIRCH WATERSHEDS #149 - #152

WATERSHED #150



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	4	11	13	18
Equivalent Harvest Area (%)	2	6	6	7
Yield Increase (%)	3	10	8	8

WATERSHED#151

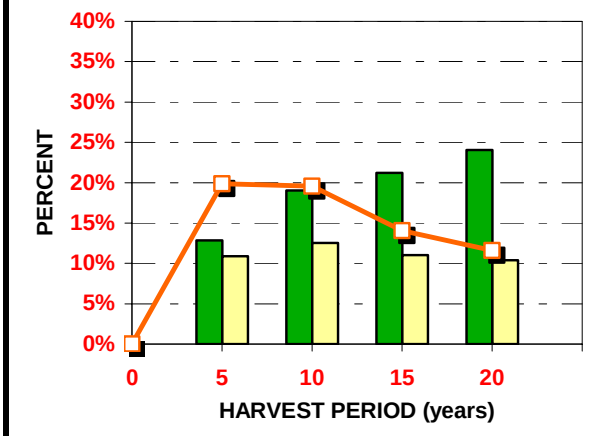


Please Note:
Scale Change

Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	9	40	40	42
Equivalent Harvest Area (%)	5	26	18	15
Yield Increase (%)	9	43	23	15

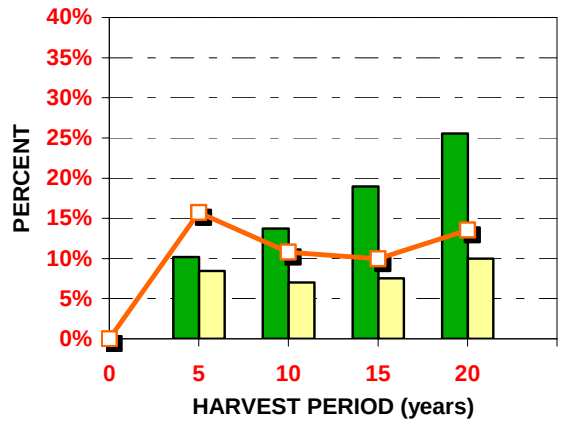
Cumulative Harvest Area (%) ECA (%) Yield Increase Above Long Term Average (%)

WATERSHED #152



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	13	19	21	24
Equivalent Harvest Area (%)	11	13	11	10
Yield Increase (%)	20	20	14	12

WATERSHED#153

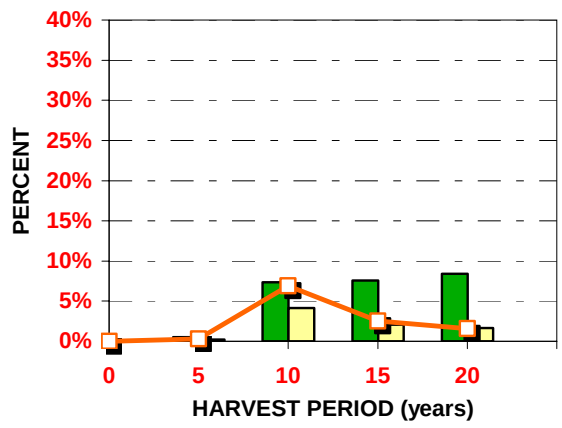


Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	10	14	19	26
Equivalent Harvest Area (%)	8	7	8	10
Yield Increase (%)	16	11	10	14

Cumulative Harvest Area (%) ECA (%) Yield Increase Above Long Term Average (%)

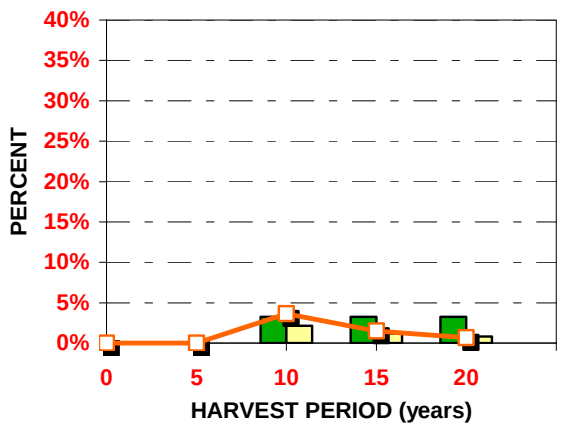
FIGURE 6-45: CUMULATIVE WATERSHED DISTURBANCE AND HYDROLOGICAL RECOVERY ANALYSIS: WHITEMUD/BIRCH WATERSHEDS #153 - #156

WATERSHED #155



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	1	7	8	8
Equivalent Harvest Area (%)	0	4	2	2
Yield Increase (%)	0	7	3	2

