# SPRAY LAKE SAWMILLS

## Chapter 6 – Preferred Forest Management Scenario

### 2021 Forest Management Plan

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| Binder | Type | ID | Name |
|---|---|---|---|
| One | Executive Summary | | |
| | Chapter | 1 | Corporate Overview and Forest Management Approach |
| | Chapter | 2 | FMP Development |
| | Chapter | 3 | Forest Landscape Assessment |
| | Chapter | 4 | Summary of Previous DFMP |
| | Chapter | 5 | VOITS – Values, Objectives, Indicators and Targets |
| | **Chapter** | **6** | **PFMS – Preferred Forest Management Scenario** |
| | Chapter | 7 | Plan Implementation and Monitoring |
| | Chapter | 8 | Research |
| | Glossary | | |
| Two | Annex | I | FMA – Forest Management Agreement |
| | Annex | II | Communication and Consultation Plans |
| | Annex | III | Stewardship Report (2007-2012) |
| | Annex | IV | Yield Curve Development |
| | Annex | V | Net Landbase Development |
| Three | Annex | VI | TSA – Timber Supply Analysis |
| | Annex | VII | SHS – Spatial Harvest Sequence |
| | Annex | VIII | Growth and Yield Plan |

# Table of Contents

# List of Tables



# List of Figures

# 1. Introduction

Innovative, detailed modeling is a large part of the Spray Lake Sawmills (SLS) planning and decision making process and the 2021 Forest Management Plan (FMP) continues this tradition. In developing a recommended management approach for the current FMP, numerous scenarios were modeled and evaluated by the Plan Development Team (PDT), in order to gain insight into the implications and trade-offs of different management alternatives. The outcome from the modeling process is the Preferred Forest Management Scenario (PFMS), which contains the timber harvesting and regeneration activities planned for the next ten years, as well as predictions for the impacts on other values.

The modeling, or forecasting and Timber Supply Analysis (TSA), was undertaken in a series of spatially explicit landscape level Patchworks (Spatial Planning Systems) scenarios. Scenarios were completed to evaluate various management issues, which ranged from non-timber values (e.g. changes in wildlife habitat) that were addressed through Non-Timber Assessment (NTA), to operational objectives such as harvest block size and block patterns.

Issues evaluated throughout the forecasting process include:

- Landscape level objectives:
    - Seral stages;
    - Habitat analysis using Government of Alberta (GoA) NTA tools; and
    - Watershed analysis using the Equivalent Clearcut Area (ECA) model.
- Operational Concerns:
    - Spatial Harvest Sequence (SHS) design;
    - Timing of compartment sequencing; and
    - Reduce SHS variance in first decade by creating an operationally feasible SHS.

The scenarios were discussed and reviewed by SLS in Technical Team (TT) meetings, as well as at PDT meetings, which were also attended by quota holders and GoA representatives. Of the 15 PDT meetings held from May 2018 until April 2020, approximately four meetings focused on TSA analysis results and providing direction to the next analysis. This allowed all PDT members to participate and provide input into the TSA and, ultimately, the PFMS.

The purpose of this chapter is to describe and document the PFMS. The details on the scenarios leading up to the PFMS are described separately in *Annex VI – Timber Supply Analysis*. The PFMS is the final scenario resulting from the series of scenarios completed in that process. It describes the harvesting and silviculture actions that SLS and quota holders plan to take over the next ten years, and the predicted response of the forest to these actions over a 200-year planning horizon. The outputs derived from the PFMS are directly used to provide indicators and targets for the VOITs (*Chapter 5 – Values, Objectives, Indicators and Targets*) and are incorporated into the guidelines for FMP implementation over the 10-year period, from May 1, 2021, to April 30, 2031, as documented in *Chapter 7 – Plan Implementation and Monitoring*.

This chapter summarizes the forest management objectives and the linkages to the PFMS. It also contains summaries of the landbase and yield curves, details of which are provided in *Annex IV – Yield Curve Development* and *Annex V – Net Landbase Development*. The assumptions and inputs used to develop the PFMS are described separately from the predicted outcomes, which are used to support FMP implementation.

## 1.1 Management Philosophy

The management philosophy for the PFMS is to implement forest management practices that result in a sustainable flow of economically viable fiber to sustain mill operations while employing a sustainable forest management approach that maintains biodiversity and ecological integrity.

The management objectives that were used to guide PFMS development are:

- Establish sustainable harvest levels that balance ecological, economic and social objectives;
- Manage forest structure through a coarse filter approach using seral stages and patch targets;
- Mitigate impacts on non-timber habitat values using a fine filter approach for a selected set of species;
- Promptly regenerate harvest areas to establish productive coniferous and mixed wood stands to support and grow sustainable harvest levels;
- Plan and promptly adapt harvesting and regeneration to mitigate impacts from insects and other infestations; and
- Spatially define FMA and Quota Holder harvesting operations to reduce the annual footprint and access requirements.

### 1.1.1 PFMS Strategies

To implement PFMS objectives, the following strategies were deployed during PFMS development:

- Model a 200-year planning horizon to estimate strategic implications;
- Use a combined (single) coniferous and deciduous landbase;
- Model even flow total conifer harvest volumes over the planning horizon;
- Deciduous harvest level is not being assigned from pure deciduous stands, with the exception of approximately 100 ha of CTP and planned blocks;
- Incorporate and sequence unused volume for SLS – volume to be in addition to even flow harvest levels;
- Apply operational sequencing constraints on harvest volumes;

- Incorporate existing planned blocks into the Spatial Harvesting Sequence (SHS) to improve operability and reduce variance;
- Retain stand level structure retention within harvest areas;
- Apply silviculture treatments to achieve RSA predicted yields;
- Manage harvest sequencing to achieve desirable thresholds in the change in predicted habitat levels using GoA NTA tools;
- Manage predicted impacts on watershed runoff using the ECA model; and
- Maintain a minimum of 10% of the managed forest as old or very old forest (actual level achieved is higher due to other NTA targets).

# 2. Landbase Summary

The Spray Lake Sawmills (SLS) Forest Management Agreement (FMA) area includes one Forest Management Unit (FMU); B12. As part of the 2021 FMP process, a netdown landbase was developed to support planning, forecasting and TSA for B12. The total land area is 334,246 hectares.

The netdown landbase is a spatial representation of the FMP area as of May 1, 2018. Initially developed for the TSA, the landbase contains traditional TSA information such as stand age, planning compartments, timber yield strata, timber productivity, as well as areas deferred or excluded from timber harvesting activity. Landbases have evolved, and now support an ever-expanding array of non-timber values such as terrestrial and aquatic wildlife habitats; at the same time, the required linkages to other datasets (such as ARIS and DIDs) have tightened. Together, these changes have considerably increased the time and effort required for landbase development and approval. The netdown landbase is one of the key products of the 2021 FMP; agreement-in-principle for the landbase was received from the GoA on October 31, 2019, representing a significant milestone in FMP development.

Development of the netdown landbase used in the forecasting and TSA is described in detail in *Annex V – Net Landbase Development*.

Table 2-1 provides a summary of the FMP area by deletion category and the area suitable for timber harvesting by broad cover group (BCG), resulting from the netdown process. The column ***sum_grp*** in the netdown landbase dataset reflects the classification in the following table, which is a combination of ***f_del*** (deletions in the passive landbase) and ***f_bcg*** (broad cover group classification in the active landbase). Active landbase distribution by yield strata is summarized in Table 2-2. Figure 2-1 maps the distribution of the deletion categories comprising the passive landbase, and Figure 2-2 maps the distribution of the active landbase by BCG.

**Table 2-1.** Summary of the classified SLS landbase

| Landbase Category | | North DFA | South DFA | Total |
|---|---|---|---|---|
| **PASSIVE** | | | | |
| **Administrative Restrictions** | | | | |
| PPA | Parks and Protected Areas | 393 | 2,096 | 2,489 |
| PRIVATE | Private Land | 5,956 | 11 | 5,967 |
| ESLUZ | Eastern Slopes Zone 1 | 1,371 | 11,424 | 12,795 |
| HISTORIC | Historic Resources | | 97 | 97 |
| OUT_FMU | Outside of the FMU boundary | 8 | 168 | 176 |
| HYDRO | Hydrology buffers | 5,712 | 5,987 | 11,700 |
| Administrative Total | | *13,440* | *19,784* | *33,224* |
| **Landscape Restrictions** | | | | |
| ROAD | Road/Access (DIDs and AVI) | 1,764 | 1,210 | 2,974 |
| DIDs | Land Dispositions | 1,635 | 678 | 2,313 |
| DRS | Disposition Reservation | 208 | 202 | 409 |
| GOA_PSP | GoA Permanent Sampling Plots | 41 | 14 | 55 |
| ANTHNON | Anthropogenic Non-vegetated | 20 | 39 | 59 |
| ANTHVEG | Anthropogenic Vegetated | 688 | 272 | 961 |
| FLOOD | Flooded area | 29 | 2 | 31 |
| LAKE | Lake | 197 | 28 | 225 |
| RIVER | River | 661 | 576 | 1,237 |
| AQUATIC | Aquatic area | 4 | 10 | 14 |
| NNF | Naturally Non-Forested (AVI) | 8,390 | 4,231 | 12,622 |
| NNV | Naturally Non-Vegetated (AVI) | 44 | 976 | 1,020 |
| NO_STRATA | No strata assigned | 23 | | 23 |
| BURN | Areas burnt after May 1 2018 | | 25 | 25 |
| *Landscape Total* | | *13,704* | *8,264* | *21,968* |
| **Operations Restrictions** | | | | |
| MOIST | Moisture deletion (AVI) | 2,408 | 232 | 2,640 |
| TPR | Low Timber Productivity Rating | 5,884 | 14,503 | 20,388 |
| DENSITY | Low density stands | 1,000 | 499 | 1,498 |
| SLOPE | Steep slopes | 4,210 | 16,851 | 21,061 |
| LT | Larch stands | 5 | 33 | 38 |
| FD | Douglas Fir stands | 106 | 80 | 187 |
| SB | Black Spruce stands | 930 | 25 | 955 |
| PA_PF | Whitebark pine and Limber pine | | 110 | 110 |
| NO_ARIS | Blocks in AVI with opening no matching to ARIS | 5 | 1 | 5 |
| OPERATIONAL | Operational Deletions | 1,516 | 3,665 | 5,181 |
| DELETION | Block Deletion | | 15 | 15 |
| SEISMIC | Seismic Lines | 957 | 669 | 1,627 |
| ISO_DEL1 | Isolated stands - buffer deletion | 7 | 3 | 10 |
| ISO_PTA1 | Isolated stands - perimeter to area ratio deletion 1 | 248 | 313 | 561 |
| ISO_PTA2 | Isolated stands - perimeter to area ratio deletion 2 | 349 | 218 | 566 |
| *Operations Total* | | *17,625* | *37,217* | *54,842* |
| *PASSIVE Total* | | *44,770* | *65,264* | *110,034* |
| **ACTIVE** | | | | |
| C | Coniferous leading | 103,586 | 89,269 | 192,854 |
| CD | Coniferous leading mixedwood | 5,865 | 1,984 | 7,849 |
| DC | Deciduous leading mixedwood | 6,209 | 1,816 | 8,025 |
| D | Deciduous leading | 9,853 | 5,630 | 15,483 |
| *ACTIVE Total* | | *125,512* | *98,699* | *224,211* |
| **Total** | | **170,282** | **163,963** | **334,246** |

**Table 2-2.** Net landbase (active) yield class area summary

| Yield Class | North DFA | South DFA | Total |
|---|---|---|---|
| N_HW | 9,853 | 5,630 | 15,483 |
| N_MIX_PL | 8,282 | 1,831 | 10,113 |
| N_MIX_SX | 3,792 | 1,969 | 5,761 |
| N_PL | 63,318 | 52,340 | 115,658 |
| N_SW | 25,131 | 29,534 | 54,665 |
| R_PL | 15,137 | 7,394 | 22,531 |
| **Total** | **125,512** | **98,699** | **224,211** |

The deletion map shows the spatial arrangement of the value sin the f_del field. The largest categories are steep slopes, low TPR, naturally non-forested, water buffers and the Eastern Slopes Zone 1 LUZ (Figure 2-1). FMU B12 is conifer dominated, with the pure pine stratum comprising the largest proportion of the active landbase (Figure 2-2).