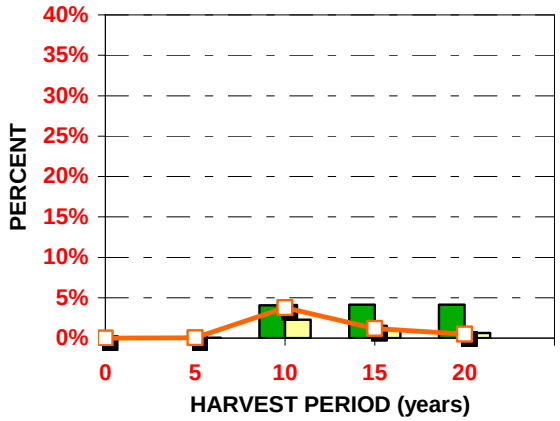
WATERSHED#156



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	0	3	3	3
Equivalent Harvest Area (%)	0	2	1	1
Yield Increase (%)	0	4	1	1

Cumulative Harvest Area (%) ECA (%) Yield Increase Above Long Term Average (%)

WATERSHED #157



Model Output	Harvest Period (years)			
	5	10	15	20
Cumulative Harvest Area (%)	0	4	4	4
Equivalent Harvest Area (%)	0	2	1	1
Yield Increase (%)	0	4	1	0

Cumulative Harvest Area (%) ECA (%) Yield Increase Above Long Term Average (%)

MAP 6-37: 10 YEAR PROJECTION – CUMULATIVE WATERSHED DISTURBANCE AND HYDROLOGIC RECOVERY ANALYSIS

MAP 6-38: 20 YEAR PROJECTION – CUMULATIVE WATERSHED DISTURBANCE AND HYDROLOGIC RECOVERY ANALYSIS

6.7.2 DISCUSSION OF RESULTS

After comparing the projected increase in stream flow against the natural variability around the long term average, it was found that one of the 28 watersheds yield an increase that is significantly different than the average yield. (See Appendix G for details).

Further review of the watershed was done to understand why it was outside the natural range of variability. After analyzing the data and discussing the results with the hydrologists Buchanan and Tolko adopted the PFMS for the following reasons:

1. The watershed that projects the highest increase in water yield is 43.2% above the long term average stream flow. This represents an increase of only 29.8 mm/yr in comparison to a rainfall event of 62.5mm that occurred in Slave Lake on September 2, 2004. (i.e. this appears to be only a minor deviation in streamflow).

2. If the increase in water yield seen in watershed 151 (43.2%) is translated to the amount of area harvested at that time, the equivalent clear cut area only represents 26.0% of the gross watershed area within the FMA (the entire watershed does not fall within the FMA), which is only 548ha out of 2,108ha.

3. As indicated in the supporting documentation, the watersheds used in the analysis are actually only small sub-catchments of larger watersheds. With larger watersheds the projected yield increases are probably very small and likely below the measurement detection limit using standard hydrometric techniques.

4. The model assumes un-routed flow. However, in the areas the analysis was completed, the topographic relief would suggest the probable outcome would be soil and ground water recharge versus direct flow into the surrounding streams.

5. The input values that identify the streamflow for the Whitemud/Birch operating area are fairly low. Therefore, only a small amount of activity in the defined watersheds will result in a large increase in streamflow. For example, a 10mm increase in Whitemud/Birch (69mm/yr) would show a 14% increase in streamflow where as a 10mm increase in the Joint FMA Sweathouse operating area (147mm/yr) would reflect a 6% increase in streamflow. From this example we see that it is important to consider the absolute projected change when analyzing the results of the analysis.

6.7.3 CONCLUSION

Upon completion of the detailed watershed analysis, Tolko engaged qualified hydrologists to complete an external review (Appendix G) and interpret the results of the PFMSs effect on stream flow. Professional opinion concluded that the PFMS does not significantly alter natural stream flow patterns.

DFMP

7.0

Implementation Strategy

7.0 IMPLEMENTATION STRATEGY

7.1 PERFORMANCE MONITORING

The performance monitoring program and stewardship reporting have been designed to provide the objectives outlined in the Interim Forest Management Planning Manual - Guidelines to Plan Development (April 1998):

- Track actual activities in comparison to forecast activities;
- Track actual responses to management activities and compare to forecasted responses;
- Provide the ability or opportunity to assess impacts arising from change;
- Trigger appropriate actions to correct or mitigate any negative impacts of the change.

The Detailed Forest Management Plan has been structured in a manner that the Goals, Objectives, and Strategies are linked throughout the plan. This linkage is further enhanced with a link to a monitoring or reporting strategy that identifies the specific measures with which the outcome of implementation of the Detailed Forest Management Plan will be measured.

This monitoring program has been referenced throughout Section 3 of the document by listing the monitoring and reporting strategy by number and title following the objectives and strategies.

The intent of the following discussion is to:

- Fully describe each monitoring or reporting mechanism;
- Indicate the timing and frequency of each measure; and
- Assemble the complete monitoring and reporting strategy into larger and recognizable reports or existing reports and processes.

The main reporting mechanisms will include the Detailed Forest Management Plan, The Five-year Stewardship Report, and the Annual Performance Monitoring Summary. In addition some aspects of the performance monitoring may be incorporated into existing plans like the General Development Plan and Annual Operating Plans.