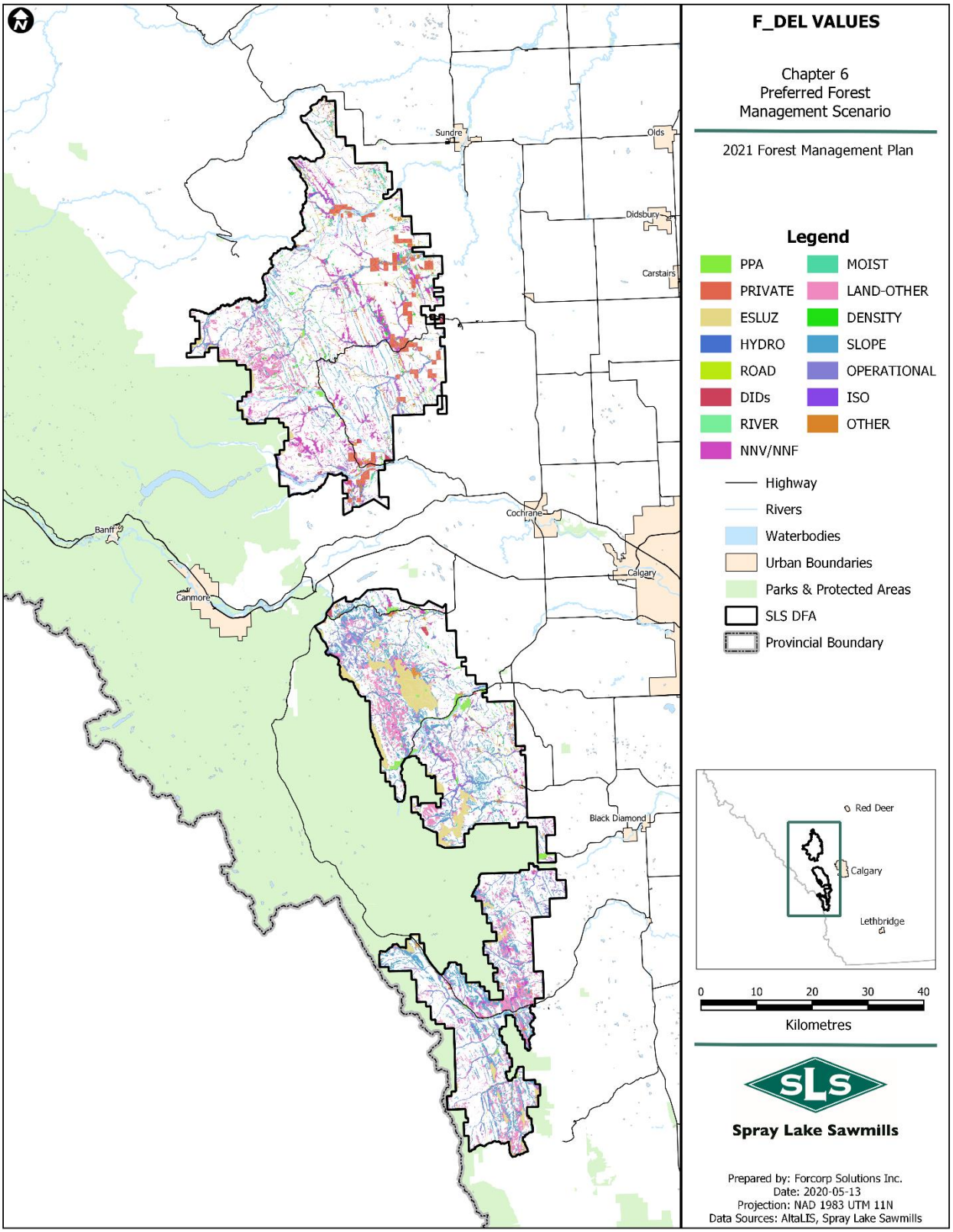


**Figure 2-1.** Final deletion categories for modeling landbase

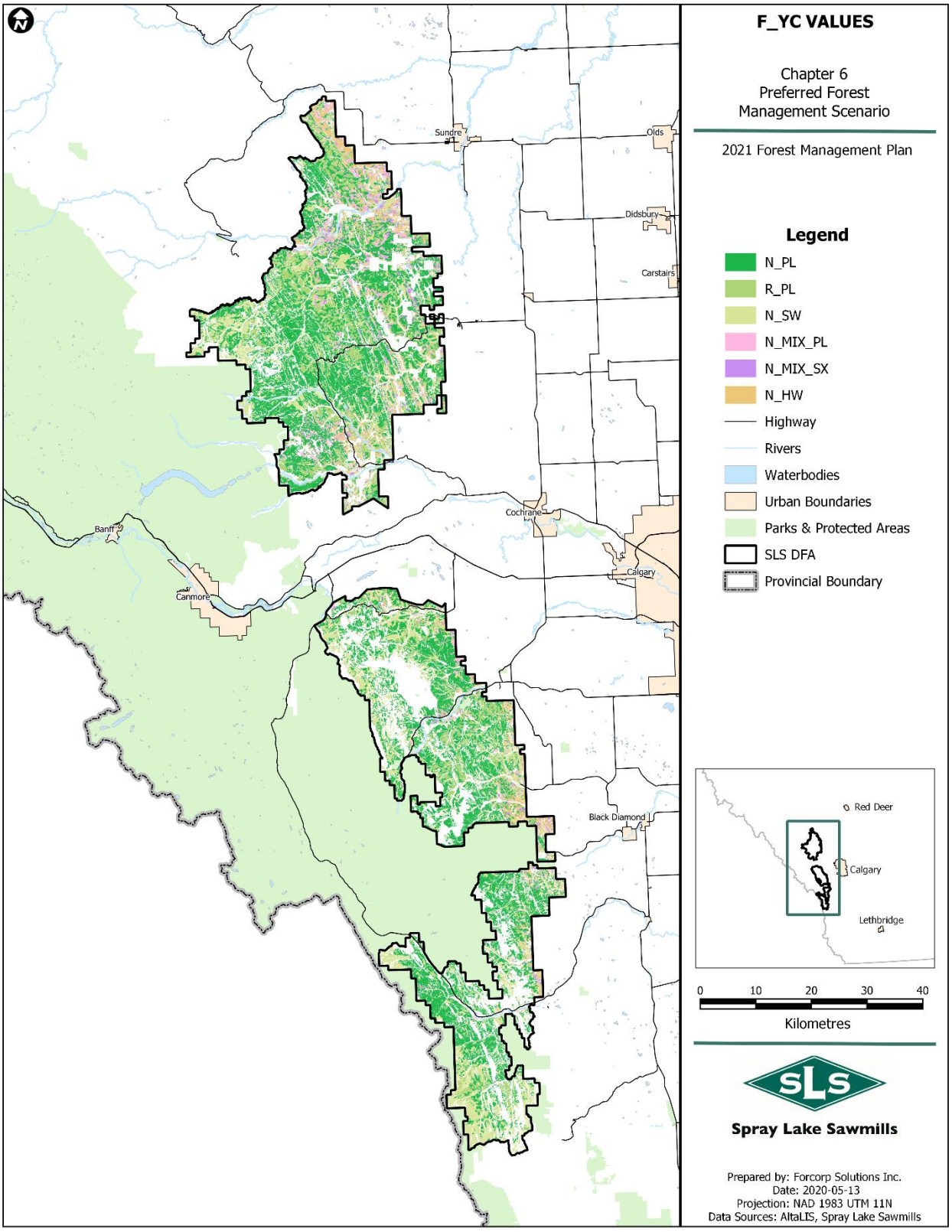


**Figure 2-2.** Final yield strata on the active landbase as used in the modeling landbase

# 3. Yield Curve Summary

## 3.1 Overview

Yield curves describe the change in merchantable timber yields over the life of a forest stand. A detailed description of the yield curve development process is provided in *Annex IV – Yield Curve Development*. The yield curves, which received Agreement-In-Principle (AIP) on October 31, 2019, are those used in the TSA process. Cull deductions were applied in the TSA processes to adjust from gross merchantable to net merchantable timber yields.

Yield curves used in the PFMS were developed from temporary sample plot (TSP), permanent sample plot (PSP), and data from Reforestation Standard of Alberta (RSA) performance survey programs across the FMP area. Stratification was based on the five Spray Lake Sawmills (SLS) base yield strata assigned through the net landbase development process. Yield strata are a modification of Alberta's base 10 yield strata.

## 3.2 Timber Yield Curves

SLS has identified two groups of stands within the net landbase for yield curve development:

**Natural Stands (NAT)**: Include all fire-origin stands that are within the active landbase. Modeling was based on non-linear regression of gross merchantable volume as a function of inventory age using natural stand TSPs. Strata were based on the AVI polygon.

**RSA managed stands (RSA)**: Represent all exiting openings that were harvested on or after December 31$^{st}$, 1995. Modeling was based on the provincial Growth and Yield Projection System (GYPSY) projection of RSA performance survey data for the Pine (Pl) stratum. The projections were averaged by yield strata using the proper sample weights by RSA program year and population areas as per RSA protocols. All other regenerating strata were based on the respective natural stand yield curves.

### 3.2.1 Utilization

Gross merchantable volumes were compiled to 11 cm top diameter inside bark and 15 cm minimum stump diameter at 30 cm stump height for the FMA baseline utilization for the conifer species group. The

deciduous species group gross merchantable volumes were compiled to 10 cm top diameter inside bark. These standards are outlined in Table 3-1 below.

**Table 3-1.** FMA utilization standards

| Utilization Attribute | Conifer | Deciduous |
|---|---|---|
| Top Diameter Inside Bark (cm) | 11 | 10 |
| Stump Diameter Outside Bark (cm) | 15 | 15 |
| Stump Height (cm) | 30 | 30 |
| Minimum Merchantable Length (m) | 4.88 | 4.88 |

### 3.2.2 Cull

Cull information was developed based on the document titled "*Tree Length Utilization in Harvest Operations*" (Alberta Agriculture & Forestry, 2015) that speaks to the importance of all yield estimates being compiled to a tree length utilization standard and the scaling system being dependent on all harvested timber crossing an approved scale.

SLS submitted a cull proposal to the GoA (Spray Lake Sawmills, 2019) quantifying the estimates of conifer cull based on scale data from 2007-2017. There was no deciduous scale information available therefore the deciduous cull estimate from Weyerhaeuser Pembina Timberlands was proposed.

The proposed conifer cull based on the analysis of scale data is 1.23% and the proposed deciduous cull based on the Pembina operations is 9.00% for all stand types for the 2021 FMP.

Net volumes are calculated by deducting cull from the projected gross merchantable volumes. Cull deductions need to apply directly to yield projections, not post-hoc AAC as defined in Section 4.2.7(d) of the Planning Standard. Cull is included here for reference only; application of yield reductions to account for cull is applied within the TSA.

### 3.2.3 Final Curves

The final curves applied in the TSA modelling were reduced for cull values (Figure 3-1).

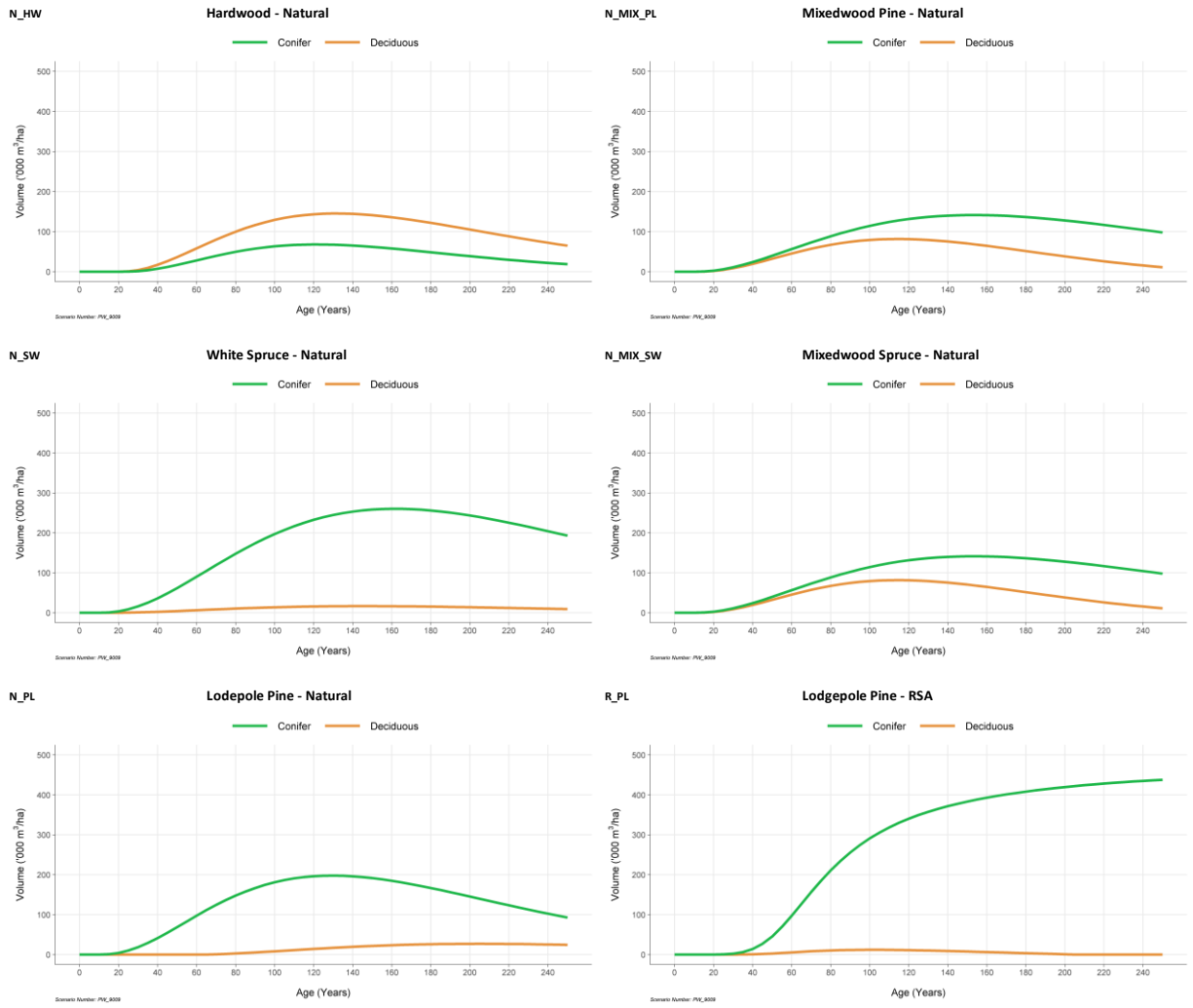


**Figure 3-1.** Volume yield curves as used in the TSA modeling for FMU B12

## 3.3 LRSYA

Long Run Sustainable Yield Average (LRSYA) is a theoretical yield that is attainable once a regulated state of the forest has been achieved and all stands are harvested at their maximum merchantable volume production as measured by the peak Mean Annual Increment (MAI) at culmination age. LRSYA provides a theoretical maximum AAC that the forest can sustain. Due to spatial and temporal constraints, even-flow, or accelerated cut assumptions in the TSA the long term AAC is expected to be lower than the LRSYA.

The LRSYA is calculated by multiplying the net area by the peak MAI of each yield stratum. The sum of all yield calculations is the LRSYA-derived AAC for the DFA.

LRSYA may be calculated for different scenarios based on transition assumptions implemented in the TSA. Spray Lake implemented three different scenarios:

- Back to natural (Table 3-2): All stands are assumed to regenerate back to natural and follow natural yield projections.

- Back to itself (Table 3-3): Stands regenerate to their current status, so existing managed stands will follow the managed stand yield projections.
- Back to managed (Table 3-4): All stands are assumed to regenerate to a managed stand and follow managed stand yield projections.

In the SLS 2021 FMP, RSA-based managed stand yield curves were only developed for the regenerating pine yield stratum and all other strata follow natural stand yield trajectories. As a result, the increase in LRSYA is clearly attributable to the assumptions in managed pine transitions and yield projections. The actual realized AAC gains will be lower due to spatial and temporal constraints in the TSA. All LRYSA calculations ignore all model constraints, therefore this comparison is in theory and assumes a regulated forest situation.

**Table 3-2.** LRSYA calculation - 'back to natural' scenario

| Current Yield Stratum | Regenerate To | Area (ha) | Age (years) | MAI ($m^3$/ha/year) | | LRSY ($m^3$/year) | |
|---|---|---|---|---|---|---|---|
| | | | | Con | Dec | Con | Dec |
| N_HW | N_HW | 15,787 | 90 | 0.64 | 1.29 | 10,104 | 20,366 |
| N_MIX_PL | N_MIX_PL | 10,282 | 100 | 1.14 | 0.79 | 11,721 | 8,122 |
| N_MIX_SX | N_MIX_SX | 5,943 | 100 | 1.14 | 0.79 | 6,775 | 4,695 |
| N_PL | N_PL | 117,247 | 90 | 1.85 | 0.06 | 216,907 | 7,035 |
| N_SW | N_SW | 56,938 | 100 | 1.97 | 0.14 | 112,167 | 7,971 |
| R_PL | N_PL | 23,060 | 90 | 1.85 | 0.06 | 42,662 | 1,384 |
| **Total** | | **229,257** | | **1.75** | **0.22** | **400,335** | **49,572** |

**Table 3-3.** LRSYA calculation - 'back to itself' scenario

| Current Yield Stratum | Regenerate To | Area (ha) | Age (years) | MAI ($m^3$/ha/year) | | LRSY ($m^3$/year) | |
|---|---|---|---|---|---|---|---|
| | | | | Con | Dec | Con | Dec |
| N_HW | N_HW | 15,787 | 90 | 0.64 | 1.29 | 10,104 | 20,366 |
| N_MIX_PL | N_MIX_PL | 10,282 | 100 | 1.14 | 0.79 | 11,721 | 8,122 |
| N_MIX_SX | N_MIX_SX | 5,943 | 100 | 1.14 | 0.79 | 6,775 | 4,695 |
| N_PL | N_PL | 117,247 | 90 | 1.85 | 0.06 | 216,907 | 7,035 |
| N_SW | N_SW | 56,938 | 100 | 1.97 | 0.14 | 112,167 | 7,971 |
| R_PL | R_PL | 23,060 | 100 | 2.91 | 0.12 | 67,105 | 2,767 |
| **Total** | | **229,257** | | **1.85** | **0.22** | **424,779** | **50,956** |

**Table 3-4.** LRSYA calculation - 'back to managed' scenario

| Current Yield Stratum | Regenerate To | Area (ha) | Age (years) | MAI ($m^3$/ha/year) | | LRSY ($m^3$/year) | |
|---|---|---|---|---|---|---|---|
| | | | | Con | Dec | Con | Dec |
| N_HW | N_HW | 15,787 | 90 | 0.64 | 1.29 | 10,104 | 20,366 |
| N_MIX_PL | N_MIX_PL | 10,282 | 100 | 1.14 | 0.79 | 11,721 | 8,122 |
| N_MIX_SX | N_MIX_SX | 5,943 | 100 | 1.14 | 0.79 | 6,775 | 4,695 |
| N_PL | R_PL | 117,247 | 100 | 2.91 | 0.12 | 341,189 | 14,070 |
| N_SW | N_SW | 56,938 | 100 | 1.97 | 0.14 | 112,167 | 7,971 |
| R_PL | R_PL | 23,060 | 100 | 2.91 | 0.12 | 67,105 | 2,767 |
| **Total** | | **229,257** | | **2.39** | **0.25** | **549,061** | **57,991** |

Assuming that all pine stands regenerate to managed pine, a long run will show a 38% increase in conifer LRSYA over the 'back to natural' scenario. If all stands regenerate to their current state (including 23,060 ha of existing managed pine stands), there will be a gain of 6% over the 'back to natural' scenario.

# 4. PFMS Assumptions and Targets

This section describes the inputs, assumptions and targets applied in the modeling exercise to produce the PFMS. The PFMS is not simply the result of a computer simulation based on model targets but, rather, a combination of numerical targets and manual intervention to address concerns and issues that are not included in the model. FMU B12 was treated as one sustained yield unit (SYU) and therefore one PFMS was produced.

## 4.1 Basic Timber Supply Assumptions

The following basic assumptions were applied in the PFMS:

- Even flow of total coniferous harvest volumes;
- Application of a 200-year planning horizon, with model reporting in five-year periods; and
- Operable coniferous growing stock constrained to not decline in the last quarter of the planning horizon.

## 4.2 Harvest and Regeneration Treatments

Clearcut harvesting, with 3% structure retention, was a uniform silviculture system applied across the entire FMU B12.

The PFMS assumes that all stands will be promptly regenerated following harvest. After harvest, coniferous and mixedwood stands will be regenerated using combinations of scarification, planting and natural regeneration and tending. As described in *Annex IV – Yield Curve Development* Section 1.5.6, regen lag is not applied to the PL strata RSA curve as skid clearance dates were used to assign the ages to the RSA plots. Furthermore, all other strata are cycled back to the natural curves and no regen lag is required.

In FMU B12, all strata regenerate back to the same species strata. While the model applied strict deterministic regeneration rules (e.g. all pine stands are regenerated to pine), flexibility for individual blocks is permitted on the ground, provided that strata-balancing objectives are achieved. Refer to *Chapter 7 – Plan Implementation & Monitoring* for more information.

### 4.2.1 Minimum Harvest Age

The Minimum Harvest Age (MHA) of 80 years was uniformly applied across the entire FMU B12 and all strata. The minimum harvest age of 80 is younger than the max MAI ages (Table 4-1), but the volumes and piece sizes at 80 years of age meet the minimum requirements for the SLS sawmill.

**Table 4-1.** Minimum harvest ages as compared to the maximum MAI of the yield curves used in 2021 FMP

| Yield Curve | Min. Harvest Age | Maximum MAI | Age at Max MAI |
|---|---|---|---|
| N_HW | 80 | 1.93 | 90 |
| N_MIX_PL | 80 | 1.97 | 90 |
| N_MIX_SX | 80 | 1.97 | 90 |
| N_PL | 80 | 1.91 | 90 |
| N_SW | 80 | 2.11 | 100 |
| R_PL | 80 | 3.03 | 100 |

## 4.3 Succession and Lifespan

Succession in the modeling is the change between strata to address natural species conversion and stand breakup over time. The PFMS continued the same approach from the previous FMP, where stands did not change strata due to aging within the planning horizon. Instead, all forested stands have declining volume curves, which maintain a low volume as they progress past the age of 350 years.

In the PFMS, 1,668 ha of active landbase reached 350 years of age and was not harvested within the 200-year timespan of the model forecast. This unharvested area is a direct result of reducing harvest from the theoretical maximum to meet the non-timber objectives.

## 4.4 Seral Stages

Seral stages classify the forest into ecological stand development phases that represent a stand's life cycle. They are commonly used as a coarse filter management tool. The seral stage classification used in the 2021 FMP (Table 4-2) is based on the Government of Alberta simplified seral stage definitions.

**Table 4-2.** Seral stages used in 2021 FMP

| Stratum | Young | Immature | Mature | Old | Very Old |
|---|---|---|---|---|---|
| FD | 1 - 19 | 20 - 79 | 80 - 119 | 120 - 179 | 180+ |
| HW | 1 - 19 | 20 - 79 | 80 - 119 | 120 - 179 | 180+ |
| HWPL | 1 - 19 | 20 - 79 | 80 - 119 | 120 - 179 | 180+ |
| HWSX | 1 - 19 | 20 - 79 | 80 - 119 | 120 - 179 | 180+ |
| PL | 1 - 19 | 20 - 79 | 80 - 119 | 120 - 179 | 180+ |
| PLHW | 1 - 19 | 20 - 79 | 80 - 119 | 120 - 179 | 180+ |
| SB | 1 - 19 | 20 - 79 | 80 - 119 | 120 - 179 | 180+ |
| SW | 1 - 19 | 20 - 79 | 80 - 119 | 120 - 179 | 180+ |
| SWHW | 1 - 19 | 20 - 79 | 80 - 119 | 120 - 179 | 180+ |

The reported seral stages used three landbase definitions; Gross landbase, Active landbase and an On-Par landbase.

### 4.4.1 Standard Analysis, Gross and Active Landbase

The main evaluation of seral stage on the old and very old seral stages is to determine if an acceptable amount of each forest condition is represented through time. Normally, the analysis is completed on the gross landbase (all areas regardless of operability) and the active landbase (areas allowed to be harvested). The gross and active landbases are the standard method of controlling and analyzing the seral stages. Targets and reports were developed and used in the PFMS scenario. Seral stage targets for both gross and active landbases were set for a minimum amount of area in the old and very old stages. The PFMS also applied patch targets to FMU B12 to achieve the objectives for the combined old and very old seral stage area.

### 4.4.2 On-Par Landbase Analysis

The third landbase type is the on-par landbase, used to report the seral stages for an area larger than the active landbase. It includes stands of similar stand composition to the active landbase that have been excluded from the active landbase based on administrative restrictions rather than stand condition (i.e. excluded productive land).

To determine the amount of productive land that is on the gross landbase, an "on-par" analysis was completed. To be considered as an on-par polygon in the landbase, the polygon would otherwise have been active landbase that could have been harvested if ground rules and various dispositions were not applied. For example, productive forest in water buffers would be considered 'on-par' and equal to the active landbase in terms of ecological value. A full list of the area removed from each landbase deletion and added to the active landbase for the purposes of the on-par analysis is presented in Table 4-3.