TABLE 7-1: PERFORMANCE MONITORING PROTOCOL

Objective	Monitoring Protocol Number																																										
	DFMP							Five Year Stewardship Report																					Annual Performance Monitoring Summary																
	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31	M32	M33	M34	M35	M36	M37	M38	M39
1.1	X							X			X																																
1.2		X															X												X														
1.3	X							X			X														X																		
1.4			X					X						X																						X						X
1.5	X							X			X																									X						
1.6	X							X		X											X															X						
1.7	X							X		X											X															X						
1.8																					X															X						
1.9																					X									X						X						X
1.10	X																				X																X						
1.11	X								X								X											X	X							X	X					
1.12																					X																						
1.13			X			X																	X													X	X					
1.14			X																																	X	X					
1.15																				X				X																			
1.16								X			X																									X	X					
1.17											X																									X						
2.1	X		X	X														X																	X						
2.2			X			X											X						X		X	X	X									X						
2.3	X							X				X		X																					X						
2.4	X							X			X																															
2.5			X										X																													
2.6			X										X																													
2.7			X															X									X									X						
2.8		X													X	X				X								X										X				
2.9	X															X													X							X		X				
2.10																				X		X								X												
2.11	X						X													X																X						
2.12						X																	X		X		X															
3.1																			X										X													
3.2																													X													
3.3																																			X							
3.4																													X													
3.5																														X				X								
4.1																													X	X												
4.2																													X	X												
5.1																	X				X							X	X	X						X	X					
5.2											X															X																	
5.3																												X														
5.4																												X														
5.5																																X										
5.6					X						X															X																	
6.1							X																							X	X											
6.2		X			X		X																						X												
6.3							X																							X												
6.4																														X	X	X										

7.1.1 DETAILED FOREST MANAGEMENT PLAN

Several of the objectives listed in Section 3 have been implemented on the entire Forest Management Area and will be summarized or updated periodically throughout the 160 year planning horizon. Monitoring and Reporting items M1 through M7 have been incorporated into the text of the Detailed Forest Management Plan submission or previously submitted to Alberta Sustainable Resource Development under separate cover.

7.1.1.1 M1 - LANDSCAPE ASSESSMENT

A Landscape Assessment was completed in April 2003 and submitted to Alberta Sustainable Resource Development for the combined Timber Supply Area of the Joint and Original Forest Management Areas. This report provides a point in time description of the current landscape conditions. The Landscape Assessment and analysis summaries were utilized to compare the current forest conditions to the future forest conditions predicted by the preferred forest management strategy on the landbase. The sections of the report are as follows:

General Description:

- General Area Description;
- Natural Sub-Regions;
- Protected and Special Management Areas;
- Watersheds.

Landscape Disturbance:

- Forest Productivity and Operational Categories;
- Historical Harvest Patterns;
- Non-Timber Resource Extraction Industries.

Landscape Pattern and Structure:

- Age Class Distribution;
- Cover Type Distribution;
- Seral Stage Distribution;
- Cover Type Age Class Distribution.

Landscape Fire Assessment:

- Fire Occurrence Risk;
- Fire Behaviour Prediction;
- Crowning Susceptibility;
- Historic Fire Occurrence;
- Values at Risk;
- Barriers to Fire Spread.

7.1.1.2 M2 - INVENTORY AND INVENTORY UPDATES

The companies have a complete approved Alberta Vegetation Inventory version 2.1 for both the Original and Joint Forest Management Agreement Areas.

The Original Forest Management Agreement Area inventory was completed in accordance with Alberta Vegetation Inventory standards version 2.1 using medium scale (1:15 000) leaf on, black and white air photo coverage obtained between 1995 and 1998. The Birch, Whitemud, Salt, Utikuma and Kimiwan operating areas were included.

Information for the Sweathouse Operating Area of the Joint FMA was purchased from Slave Lake Pulp. The Alberta Vegetation Inventory for the Sweathouse operating area was completed in accordance with Alberta Vegetation Inventory standards version 2.2 using medium scale (1:15,000) leaf on, black and white air photo coverage obtained between 1997 and 1998. The Sweathouse Operating Area data has been standardized to Alberta Vegetation Inventory 2.1 to match the Original Forest Management Agreement Area data.

For the Detailed Forest Management Plan process, updated harvest opening boundaries reflecting harvesting activities for both the Original and Joint Forest Management Areas were completed to bring the harvest history current to the timber year ending April 30, 2002.

The companies will implement a maintenance schedule for regular updates of the Alberta Vegetation Inventory (Version 2.1) and submit for approval, for complete operating areas according to the following table.

TABLE 7-2: PHOTOGRAPHY UPDATE

FMA	OPERATING AREA	ORIGINAL PHOTOGRAPHY	UPDATE YEAR
Original FMA	Birch	1996	2008
	Whitemud	1995/1996	2008
	Salt	1995/1996	2006
	Utikuma	1995/1996/1997	2009
Joint FMA	Kimiwan	1995/1996	2007
	Sweathouse	1997/1998	2010

7.1.1.3 M3 - GROUND RULE DEVELOPMENT

The Original Forest Management Agreement between Tolko Industries Ltd. and the Province of Alberta in section 16(2) states that "Within six months following the approval of the detailed management plan under 10(4), the Minister and the Company shall jointly develop a new set of ground rules consistent with the management plan objectives, for the preparation of operating plans and to guide harvesting and reforestation operations". The forestry company and Alberta Sustainable Resource Development - Public Lands and Forests Division will jointly develop the operating ground rules for the Forest Management Agreement Area within six months of plan approval. These guidelines will apply to all forestry operations on the Forest Management Agreement Area and operations may only deviate from them under authority of the Area Manager.