**Table 4-3.** On-par area by landbase category

| Landbase Category | | DFA Area | On-Par Change | On-Par New Area |
|---|---|---|---|---|
| | **PASSIVE** | | | |
| **Administrative Restrictions** | | | | |
| PPA | Parks and Protected Areas | 2,489 | (1,811) | 678 |
| PRIVATE | Private Land | 5,967 | (3,393) | 2,575 |
| ESLUZ | Eastern Slopes Zone 1 | 12,795 | (6,390) | 6,405 |
| HISTORIC | Historic Resources | 97 | (48) | 49 |
| OUT_FMU | Outside of the FMU boundary | 176 | (78) | 98 |
| HYDRO | Hydrology buffers | 11,700 | (7,566) | 4,134 |
| Administrative Total | | *33,224* | *(19,285)* | *13,939* |
| **Landscape Restrictions** | | | | |
| ROAD | Road/Access (DIDs and AVI) | 2,974 | 0 | 2,974 |
| DIDs | Land Dispositions | 2,313 | (511) | 1,802 |
| DRS | Disposition Reservation | 409 | (302) | 107 |
| GOA_PSP | GoA Permanent Sampling Plots | 55 | (51) | 4 |
| ANTHNON | Anthropogenic Non-vegetated | 59 | 0 | 59 |
| ANTHVEG | Anthropogenic Vegetated | 961 | (11) | 950 |
| FLOOD | Flooded area | 31 | 0 | 31 |
| LAKE | Lake | 225 | 0 | 225 |
| RIVER | River | 1,237 | 0 | 1,237 |
| AQUATIC | Aquatic area | 14 | 0 | 14 |
| NNF | Naturally Non-Forested (AVI) | 12,622 | 0 | 12,622 |
| NNV | Naturally Non-Vegetated (AVI) | 1,020 | 0 | 1,020 |
| NO_STRATA | No strata assigned | 23 | 0 | 23 |
| BURN | Areas burnt after May 1 2018 | 25 | (25) | 0 |
| *Landscape Total* | | *21,968* | *(901)* | *21,067* |

| Landbase Category | | DFA Area | On-Par Change | On-Par New Area |
|---|---|---|---|---|
| | **PASSIVE** | | | |
| **Operations Restrictions** | | | | |
| MOIST | Moisture deletion (AVI) | 2,640 | (68) | 2,571 |
| TPR | Low Timber Productivity Rating | 20,388 | 0 | 20,388 |
| DENSITY | Low density stands | 1,498 | 0 | 1,498 |
| SLOPE | Steep slopes | 21,061 | (20,679) | 381 |
| LT | Larch stands | 38 | 0 | 38 |
| FD | Douglas Fir stands | 187 | 0 | 187 |
| SB | Black Spruce stands | 955 | 0 | 955 |
| PA_PF | Whitebark pine and Limber pine | 110 | 0 | 110 |
| NO_ARIS | Blocks in AVI with opening no matching to ARIS | 5 | (5) | 0 |
| OPERATIONAL | Operational Deletions | 5,181 | (4,844) | 337 |
| DELETION | Block Deletion | 15 | (15) | 0 |
| SEISMIC | Seismic Lines | 1,627 | 0 | 1,627 |
| ISO_DEL1 | Isolated stands - buffer deletion | 10 | (10) | 0 |
| ISO_PTA1 | Isolated stands - perimeter to area ratio deletion 1 | 561 | (561) | 0 |
| ISO_PTA2 | Isolated stands - perimeter to area ratio deletion 2 | 566 | (566) | 0 |
| *Operations Total* | | *54,842* | *(26,750)* | *28,093* |
| *PASSIVE Total* | | *110,034* | *(46,936)* | *63,099* |
| | **ACTIVE** | | | |
| C | Coniferous leading | 192,854 | 42,109 | 234,963 |
| MIX | Mixedwood | 15,874 | 2,592 | 18,466 |
| D | Deciduous leading | 15,483 | 2,235 | 17,718 |
| *ACTIVE Total* | | *224,211* | *46,936* | *271,147* |
| **Total** | | **334,246** | **0** | **334,246** |

This on-par landbase allows portions of the gross landbase to be reported in the on-par portion of the seral stage analysis.

## 4.5 Interior Old Forest

In the TSA modeling, interior old forest patches are patches greater than 120 ha that are composed of stands greater than 120 years old. Patches include both the active and passive forested areas of the landbase and all strata. In the PFMS, the interior old forest patch target was applied to the gross landbase for FMU B12.

## 4.6 Landbase Losses

Deterministic modeling processes were used in the TSA. This approach does not permit effective incorporation of fire, which is properly addressed through stochastic processes. No fire loss factor was included in the PFMS. Landbase losses that were not accounted for, such as fire or other factors, will be addressed through the application of triggers that initiate a re-planning process. The mechanism that accounts for large scale losses of productive forest on the landbase is an AAC recalculation trigger. When the managed landbase is reduced by 2.5% or more from the current level, the GoA will evaluate the impact and, if appropriate, apply a reduction to the AAC.

## 4.7 Natural Disturbances

The spatial arrangement of the existing forest is highly fragmented due to past harvesting and other industrial development, resulting in smaller patches being available for harvest, especially over the next few decades. In the Patchworks model, patch size targets were applied in the PFMS to control the spatial

harvest patterns. Patch targets were applied to the regenerating seral stage to control the sizes of openings created across the landscape. The patch size of 50-200 ha was maximized in the PFMS to encourage the model to group harvesting operations and to provide a desirable range of opening sizes. Larger patch sizes greater than 200 ha were allowed, but minimized, to maintain desired block sizes.

### 4.7.1 PIC Analysis

"An Evaluation of the Pre-Industrial Conditions", also know as PIC, was completed by Marie-Pierre Rogeau in 2013 (Rogeau, 2013). Her analysis focused on the range of conditions present before 1930 in the SLS DFA. 1930 was chosen as it represents a turning point in fire suppression activity in the province and specifically in the SLS DFA. Since 1930 very few large fires have been experienced in the area, even with several years of extremely favorable weather conditions. This history of fire suppression puts the forest in a condition of older ages and increased available fuel when compared to a regular cycle of less intense but more frequent fires.

The result of this study provided a range of conditions that would have been common in the pre-fire suppression era, thus creating an evaluation of the Pre-Industrial Condition. The format of the PIC is very similar to the concept of the Natural Range of Variation (CBFA, 2016). Each combination of seral stage and strata has a defined range of percent area that would have been found in the natural forest. This range generally shows that the SLS forest is either currently or trending to become much older than the typical pre-industrial condition.

A sample of some of the outputs for the PFMS are shown in Figure 4-1. The y axis represents the percentage of the total DFA forested area; the x axis represents time in years; the red dotted line indicates the modelled natural forest condition (pre-fire suppression); the green area indicates percentage of old growth area within 15% of the natural (pre-fire suppression) mean; and the black line indicates the modelled PFMS old growth levels over 200 years.

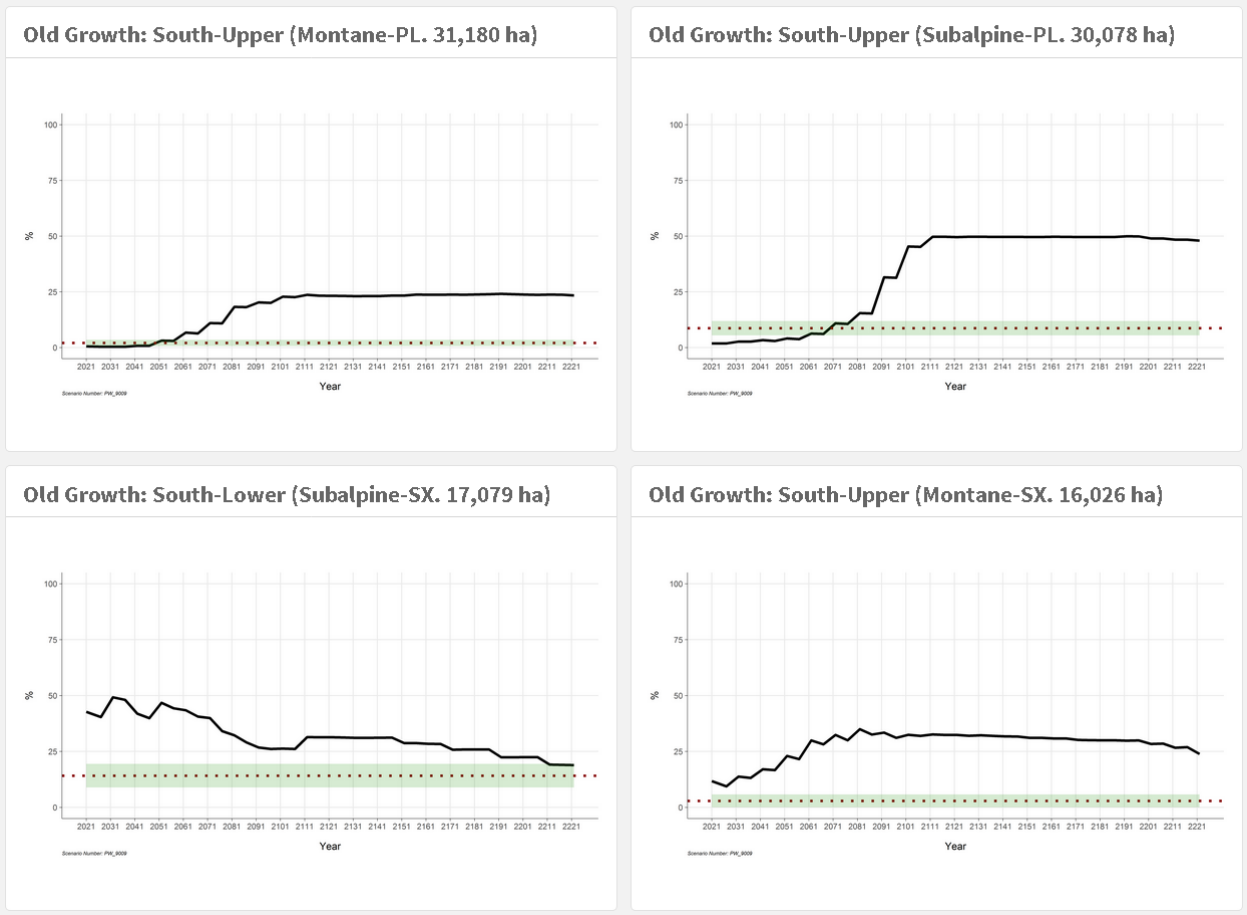


**Figure 4-1.** Sample outputs of PIC analysis on PFMS scenario

The PIC ranges were inputted into the Patchworks model and reported for many of the scenarios. Ultimately, the metric was not accepted by Alberta as a metric that would be evaluated in the review of the FMP. The outputs were reviewed by SLS but are not reported in the management plan.

## 4.8 Mountain Pine Beetle

Currently there is no significant Mountain Pine Beetle (MPB) infestation within the SLS DFA. Future forest management plans may need to re-focus on MPB risk and the Alberta Management Strategy (Alberta Sustainable Resource Development, 2007), as large areas of mature pine age and become more vulnerable to MPB infestation (see *Chapter 7 – Plan Implementation and Monitoring* Section 6.2 for further information).

## 4.9 Operational Considerations

Developing a 20-year SHS as part of the forecasting exercise supports forest sustainability, by strengthening the relationship between strategic planning and field operations. It ensures that the long-term consequences of field operations are incorporated into the forecasting and that harvesting activity reflects the strategically determined AAC. For this to be effective, the SHS must be operationally feasible. As part of this process, Spray Lake Sawmills invested considerable time and effort in determining

operability thresholds for the new AVI that could be effectively applied in the PFMS and operationally implemented in the SHS.

All operators in the FMP area requested that annual harvesting operations be more or less grouped together and that merchantable patches left behind for future harvest be large enough to warrant a return at a later date. These operational considerations were addressed in the forecasting process in the following manner.

### 4.9.1 Annual Harvest Patches

Annual harvesting was controlled by creating patch goals made up of only recently harvested stands with an age of zero or one year. By setting the topology distance to 100 m and constraining the 250+ ha patch goals to minimum levels, the model was encouraged to create several clusters of stands each year. Existing blocks in the landbase would in theory not contribute toward the patch goals. However, the first 3 years of the model are pre-blocked and pre-SHS, and therefore do contribute to the target. This technique reduced the reliance on restricting harvest to annually identified operating unit boundaries.

### 4.9.2 Operating Units

SLS uses operating units to restrict access in certain time periods. The operating units were created to help the model combine harvest activities into operationally feasible groups for the remainder of the planning horizon after the SHS period. Operating units within the first 20 years of the planning horizon were constrained using the *Access Control* feature within Patchworks. A second way of controlling is limiting the number of operating units open in each period and this was used throughout the 200-year planning horizon.

### 4.9.3 Road Network

A road network consisting of current and potential future road segments was included in the model. Every road segment was assigned costs associated with construction, maintenance and hauling, which were then constrained to reduce the number of roads used in each period. This approach works in conjunction with harvest patches and operating units to group harvest into operationally feasible patterns.

## 4.10 Wildlife Habitat

For the 2021 FMP, SLS used non-timber assessment (NTA) tools that were provided by the GoA, with the objective of enabling consistent predictions of habitat to support planning processes across the province.

Where possible, these tools were incorporated directly into the TSA models. This included the marten and songbird models. This approach reduces the time between scenario development and habitat prediction while permitting targets to be established directly into the TSA model and PFMS. The Barred Owl and Grizzly Bear models could not be processed directly in Patchworks due to the spatial modeling requirements for these species and therefore were post-processed using the Patchworks outputs.

The habitat objective in the TSA was to limit the impact of timber management activities on wildlife habitat. The majority of habitat metrics did not require active control in the model to achieve results within the thresholds required by GoA.

### 4.10.1 Songbirds

Songbird metrics were derived from curves provided by the GoA (Figure 4-2) that define the relative abundance of each songbird within each forest strata. These curves were then incorporated directly into the Patchworks model to allow control and reporting within the model.