7.1.1.4 M4 - WATERSHED ASSESSMENT

During the Detailed Forest Management Plan process, the watersheds or portions of watersheds on the landbase were identified. A total of eighty-six (86) watersheds were identified in the Timber

Supply Area (Joint and Original Forest Management Agreement Areas). Twenty-eight (28) of the watersheds or portions of watersheds are located on the Joint Forest Management Agreement Area and fifty-eight (58) of the watersheds or portions of watershed are located on the Original Forest Management Agreement Area. These watershed or portions of watershed have been identified to provide a vehicle for evaluating the preferred forest management strategy and predicting the potential impacts of forest harvesting operations on these watersheds. These summaries and analysis information have been included in the Detailed Forest Management Plan.

7.1.1.5 M5 - INFORMATION EXCHANGE.

Successful implementation of the Detailed Forest Management Plan is dependant on effective communication and the exchange of information between forest companies, the government and the public. A summary of the process the company utilizes to facilitate information exchange will be included in the Five-year Stewardship Report.

7.1.1.6 M6 - ACCESS CORRIDOR IDENTIFICATION MAP

A map identifying the access corridors has been developed and included in the Detailed Forest Management Plan. This map at a coarse filter level identifies the existing and planned access corridors to each of the operating areas.

7.1.1.7 M7 -STAKEHOLDER INFORMATION LISTING

A listing of the commercial stakeholders (trappers, outfitters, grazing lease or licences, utility companies, and oil and gas industry) has been included in the Detailed Forest Management Plan. This information will be utilized internally by Tolko Industries Ltd. planning staff during the implementation of the twenty-year spatial harvest sequence and the development of Annual Operating Plans.

7.1.2 FIVE YEAR STEWARDSHIP REPORT

The Five-year Stewardship Report is designed as a mid-term report on the implementation of the Detailed Forest Management Plan. A number of the monitoring protocols and commitments detailed within the strategies fall within the time frame of the Five-year Stewardship Report. This report will be submitted at the end of each five year period after the approval of the Detailed Forest Management Plan. Monitoring and Reporting items M8 through M25, and item M39 will be incorporated into the Five-year Stewardship Report.

7.1.2.1 M8 - LANDSCAPE STRUCTURAL SUMMARY TABLE

- Seral Stage Summary Table.

Seral stage reporting is necessary in a number of the strategies, especially those pertaining to biodiversity and wildlife habitat. The Five-year Stewardship Report will provide a summary 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 Operating Area. The plan recognizes that natural disturbances may completely eliminate one or more seral stages from any particular unit. The seral stage section of the Five-year 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 Detailed Forest Management Plan.

- Patch Size and Fragmentation Summary Table.

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 Five-year Stewardship Report, this analysis will be compiled 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 will be assessed through the patch size distribution statistics.

7.1.2.2 M9 - RECLAMATION LISTING

A need to maintain or increase the productive forest landbase was identified in the Detailed Forest Management Plan. One method of accomplishing this is to return reclaimed landuse dispositions to a productive capacity. On the anniversary date of the Forest Management Agreement, Alberta Sustainable Resource Development sends a listing of the cancelled dispositions to the company. This information will be summarized within the Five-year Stewardship Report. In addition, a summary of efforts by the forest company to reforest abandoned or cancelled dispositions and return the areas to a productive capacity will be included.

7.1.2.3 M10 - UNDERSTOREY INVENTORY

The forest companies have completed an understorey inventory. The primary objective is to identify understories of conifer and deciduous species. This inventory was completed to be utilized as a tool during the implementation of the mixedwood strategies and to support the conifer and deciduous allowable cuts.

7.1.2.4 M11 - SPATIAL HARVEST SEQUENCE VARIANCE TABLE

The Detailed Forest Management Plan submission includes a twenty-year spatial harvest sequence. It is recognized that the twenty-year spatial harvest sequence is intended to be operational however, the Alberta Vegetation Inventory and volume sampling were undertaken at a broad landscape level. The transition to operational level planning may result in some variance from the twenty-year spatial harvest sequence for a variety of reasons. It is the intent of the forest company to annually monitor the variance from the twenty-year spatial harvest sequence and summarize these variances in the five-year stewardship report.

7.1.2.5 M12 - WILDLIFE SPECIES LIFE REQUISITE INFORMATION

Utilizing the approved Alberta Vegetation Inventory and Wildlife Species Life Requisite information an assessment has been completed, and the results summarized within the Detailed Forest Management Plan. This information forecasts the habitat availability at points in time throughout the planning horizon for the following wildlife species: Moose (***Alces alces andersoni***), American Marten (***Martes americana actuosa***), Northern Goshawk (***Accipiter gentilis atricapillus)***, Pileated Woodpecker (***Dryocopus pileatus abieticola***), and Grizzly Bear (***Ursus arctos)***.