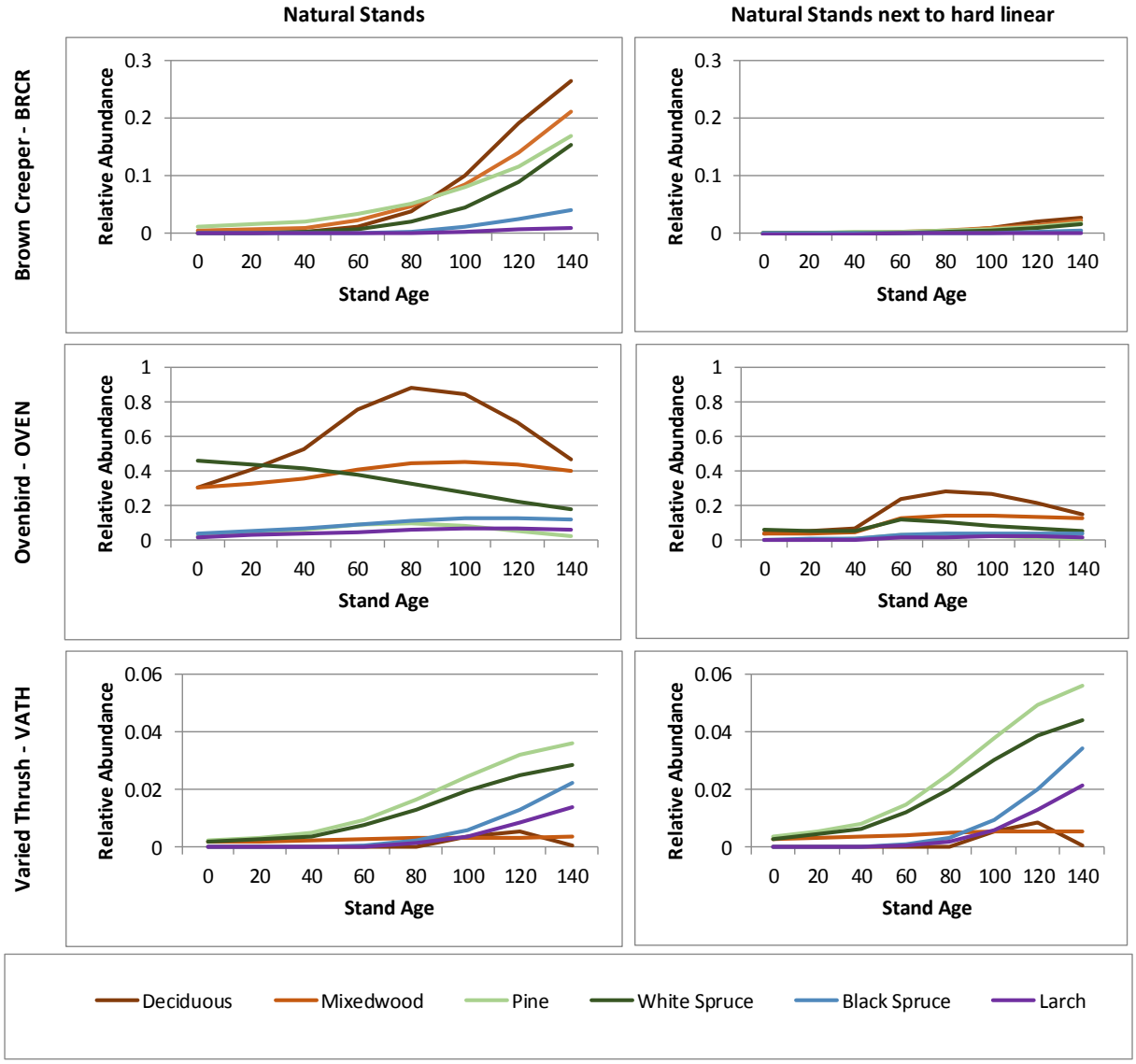


**Figure 4-2.** Songbird relative abundance curves provided by the GoA

The curves provided by the GoA are delineated by distance from hard linear (HLIN) features, which are defined as roads above a 0.5% density on a 7-ha grid. Each songbird species has a separate curve for each forest strata, which describe the bird's relative abundance over the life of each stratum.

The reporting for songbirds is non-spatial, using an area-weighted average relative abundance for each FMU. These are tracked through the planning horizon and measured against the current conditions. If a species drops more than 15% from its current condition, management actions, either strategic or operational, are to be considered.

### 4.10.2 Marten

The marten metric is included in the TSA models in the same fashion as the songbirds. The Marten model uses a Habitat Suitability Index (HSI) in place of relative abundance, but the methodology of reporting is the same. The curves provided by the GoA are based on a set of strata defining combinations of aspen, pine and white spruce, further split by site condition (Figure 4-3). In the PFMS, it has been constrained to maintain no more than a 30% drop from initial conditions in FMU B12.

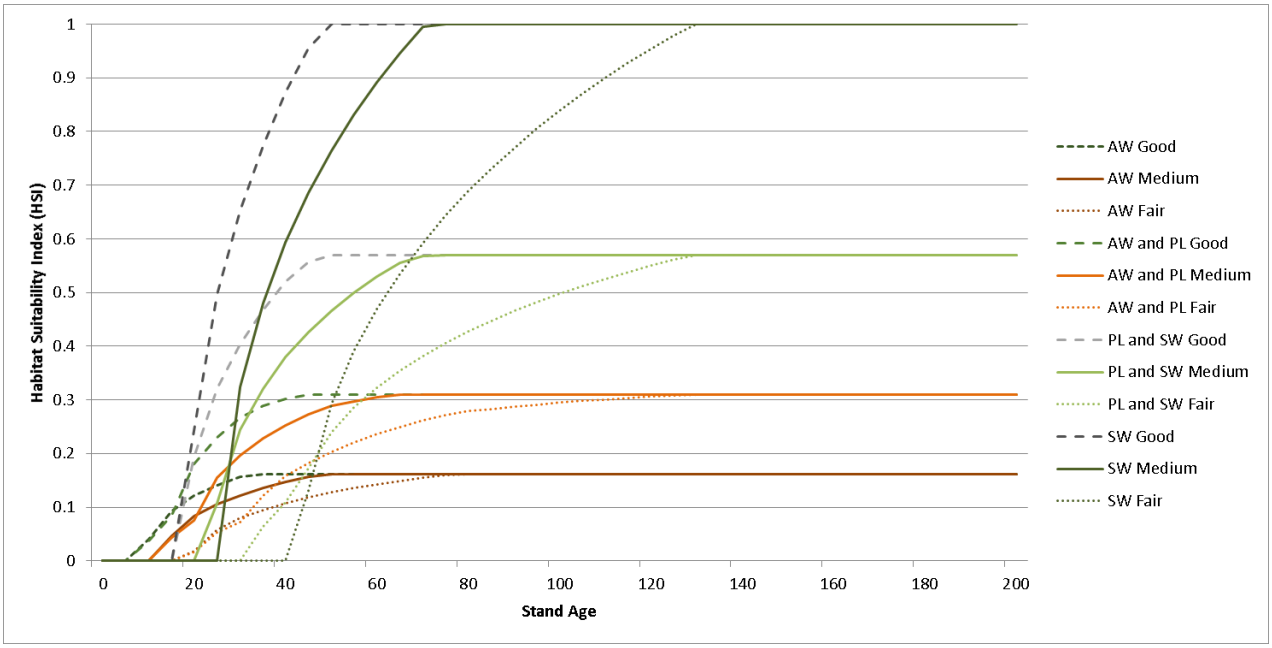


**Figure 4-3.** Marten Habitat Suitability Index curves

### 4.10.3 Barred Owl

For Barred Owl a separate habitat model is run outside of Patchworks using current and future landbase conditions exported from the Patchworks model. Landbase conditions were then used to generate a series of raster layers that define the following metrics:

1. Amount and distribution of older hardwood;
2. Amount and distribution of older white spruce;
3. Distance of each raster cell to disturbances (blocks younger than 30 years old);
4. Distance of each raster cell to old hardwood and white spruce (older than 90 years old); and
5. Area to perimeter ratio of forested stands greater than 30 years old.

Once these rasters were generated, they were combined together to generate a Resource Selection Function (RSF) raster. The final step was to generate a breeding pair raster layer, which groups the RSF raster into 562 ha cells to determine if a breeding pair could exist within the larger area. The larger raster cells require a specific combination of the five original raster values to count as a breeding pair.

As the Barred Owl model cannot be directly mimicked within the Patchworks model, direct control on constraining for breeding pairs is not an option. In lieu of direct control, modifications were made to the harvest sequence to minimize impacts to the Barred Owl.

### 4.10.4 Grizzly Bear

Grizzly Bear habitat was modeled using the fRI Research 2018 Grizzly Bear assessment tools (fRI Research Grizzly Bear Program, 2019). Grizzly Bear habitat was not explicitly modeled in the TSA, as the majority of strategies are operational level strategies and the tools were not designed for direct incorporation in the TSA. To capture the advice from GoA to mitigate impacts on grizzly bear, the TSA model controlled harvest block patterns to be grouped as much as possible in the PFMS. While this is beneficial from an operations perspective, it also advantageous to Grizzly Bears, as condensed harvesting reduces the amount of time that roads are left open and used. A Grizzly Bear habitat strategy was developed for the PFMS (*Chapter 7 – Plan Implementation and Monitoring* Section 8.2.1).

## 4.11 Watershed

Runoff from watersheds was evaluated by using the Equivalent Clearcut Area (ECA) methodology as outlined in the Alberta Non-Timber Assessments in Forest Management Planning procedures. This method uses ECA curves that match each volume strata curve. Each is based on using a value of one (1) at stand age zero, and a value of zero (0) when the total volume yield curve reaches maximum periodic annual increment (PAI). An example curve showing the volume and resulting ECA curve for the PL natural strata in FMU B12 is shown in Figure 4-4. In this example, the ECA curve reaches zero at age 45. For all volume curve types, PAI is reached between the ages of 45 and 60 (Figure 4-5).

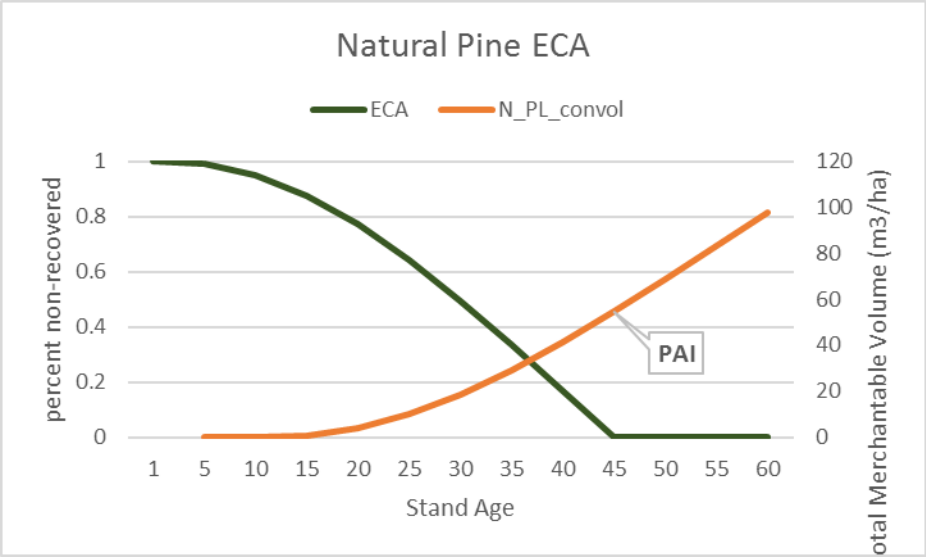


**Figure 4-4.** Example of ECA curve using PL natural curve for FMU B12

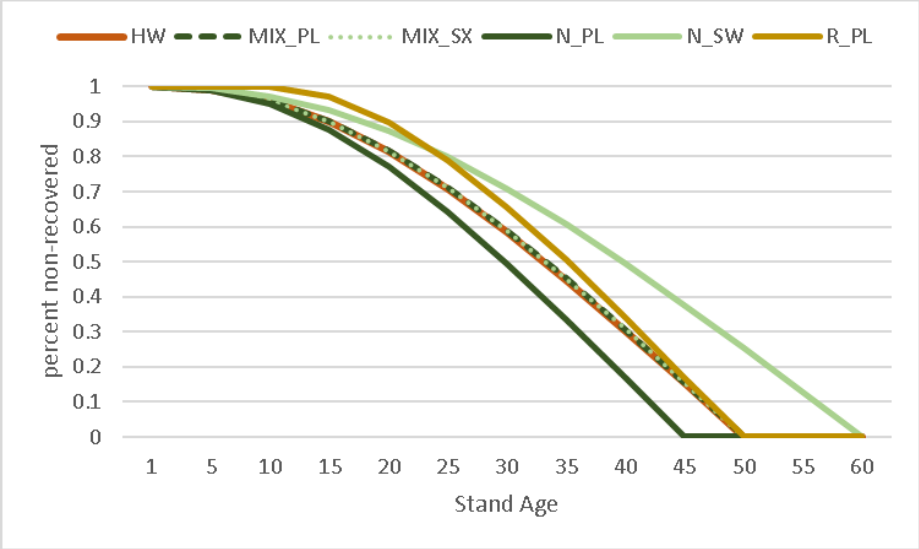


**Figure 4-5.** All ECA curves for all strata in FMU B12

Reporting for watershed ECA values is by watershed and for all watersheds in total. The total ECA value (∑(curve value * stand area)) for each watershed is divided by the total area of each watershed. The result is a percentage, where lower percentages represent watersheds with older forest, and larger percentages represent watersheds with young forests. These percentages are then classified into three classes:

1. Less than 30%;
2. Equal or greater than 30% and less than 50%; or
3. Equal or greater than 50%.

The initial conditions for ECA show no watersheds above the 50% threshold (Figure 4-6). In the PFMS, the 20-year SHS was refined to mitigate the impact on runoff by modifying harvest patters so that no watersheds were greater than 50% (see *Chapter 7 – Plan Implementation and Monitoring* Section 7.2 for more information).