7.1.2.6 M13 - SPECIES OF CONCERN LISTING

The listing of Species of Concern is to be completed within one year of the Detailed Forest Management Plan approval with a summary of known presence on the Forest Management Area for the Five-year Stewardship Report.

7.1.2.7 M14 - STAND STRUCTURE RETENTION SUMMARY

Structure containing dead and live trees, representative of the pre-harvest stand condition including species, tree size, condition and distribution, will be retained on the harvest areas. Single tree or patch retention will be applied to a minimum level of 1% of the scheduled harvest area within each compartment up to an average level of 3% of the scheduled harvest area across each operating area over the term of the Detailed Forest Management Plan.

The following techniques will be applied to the landbase alone or in combination to harvest areas to achieve the desired structure retention:

- Single tree retention will be applied to the landbase by leaving approximately eight (8) stems per hectare on the harvest area. The technique will be implemented on the landbase via guidance to machine operators during harvest operations.
- Small clump retention will be applied to the landbase by leaving small groups of trees in conjunction with other operational issues within the harvest area (examples: understorey protection or avoidance, wildlife features such as dens, nests and mineral licks, and watercourse or water source area buffers etc),via instructions to machine operators.
- Green island retention will be applied on harvest areas greater than 100 hectares in size. Green island retention patches will be clearly identified on detailed block plans and in the field prior to harvest operations.

The area retained on the harvest areas will be assessed and tracked on harvest area basis through a post-harvest assessment program utilizing post harvest aerial photography and photo interpretation.

The structure that is maintained will be reported by area and category at the end of every cut control period and reconciled each decade.

Figure 7-1 and Figure 7-2 are examples of the harvest area aerial photography update. Through instructions to the photo interpreters, areas of retention down to tenths of hectares can be identified and a summary of the Alberta Vegetation Inventory cover types can be produced.

FIGURE 7-1: DECIDUOUS HARVEST AREA UPDATE AERIAL PHOTOGRAPHY

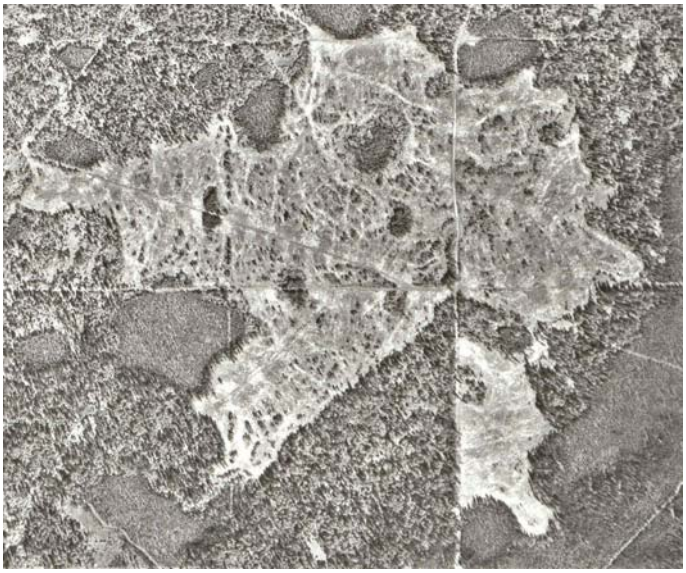


FIGURE 7-2: CONIFEROUS HARVEST AREA UPDATE AERIAL PHOTOGRAPHY

7.1.2.8 M15 - INSECT AND DISEASE SUMMARY

Insect and disease outbreaks are reported annually by the Government. These annual Government reports will be reviewed for references to insect or disease infestations or outbreaks affecting the Forest Management Agreement Area. These references will be summarized in the Five-year

Stewardship Report. Forest companies participates in the operational monitoring of insects and diseases outbreaks and provides this information to the Government for inclusion in their reports.

7.1.2.9 M16 - FOREST FIRE SUMMARY

The Alberta Government tracks the number and size of forest fires in the Province of Alberta. A summary of this information for the Forest Management Agreement Area will be requested by the company and the number, size (hectares) and effect of fires on the net landbase will be summarized in the Five-year Stewardship Report.

7.1.2.10 M17 - LANDUSE SUMMARY

This report will be a compilation of the Annual Landuse Summaries with an evaluation of the effect on the net landbase summarized in the Five-year Stewardship Report.

7.1.2.11 M18 - WATERSHED ANALYSES SUMMARY

It is perceived that forest harvesting operations may have effects on water quantity and timing of flows. The company have undertaken an Age Threshold Analysis on the watersheds within the Forest Management Agreement Area. Watersheds or partial watersheds were identified on the Forest Management Agreement Area, this information was input into computer simulation models (e.g. Cumulative Watershed Disturbance and Hydrologic Recovery Simulator (ECA- Alberta)) and the results summarized in the Detailed Forest Management Plan.