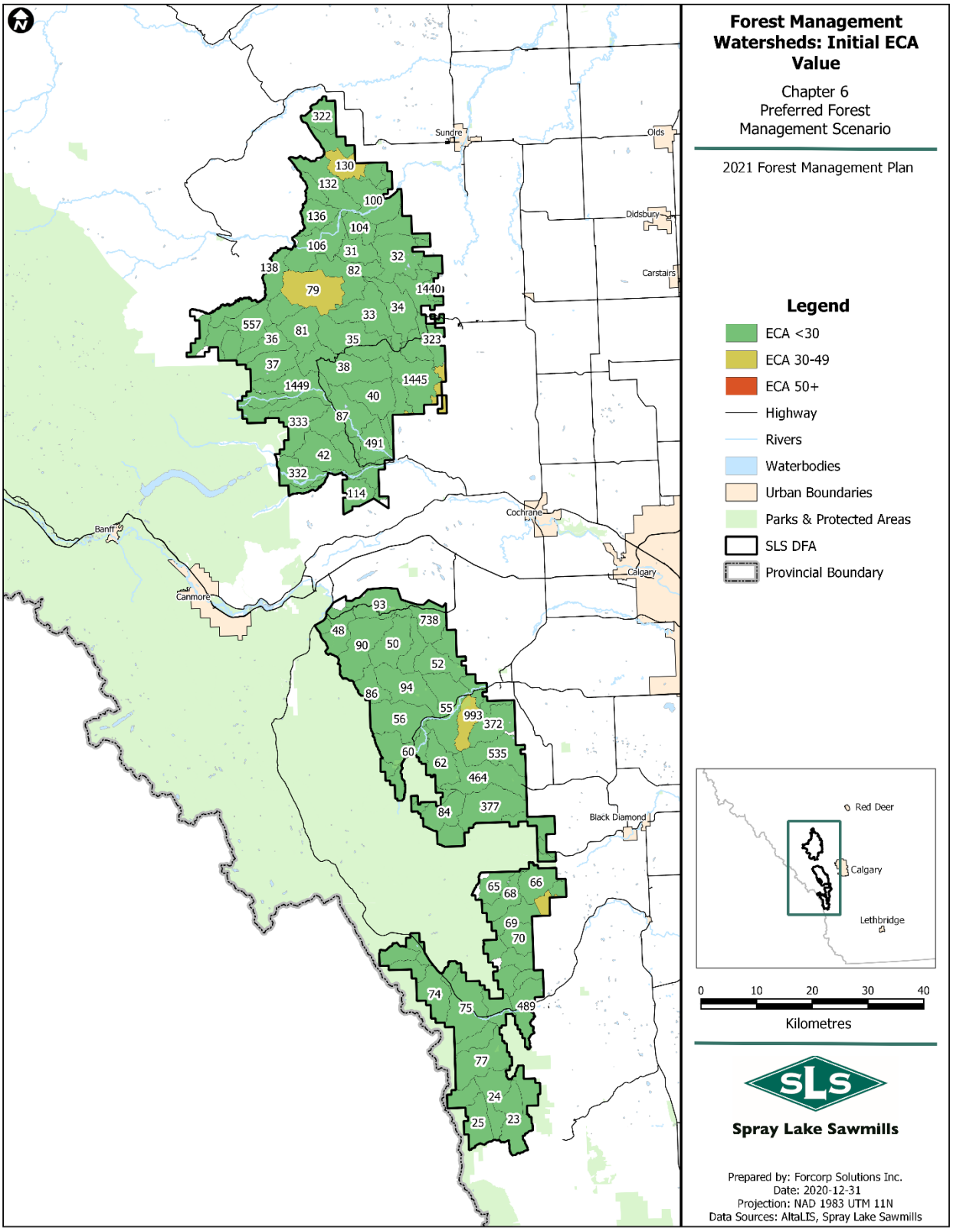


**Figure 4-6.** Forest management watersheds with their initial ECA class

### 4.11.1 HUC 10 Watersheds

An additional analysis using was conducted using HUC 10 watersheds, which are generally larger than the ECA watersheds. The HUC system of classification was developed by the United States Geological Survey (USGS) with accommodation to reflect the pre-existing Canadian classification system. The nested 10-digit HUC watersheds were originally created for Fisheries Management – Westslope Cutthroat Trout management purposes (Government of Alberta, Accessed May 2020). The process of evaluating the HUC 10 watersheds is the same as used for the ECA, where the ECA curves are applied to the area within each watershed, and then evaluated based on 30% and 50% thresholds. The initial conditions for HUC10 show no watersheds above the 50% threshold and only one above the 30% threshold (Figure 4-7). This one watershed is mostly outside the DFA and extends north towards the town of Olds.

The PFMS scenario strives to not have any watersheds over the 30% threshold in the first 20 years of the sequence (Figure 4-7). One small portion of a watershed is over the 30% threshold currently. This one watershed is mostly outside the DFA and extends north towards the town of Olds.

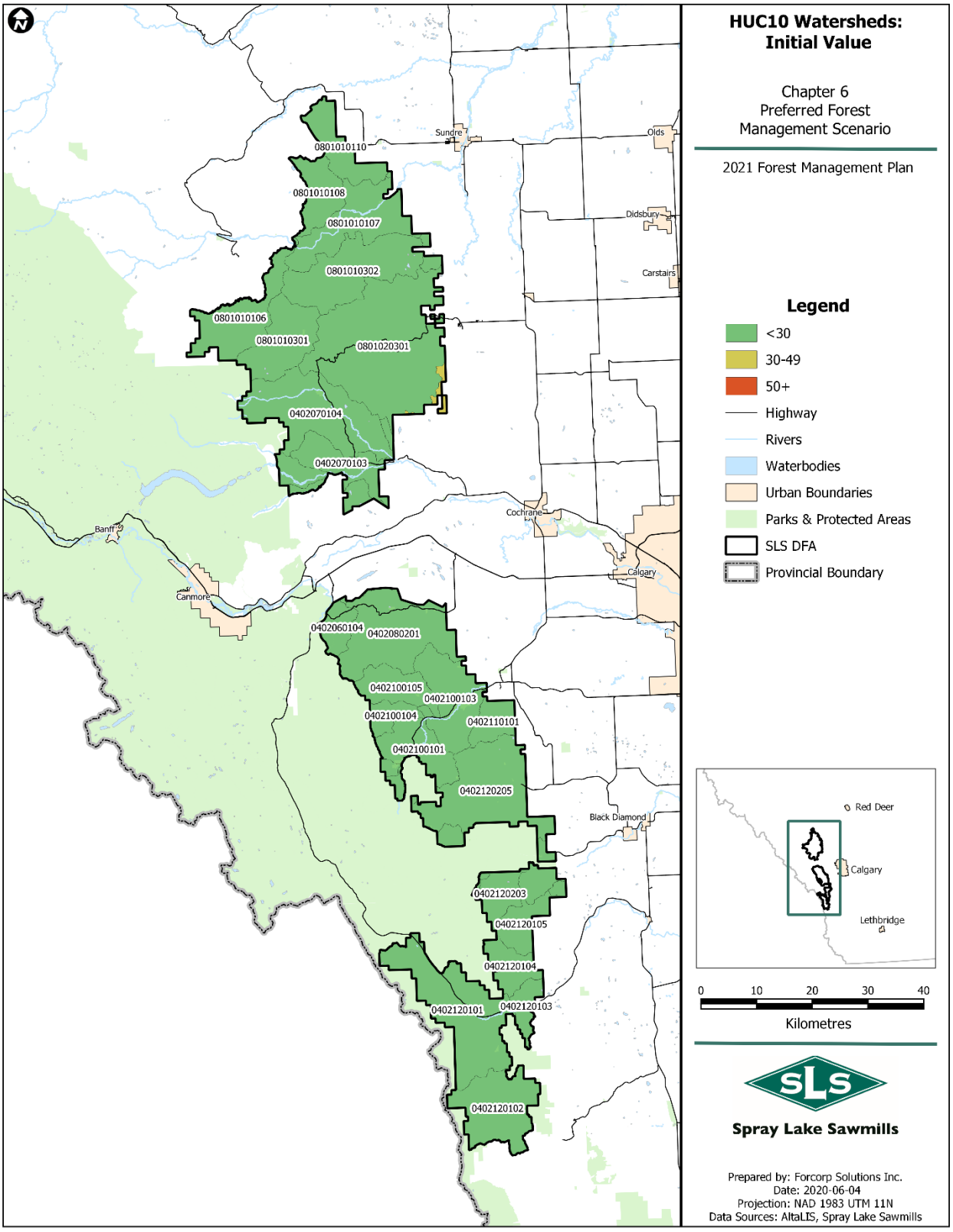


**Figure 4-7.** HUC 10 watersheds with their initial condition

## 4.12 Target Weightings

The weighting of individual targets impacts the model's ability to achieve the target values desired by the management team. Greater weighting, relative to another value's weighting, increases the probability a target will be achieved. However, the weighting of the targets is not a mathematical process of determining the actual weights but a process of attempting to obtain the desired outcome of the target values. Some targets are desired to be even flow; some are required to meet a minimum or maximum, with fluctuations allowed above or below the minimum or maximum; and still others can have significant deviation from the target value and still be within accepted values. Once the desired effect is agreed upon, the weights are adjusted to achieve the targets.

Some targets are difficult to achieve, and their weighting will be higher than that of other targets. Other targets will achieve their values with very little encouragement, so very little weighting is required. The relative weighting between targets does not reflect their relative importance but simply the weighting required to achieve the desired outcome.

# 5. PFMS

The Preferred Forest Management Scenario (PFMS) is the recommended forest management approach to be implemented over the next ten years. Once approved by the GoA, it will direct the amount and location of timber harvesting and regeneration activities by all forest operators on the DFA for the period 2021 - 2031.

The PFMS was developed within the context of forest sustainability, representing a balance between timber and non-timber values. It was developed and refined by SLS and the PDT over several months and it was influenced by input from a wide range of interests, including representatives of Spray Lake Sawmills, Canfor, Sundre Forest Products, J.H. Neilson Forest Products, Precision Forest Industries, Alberta Agriculture and Forestry, Alberta Environment and Parks, First Nations from in and around the FMP area, Spray Lake's Public Advisory Committee (PAC) and other public stakeholders. It reflects a combination of previous decisions, numerical targets for values of interest, and biological and anthropogenic assumptions with operational considerations. The PFMS is not solely the result of computer analysis but, rather, an iterative refinement of model projections combined with human direction. PDT members combined model projections with their knowledge of the forest and forest management to refine each successive scenario until the overall results were deemed satisfactory to all involved.

The PFMS combines human-refined modeled outputs with implementation rules, such as those provided in operational guidance provided throughout the 2021 FMP, updated Operating Ground Rules (OGRs), best management practices and applicable federal and provincial legislation, regulations and policy. Implementation and reporting guidance for the FMP is described in *Chapter 7 – Plan Implementation and Monitoring*, along with all of the model outputs required for implementation.

There are two primary products derived from the PFMS that are required for FMP implementation: the recommended harvest level and the SHS. While the PFMS contains a 200-year harvest sequence for long-term modeling purposes, the SHS identifies harvesting locations for only the first 20 years of the harvest sequence: it begins with the 2021/22 timber year and is divided into two periods representing years 1-10 (timber years 2021/22 to 2030/31) and 11-20 (timber years 2031/32 to 2040/41). SHS stands have been allocated to all disposition holders, (i.e. Spray Lake Sawmills, Canfor, Sundre Forest Products, J.H. Neilson Forest Products, Precision Forest Industries and the CTP program) based on timber rights and operating area negotiations.

This section presents the PFMS in detail, including both strategic and operational targets, and their associated results. The section is organized by indicator, with the action-based indicators presented first, followed by the inventory indicators and the patch targets. The PFMS is represented by scenario 9009. It was generated in the Patchworks modeling environment using the yield curves, landbase, and timber supply assumptions described in this chapter. *Appendix VI TSA – Timber Supply Analysis* contains a summary of scenarios leading up to the PFMS for FMU B12.

## 5.1 Forest Products – Harvest Volume

Harvest volume is a major consideration in the development of the PFMS. This volume provides the supply of logs to forest companies to operate their mills in an efficient and cost-effective manner. The coniferous landbase for FMU B12 was used to determine even flow conifer harvest volumes.

Harvest volumes reported in this chapter were calculated directly from Patchworks outputs. While strict even flow targets were modeled, the PFMS has some small variation in 5-year periods, which is typical of Patchworks and spatial models more generally.

Unused volumes are the under-produced harvest volumes from the previous quadrant. Unused volumes were included in the modelled harvest targets. However, the maximum unused volumes modeled were less that the totals requested as limited to a maximum 25% increase over the even flow levels as per GoA policy. Unused volumes requested were 250,000 $m^3$ coniferous for Spray Lake Sawmills in FMU B12 over five years. Actual unused volumes modeled, as well as the harvest levels from the PFMS are summarized in Table 5-1. This table is a subset of the complete table in Appendix I. These values are recommended for approval as the AAC levels for the 2021 FMP. The SLS volumes are all area based, while all other operators are fixed volume based allocations.

**Table 5-1.** Recommended harvest levels for the PFMS

| Company Name | Disposition ID | FMU | Landbase Management Type | Source | AAC Volume Allocation | | Decade 1 [1] | | Decade 2 [2] Volume ($m^3$) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | % | $m^3$ | Unused Volume ($m^3$) | Decade Volume ($m^3$) [4] | |
| **Conifer Allocations** | | | | | | | | | |
| Spray Lake Sawmills (1980) Ltd | FMA0100038 | B12 | Single Combined | FMA-Only | 83.5 | 346,320 | 250,000 | 3,713,200 | 3,463,200 |
| Spray Lake Sawmills (1980) Ltd.[3] | CTQB120001 | B12 | Single Combined | Non-FMA | 7.9 | 32,580 | - | 325,800 | 325,800 |
| Sundre Forest Products Inc.[5] | CTQB120002 | B12 | Single Combined | All-FMU | 0.8 | 3,500 | - | 35,000 | 35,000 |
| J.H. Neilson Forest Products Ltd.[5] | CTQB120003 | B12 | Single Combined | All-FMU | 0.8 | 3,500 | - | 35,000 | 35,000 |
| Precision Forest Industries Ltd.[5] | CTQB120004 | B12 | Single Combined | All-FMU | 0.8 | 3,500 | - | 35,000 | 35,000 |
| Precision Forest Industries Ltd.[5] | CTQB120005 | B12 | Single Combined | All-FMU | 0.8 | 3,500 | - | 35,000 | 35,000 |
| Canadian Forest Products Ltd.[5] | CTQB120006 | B12 | Single Combined | All-FMU | 3.3 | 13,810 | - | 138,100 | 138,100 |
| Community Timber Program – Old B9 FMU[5] | Permits | B12 | Single Combined | All-FMU | 0.8 | 3,500 | - | 35,000 | 35,000 |
| Community Timber Program – Old B10 FMU[5] | Permits | B12 | Single Combined | All-FMU | 1.2 | 4,790 | - | 47,900 | 47,900 |
| **Total Coniferous** | | | | | | 415,000 | 250,000 | 4,400,000 | 4,150,000 |
| **Deciduous Allocations** | | | | | | | | | |
| Spray Lake Sawmills (1980) Ltd | FMA0100038 | B12 | Single Combined | FMA-Only | 85.1 | 31,678 | 21,786 | 338,566 | 316,780 |
| Spray Lake Sawmills (1980) Ltd[3] | DTAB120001 | B12 | Single Combined | Non-FMA | 13.6 | 5,071 | - | 50,710 | 50,710 |
| Community Timber Program – Old B10 FMU[5] | Permits | B12 | Single Combined | All-FMU | 1.3 | 500 | - | 5,000 | 5,000 |
| **Total Deciduous** | | | | | | 37,249 | 21,786 | 394,276 | 372,490 |

[1] Decade 1 is Quadrant period: May 1, 2021 - April 30, 2026 and Quadrant period: May 1, 2026 - April 30, 2031.
[2] Decade 2 is Quadrant period: May 1, 2031 - April 30, 2036 and Quadrant period: May 1, 2036 - April 30, 2041.
[3] Quota calculated from 20-year SHS from non-fma area.
[4] Total volume, including Unused Volume.
[5] Volume based license.

### 5.1.1 Coniferous Harvest

The conifer harvest volume is even flow, on the total conifer volume. The PFMS includes unused volumes for FMU B12, harvested in the first 5 years (Figure 5-1).

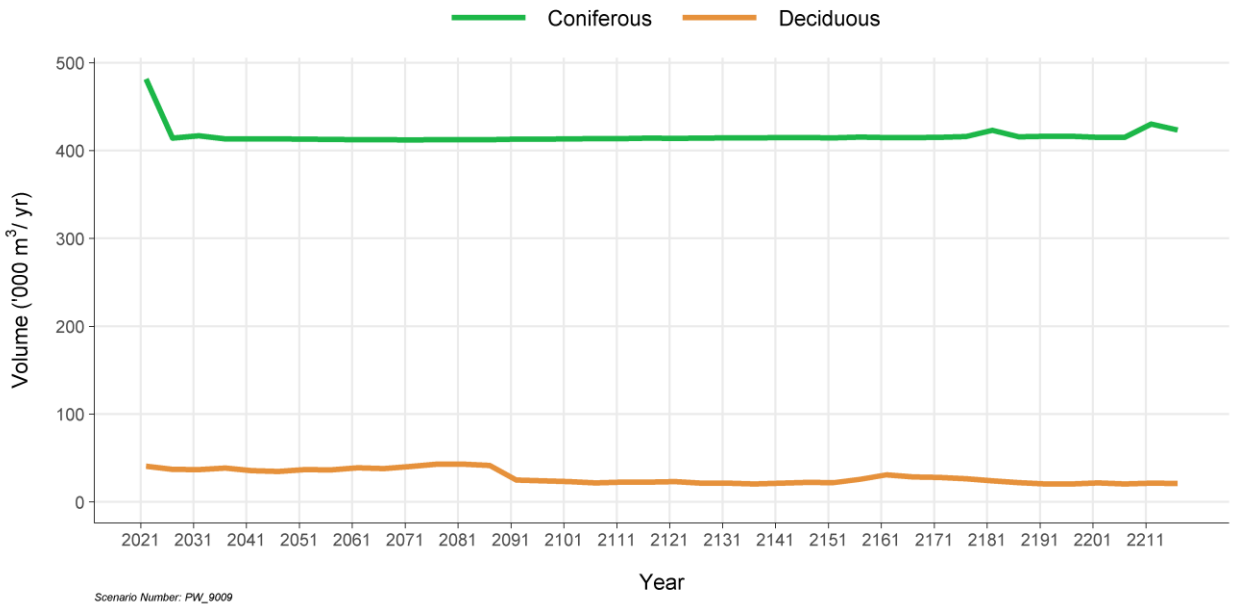


**Figure 5-1.** Annual coniferous harvest volume for FMU B12

### 5.1.2 Deciduous Harvest

The deciduous harvest volumes presented are from the coniferous landbase. The deciduous landbase was not harvested within the model as there are no active deciduous operators in the FMA. A very minor amount of deciduous landbase was scheduled for the deciduous CTP program (65 ha) in the south part of B12 and SLS did have some pre-planned areas in the model, where the boundary of the harvest area has been 'laid-out' on the ground. Spray Lake Sawmills contacted Sundre Forest Products (Sundre), who currently hold a deciduous volume supply agreement for 15,000 $m^3$ but confirmed that Sundre has no interest in implementing it.

As a result, the deciduous harvest level is not constrained, and consists of 'incidental' volume from the coniferous landbase.

## 5.2 Forest Products – Harvest Area

### 5.2.1 Strata

The harvest strata are evenly distributed (Figure 5-2). Natural Pl provides the largest contribution to the harvest area in the first 60 years, while regenerating Pl contributes more of the harvest area following the first 60 years. White spruce stands contribute about 25% to the harvest area throughout the 200-year planning horizon. The harvest area by strata and age class is presented in Table 5-2.