7.1.2.12 M19 - HISTORICAL RESOURCES SUMMARY

The Forest Management Agreement Area is covered by the South Peace Heritage Historical Resources Potential Model. This model is utilized to predict the effect forestry operations may have on the below ground historical resources as defined by Alberta Community Development. The areas identified for harvest operations in the twenty-year spatial harvest sequence will be input into the model and a summary of the findings or areas identified for further information collection will be included in the Five-year Stewardship Report.

7.1.2.13 M20 - TRAINING AND EMPLOYMENT LISTING

This part of the Five-year Stewardship Report will list the training programs employed by the forest company for the purposes of health, safety, environmental awareness, legislation, and awareness of the planning hierarchy.

7.1.2.14 M21 - GROWTH AND YIELD ACTIVITY SUMMARY

The forest companies are implementing an approved Growth and Yield Program which will provide stand and tree level information aimed at better understanding the growth dynamics of the forests within the Forest Management Agreement Area. This program will include both Permanent and Temporary Sample Plots. A summary of the activities will be included in the Five-year Stewardship Report.

7.1.2.15 M22 - WEED MANAGEMENT PLAN

The development of the Weed Management Plan will be completed within one year of approval of the Detailed Forest Management Plan. The plan will include education, prevention, detection,

monitoring, and control strategies pertaining to restricted and noxious weeds on the Forest Management Agreement Area. The plan will contain the following sections:

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

7.1.2.16 M23- DETAILED ROAD INVENTORY MAP

The company recognizes the importance of minimizing access within the Forest Management Agreement Area to protect a number of other values such as wildlife, water quality and soil disturbance. Within one year of approval of this plan the company will complete a detailed road inventory for the Forest Management Agreement Area and work with Alberta Sustainable Resource Development to identify access control requirements and implementation processes.

7.1.2.17 M24 - FOREST LEGISLATION

The company will provide a description of the process the forest company employs to ensure that company staff have access to current forest legislation.

7.1.2.18 M25 - FOREST ROAD USE AGREEMENT SUMMARY

A large number of road use agreements are issued within the Forest Management Agreement Area each year. This summary will be provided to demonstrate the level of commitment to working cooperatively with other industry users while minimizing the development of duplicate access routes on the Forest Management Agreement Area.

7.1.3 ANNUAL PERFORMANCE MONITORING SUMMARY

The Annual Performance Monitoring Summary is designed as an annual report on the implementation of the Detailed Forest Management Plan. A number of the monitoring protocols and commitments detailed within the strategies have an annual monitoring and reporting component. This report will be submitted on an annual basis after the approval of the Detailed Forest Management Plan. Monitoring and Reporting items M26 through M39 will be incorporated into the Annual Performance Monitoring Summary. Some components of the monitoring and reporting protocols may also be incorporated into existing plans like the General Development Plan or Annual Operating Plans.

7.1.3.1 M26 - INTEGRATED HARVEST SUMMARY

The main purpose of the Integrated Harvest Summary 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 General Development Plan process, permits individual companies to assess their yearly operations and mesh the activities of their operations on the Forest Management Area with their operations outside the Forest Management Area. The integrated harvest schedule reported annually in the General Development Plan indicates the level of integration on the Annual Operating Plans.

7.1.3.2 M27 - ROAD MAINTENANCE AND ABANDONMENT SUMMARY

The Road Maintenance and Abandonment summary included in the General Development Plan indicates the degree of integration required to access the fibre supply. Included in this report is the status and condition of all Licenses of Occupation within the Forest Management Agreement Area under company ownership.

7.1.3.3 M28 – FIBRE SUPPLY TABLE

The fibre supply table summarizes the drain of conifer and deciduous timber from the Forest Management Area.

7.1.3.4 M29 - ANNUAL LANDUSE SUMMARY

The annual landuse summary will provide a description of withdrawals from the Forest Management Area due to other landuse dispositions.

7.1.3.5 M30 - PUBLIC INVOLVEMENT, EDUCATION AND SAFETY SUMMARY

A summary of company efforts to provide opportunities for education, exchange of information and feedback regarding the forest management planning process and the practice of forestry will be provided annually. An assessment of the level of public involvement in the development of annual forest industry plans will provide the opportunity to gauge public perceptions and values over the long term. The summary will include a description of how feedback received from members of the public was addressed in the forest management planning process.

7.1.3.6 M31 – MEMBERSHIP LISTING

A list summarizing the company memberships will be provided annually.

7.1.3.7 M32 – LOG HAUL SUMMARY

A summary of the past seasons log haul will be provided annually.

7.1.3.8 M33 - WOODLOT SUMMARY

A summary of the status of the Woodlot Program will be provided annually.

7.1.3.9 M34 – RESEARCH AND EDUCATION FUND SUMMARY

As per section 32(2) of the Original Forest Management Agreement $0.25 per cubic meter will be used "to enhance the management activities and level of understanding of the forest resources and forest products within the forest management area." A summary of these activities will be provided annually.

7.1.3.10 M35 – CONTRACTOR SUMMARY

A summary of contractors and local businesses utilized by the company will be provided annually.

7.1.3.11 M36 - ANNUAL HARVEST SUMMARY

The annual harvest reports indicate the post harvest results from the previous timber year (May 1 to April 30). The indicators include: area and volume summaries, a summary of variance from the harvest design, stand structure retention results, a summary of coarse woody debris descriptions, and a summary of slash disposal activities.

7.1.3.12 M37 - ANNUAL SILVICULTURE SUMMARY

- Silviculture Activity Summary.

The information in this summary will include the silvicultural activity, area treated, and type of treatment.

- Harvest Opening Declarations Table.

The single landbase concept allows flexibility in the declarations of target strata group assignments. Each block will be assigned a strata group to balance the requirements for maintenance of the Annual Allowable Cut and Detailed Forest Management Plan objectives.

- Annual Silvicultural Activity Schedule.

Areas proposed for treatments for the next year will be described.

- Afforestation Summary.

The potentially productive ground within the Forest Management Area may be reforested to a productive capacity at any time during the plan. Any work done towards inclusion of these areas into the productive landbase will be reported annually.

7.1.3.13 M38 - FIRE CONTROL PLAN

A company specific Fire Control Plan is submitted annually at the start of the fire season (April 1st to October 30th). Portions of the plan are included in Annual Operating Plans with operations being conducted during the fire season. The contents of the Fire Control Plan reflect the

requirements stipulated under the ground rules and legislation and detail the company action plan with regards to forest protection and fire prevention.

The company will work with the Forest Protection Division to develop prevention programs, which are intended to reduce the risk of fire. The programs may include hazard tree reduction, corridor development, conversion of stands and training programs.

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.

7.1.3.14 M39 - ANNUAL RESEARCH LISTING

A complete listing of the research being conducted by the forest company or the forest company is participating in will be provided annually.

7.2 ADAPTIVE MANAGEMENT

The company has adopted a philosophy of adaptive management. Through the process of monitoring the application of the objectives and strategies to the landbase, a feedback loop has been created which will allow for the modification or adjustment of the forest management practices.

7.3 PUBLIC INVOLVEMENT

The purpose of the Public Involvement process is to exchange information and promote dialogue between Tolko Industries Ltd. and the stakeholders within the communities in which the company operates. The Public Involvement Process was initiated 1999 with the development of a Public Involvement Plan (refer to Appendix E). The plan outlined the approach to public involvement utilizing the following five mechanisms:

1) Forest Advisory Committee (FRAC),
2) Public Information Meeting,
3) Resource User Consultations,
4) Public Awareness Campaign,
5) Documentation and Monitoring.

The aim of this process was to provide an opportunity for stakeholders with an interest in the outcome of a decision to influence that decision. This process is founded through the sharing and transferring of relevant information. Through these mechanisms, individuals are given an opportunity to communicate their concerns and discuss relevant issues with Tolko representatives.

Early in 2000 the Forest Resources Advisory Committee (FRAC) was formed by inviting groups, organizations and the public to identify a representative and participate on the committee.

Tolko Industries Ltd. annually holds Open House meetings for review of the General Development Plan and present the plan at the Municipal District and County council meetings.

During the summer of 2004 Tolko Industries Ltd. High Prairie OSB Division (Tolko) expanded the Public Involvement initiatives presently in place in accordance with requests made by Alberta Sustainable Resource Development regarding the re-submission of the Detailed Forest Management Plans (DFMP). Tolko provided open house opportunities for the following communities: High Prairie, Falher, Girouxville, Wanham, McLennan, Sucker Creek, Gift Lake, Atikameg, East Prairie, Peavine, Grouard, Driftpile, DeBolt, Valleyview, and Sturgeon Lake. The goal of the expansion and development was to ensure that the Public Involvement process allows for the inclusion of stakeholders interested in forest management into forest planning processes. Such participation of public stakeholders ensured that due consideration, in reference to stakeholder views, influence, and advice, is considered within Tolko Industries Ltd. forest management planning processes. Notification for these open houses was completed utilizing local newspaper print advertisements, posters, radio advertisements and a website (www.highprairiecsa.com). Posters were put up in all communities in which the Open Houses occurred. The posters were located in local businesses, community offices and community bulletin boards. A summary of the open house and meeting dates since 1999 is provided in Table 7-3. A summary of the questions, topics or issues expressed at the meetings is provided in Appendix F.

In addition to the open house meetings, a Trapline Licence Holder Stakeholder communication process was conducted the week of August 23rd to 27th, 2004. A total of sixty one trapline licence holders were sent an invitation via Canada Post to attend an Open House Meeting to review the Detailed Forest Management Plan and identify any issues or concerns. A summary of the questions, issues, or topics expressed at the Trapline Licence Holder communication process in Appendix F.

TABLE 7-3: MEETING LIST

Meeting Type	Year	Date
GDP Open House - High Prairie	1999	July 6, 1999
GDP Open House - Valleyview	1999	July 7, 1999
FRAC Meeting	2000	January 18, 2000
FRAC Meeting	2000	March 13, 2000
FRAC Meeting	2000	May 8, 2000
GDP Open House - High Prairie	2000	June 20, 2000
GDP Open House - Atikameg	2000	June 21, 2000
GDP Open House - Valleyview	2000	June 22, 2000
FRAC Meeting	2000	June 26, 2000
FRAC Meeting	2000	September 11, 2000
FRAC Meeting	2000	November 6, 2000
FRAC Meeting	2001	February 12, 2001
Original DFMP Planning Team Meeting	2001	February 26, 2001
Original DFMP Planning Team Meeting	2001	March 28, 2001
Original DFMP Planning Team Meeting	2001	April 25, 2001
FRAC Meeting	2001	June 4, 2001
GDP Open House - High Prairie	2001	June 19, 2001
GDP Open House - Atikameg	2001	June 21, 2001
Original DFMP Planning Team Meeting	2001	June 27, 2001
Original DFMP Planning Team Meeting	2001	July 25, 2001
Original DFMP Planning Team Meeting	2001	August 29, 2001
Original DFMP Planning Team Meeting	2001	September 26, 2001
FRAC Meeting	2001	October 22, 2001
Original DFMP Planning Team Meeting	2001	October 31, 2001
Original DFMP Planning Team Meeting	2001	November 28, 2001
FRAC Meeting	2001	December 10, 2001
Original DFMP Planning Team Meeting	2001	December 19, 2001
FRAC Meeting	2002	January 14, 2002
Original DFMP Planning Team Meeting	2002	January 30, 2002
FRAC Meeting	2002	February 11, 2002
Original DFMP Planning Team Meeting	2002	February 27, 2002
FRAC Meeting	2002	April 8, 2002
Original DFMP Planning Team Meeting	2002	May 29, 2002
FRAC Meeting	2002	June 10, 2002
Original DFMP Planning Team Meeting	2002	June 26, 2002
GDP Open House - High Prairie	2002	July 30, 2002
GDP Open House - Valleyview	2002	July 31, 2002
Joint DFMP Planning Team Meeting	2002	September 24, 2002
FRAC Meeting	2002	October 21, 2002
Joint DFMP Planning Team Meeting	2002	October 29, 2002
Joint DFMP Planning Team Meeting	2002	November 26, 2002
Original DFMP Planning Team Meeting	2002	November 27, 2002
FRAC Meeting	2002	December 9, 2002

Meeting Type	Year	Date
Joint DFMP Planning Team Meeting	2003	January 28, 2003
Original DFMP Planning Team Meeting	2003	January 29, 2003
Joint DFMP Planning Team Meeting	2003	February 25, 2003
Original DFMP Planning Team Meeting	2003	February 26, 2003
Joint & Original DFMP Planning Team Meeting	2003	March 25, 2003
FRAC Meeting	2003	April 14, 2003
Joint & Original DFMP Planning Team Meeting	2003	April 29, 2003
Joint DFMP Planning Team Meeting	2003	May 27, 2003
Original DFMP Planning Team Meeting	2003	May 28, 2003
FRAC Meeting	2003	June 9, 2003
Joint & Original DFMP Planning Team Meeting	2003	June 24, 2003
GDP/DFMP Open House - Valleyview	2003	June 26, 2003
GDP/DFMP Open House - High Prairie	2003	June 27, 2003
Joint & Original DFMP Planning Team Meeting	2003	July 29, 2003
Joint & Original DFMP Planning Team Meeting	2003	August 26, 2003
Joint & Original DFMP Planning Team Meeting	2003	September 30, 2003
FRAC Meeting	2003	October 20, 2003
Joint & Original DFMP Planning Team Meeting	2003	October 28, 2003
Joint & Original DFMP Planning Team Meeting	2003	November 12, 2003
Joint & Original DFMP Planning Team Meeting	2003	November 25, 2003
Lesser Slave Indian Regional Council Presentation	2003	November 27, 2003
FRAC Meeting	2003	December 8, 2003
Open House	2003	December 10, 2003
Joint & Original DFMP Planning Team Meeting	2004	January 15, 2004
Municipal District of Smoky	2004	July 7, 2004
Northern Sunrise County	2004	July 8, 2004
Open House - Valleyview	2004	July 14, 2004
Municipal District of Greenview	2004	July 14, 2004
Open House - Wanham	2004	July 15, 2004
Open House - High Prairie	2004	July 19, 2004
Open House - McLennan	2004	July 19, 2004
Open House - Falher	2004	July 20, 2004
Open House - Girouxville	2004	July 20, 2004
Open House - Sucker Creek	2004	July 21, 2004
Open House - Grouard	2004	July 23, 2004
Municipal District of Big Lakes	2004	July 28, 2004
Open House - Peavine	2004	August 11, 2004
Open House - Gift Lake	2004	August 17, 2004
Open House - East Prairie	2004	August 18, 2004
Open House - DeBolt	2004	August 19, 2004
Open House - Driftpile	2004	August 25, 2004
Open House - Atikameg	2004	September 2, 2004
Open House - Sturgeon Lake	2004	September 9, 2004