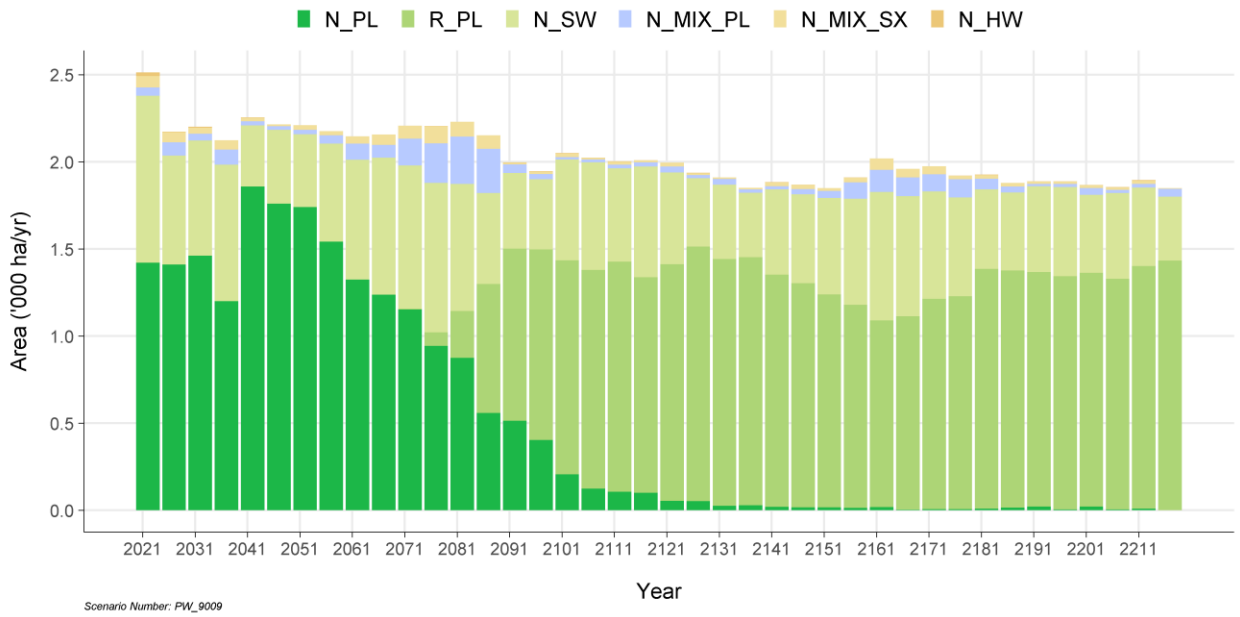


**Figure 5-2.** Area harvested by strata for FMU B12

| Compartment | Decade 1 Harvest Age | | | | | | Decade 2 Harvest Age | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Yield Strata | 80-99 Area (ha) | 100-119 Area (ha) | 120-139 Area (ha) | 140-159 Area (ha) | 160+ Area (ha) | Total Area (ha) | 80-99 Area (ha) | 100-119 Area (ha) | 120-139 Area (ha) | 140-159 Area (ha) | 160+ Area (ha) | Total Area (ha) |
| **Atkinson Creek** | | | | | | | | | | | | |
| N_HW | - | 7 | 6 | - | 1 | 14 | - | - | 1 | - | - | 1 |
| N_MIX_PL | 3 | 7 | 12 | 8 | - | 30 | - | - | 14 | 1 | 7 | 23 |
| N_MIX_SX | 11 | 7 | 30 | 19 | - | 67 | - | 3 | 22 | 41 | 14 | 80 |
| N_PL | 203 | 162 | 425 | 240 | 352 | 1,382 | - | 31 | 192 | 167 | 271 | 661 |
| N_SW | 31 | 64 | 58 | 200 | 302 | 655 | - | 4 | 56 | 106 | 310 | 475 |
| **Atkinson Creek Total** | 249 | 247 | 532 | 467 | 655 | 2,149 | - | 38 | 284 | 316 | 601 | 1,239 |
| **B9 Quota** | | | | | | | | | | | | |
| N_HW | 2 | 11 | - | - | - | 13 | - | - | - | - | - | - |
| N_MIX_PL | 2 | 53 | 34 | - | - | 89 | - | 20 | 57 | 60 | 8 | 145 |
| N_MIX_SX | 16 | 121 | 64 | 17 | - | 217 | - | 2 | 40 | 5 | - | 46 |
| N_PL | 86 | 233 | 531 | 334 | 29 | 1,213 | 42 | 25 | 634 | 957 | 126 | 1,785 |
| N_SW | 15 | 158 | 278 | 347 | 50 | 848 | 1 | 4 | 100 | 318 | 159 | 581 |
| **B9 Quota Total** | 120 | 576 | 908 | 697 | 79 | 2,380 | 44 | 51 | 830 | 1,340 | 293 | 2,557 |
| **Burnt Timber Creek** | | | | | | | | | | | | |
| N_MIX_SX | - | - | 1 | - | - | 1 | - | - | - | - | - | - |
| N_PL | 2 | 82 | 920 | 98 | 271 | 1,373 | - | 119 | 383 | 8 | 321 | 831 |
| N_SW | - | 17 | 208 | 6 | 411 | 643 | - | 65 | 127 | 3 | 839 | 1,033 |
| **Burnt Timber Creek Total** | 2 | 99 | 1,129 | 104 | 683 | 2,017 | - | 184 | 510 | 11 | 1,160 | 1,864 |
| **Coalcamp Creek** | | | | | | | | | | | | |
| N_MIX_PL | - | 104 | 31 | 13 | 5 | 153 | - | 25 | 65 | 106 | 11 | 207 |
| N_MIX_SX | - | 13 | - | - | - | 13 | - | 3 | 11 | 70 | 7 | 92 |
| N_PL | - | 126 | 540 | 95 | 66 | 827 | - | 97 | 214 | 800 | 758 | 1,869 |
| N_SW | - | 14 | 121 | 120 | 30 | 285 | 3 | 3 | 127 | 107 | 172 | 411 |
| **Coalcamp Creek Total** | - | 256 | 692 | 228 | 101 | 1,278 | 3 | 128 | 417 | 1,083 | 948 | 2,579 |
| **Ghost River** | | | | | | | | | | | | |
| N_MIX_PL | - | - | - | - | - | - | - | 31 | 13 | - | - | 44 |
| N_MIX_SX | - | - | - | - | - | - | - | 12 | - | 7 | - | 19 |
| N_PL | - | 6 | - | - | - | 6 | 3 | 61 | 31 | 51 | - | 146 |
| N_SW | - | - | - | - | - | - | - | 17 | 6 | 180 | 59 | 262 |
| **Ghost River Total** | - | 6 | - | - | - | 6 | 3 | 121 | 50 | 237 | 59 | 470 |
| **Grease Creek** | | | | | | | | | | | | |
| N_HW | - | 0 | 32 | - | - | 33 | - | - | - | - | - | - |
| N_MIX_PL | 4 | 104 | 122 | 18 | - | 249 | - | - | 5 | - | - | 5 |
| N_MIX_SX | 38 | 26 | 113 | 18 | 21 | 217 | - | 3 | 13 | - | - | 15 |
| N_PL | 39 | 744 | 2,642 | 185 | 299 | 3,910 | 10 | 289 | 3,075 | 135 | 132 | 3,641 |
| N_SW | 51 | 54 | 825 | 121 | 784 | 1,835 | - | 34 | 412 | 39 | 306 | 791 |
| **Grease Creek Total** | 132 | 929 | 3,735 | 343 | 1,104 | 6,243 | 10 | 325 | 3,505 | 175 | 438 | 4,453 |
| **Highwood River** | | | | | | | | | | | | |
| N_HW | - | - | - | 1 | - | 1 | - | - | - | - | - | - |
| N_MIX_PL | 10 | 10 | 7 | - | - | 27 | - | 12 | - | - | - | 12 |
| N_MIX_SX | - | 6 | - | - | - | 6 | - | - | - | - | - | - |
| N_PL | 1,258 | 170 | 296 | 143 | 130 | 1,997 | 491 | 368 | 4 | 110 | 173 | 1,146 |
| N_SW | 91 | 39 | 65 | 257 | 601 | 1,054 | 46 | 13 | 15 | 48 | 1,332 | 1,455 |
| **Highwood River Total** | 1,359 | 225 | 368 | 400 | 732 | 3,084 | 538 | 394 | 19 | 159 | 1,505 | 2,613 |
| **Jumpingpound Creek** | | | | | | | | | | | | |
| N_MIX_PL | 7 | 31 | 13 | 11 | - | 61 | - | - | 37 | 104 | 14 | 154 |
| N_MIX_SX | 14 | 41 | 31 | - | 2 | 88 | - | 3 | 12 | 16 | 2 | 33 |
| N_PL | 310 | 375 | 1,281 | 155 | 78 | 2,200 | 10 | 184 | 293 | 540 | 57 | 1,083 |
| N_SW | 34 | 220 | 1,079 | 320 | 758 | 2,411 | 2 | 133 | 74 | 174 | 239 | 621 |
| **Jumpingpound Creek Total** | 365 | 667 | 2,404 | 486 | 838 | 4,760 | 12 | 319 | 416 | 834 | 311 | 1,892 |
| **McLean Creek** | | | | | | | | | | | | |
| N_HW | 15 | 30 | 8 | 4 | - | 56 | - | 15 | 9 | 1 | - | 26 |
| N_MIX_PL | 0 | 3 | 3 | 6 | - | 11 | - | 8 | 20 | 5 | - | 33 |
| N_MIX_SX | - | 12 | - | - | - | 12 | 6 | 18 | 26 | 49 | 3 | 103 |
| N_PL | 83 | 329 | 311 | 461 | 5 | 1,189 | 12 | 213 | 679 | 898 | 148 | 1,949 |
| N_SW | 1 | 1 | 7 | 114 | 33 | 157 | 1 | 33 | 214 | 455 | 562 | 1,265 |
| **McLean Creek Total** | 99 | 374 | 329 | 585 | 38 | 1,425 | 19 | 287 | 948 | 1,408 | 713 | 3,376 |
| **Sullivan Creek** | | | | | | | | | | | | |
| N_MIX_PL | - | - | - | - | - | - | - | 2 | 1 | - | - | 3 |
| N_MIX_SX | - | - | - | - | - | - | 40 | - | 11 | - | - | 51 |
| N_PL | 5 | 7 | 29 | 19 | - | 59 | 3 | 75 | 73 | 25 | 20 | 196 |
| N_SW | - | - | 2 | 27 | - | 29 | - | 5 | 47 | 151 | 132 | 335 |
| **Sullivan Creek Total** | 5 | 7 | 31 | 46 | - | 88 | 44 | 82 | 132 | 175 | 152 | 585 |
| **DFA Total** | **2,330** | **3,386** | **10,129** | **3,355** | **4,229** | **23,430** | **673** | **1,928** | **7,110** | **5,738** | **6,180** | **21,628** |

**Table 5-2.** Area harvested in each compartment

### 5.2.2 Harvest Age

The harvest age for FMU B12 follows a pattern of general decrease starting at year 60 (Figure 5-3). The minimum harvest age is 80 years old for all strata, and the average stays above this minimum, indicating that the harvest level allows for active growing stock to grow older than 80 years old.

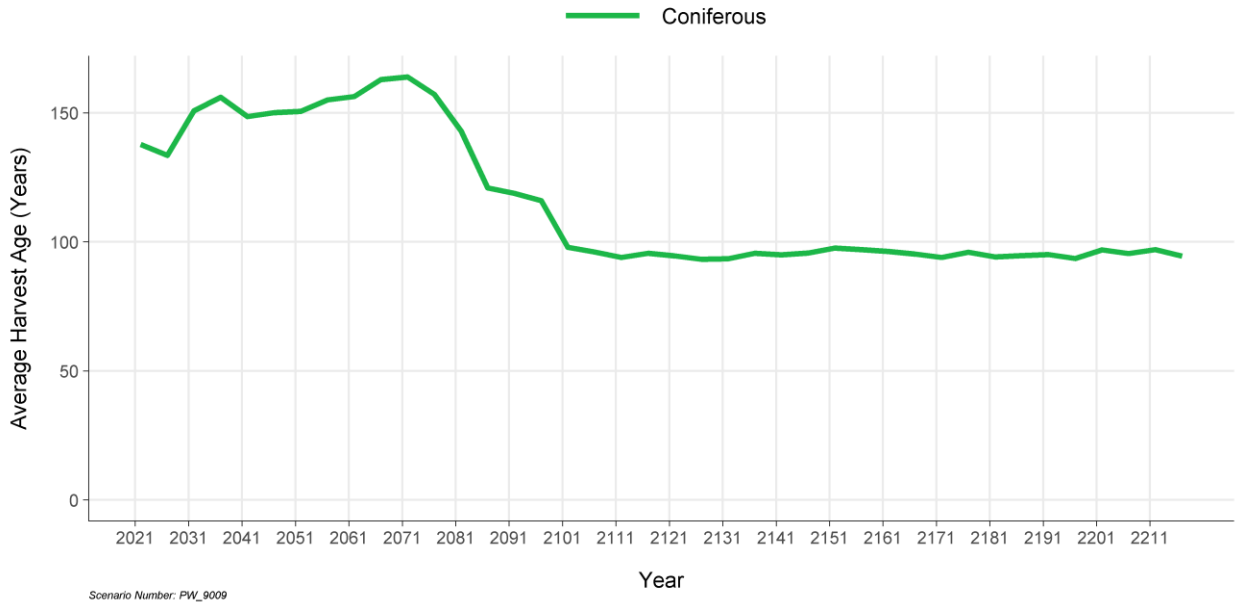


**Figure 5-3.** Harvest ages by strata for FMU B12

### 5.2.3 Piece Size

The coniferous piece size in B12 remains close to 4 trees/$m^3$ over the SHS and increases to between 5 and 6 trees/$m^3$ for the remainder of the planning horizon (Figure 5-4). This piece size is acceptable to SLS operational specifications, keeping in mind that this metric is an average based on yield curves and has been shown to be a very coarse indicator of actual piece sizes.

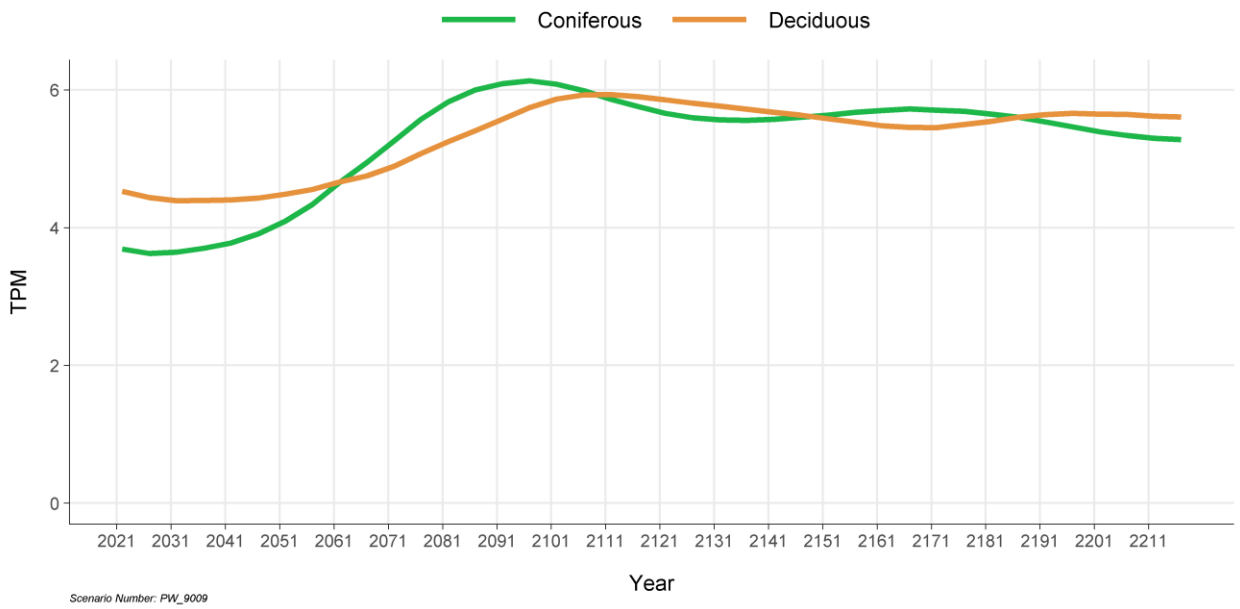


**Figure 5-4.** Coniferous and deciduous piece size for FMU B12

## 5.3 Forest Condition – Growing Stock

Two types of growing stock are reported: active and active operable growing stock. Active growing stock is the total coniferous merchantable volume present on the active landbase at each point in time. The active operable growing stock represents the merchantable volume from only those stands on the active landbase that are above the minimum harvest age in that period, and thus represent the volume that is actually available to be harvested in that period.

In general, the active operable growing stock is lower than the active growing stock. The two are very close initially, indicating that most growing stock is over 80 years old. Over time, the span widens as the forest moves to a more regulated condition (Figure 5-5).

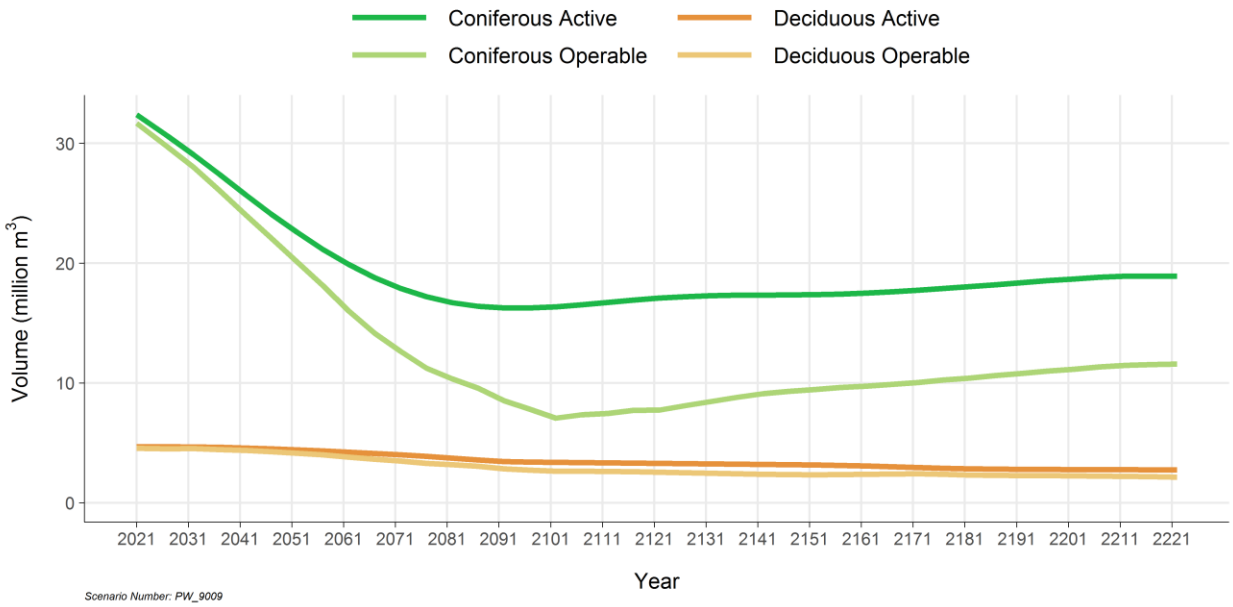


**Figure 5-5.** Active and operable growing stock for FMU B12

The distribution of the active operable growing stock by strata can provide insight into forest dynamics. For the FMU B12 coniferous operable growing stock, all strata follow a similar pattern of fairly stable volumes, with a marked decrease in the first 40 years and slightly increasing past year 80 (Figure 5-6).

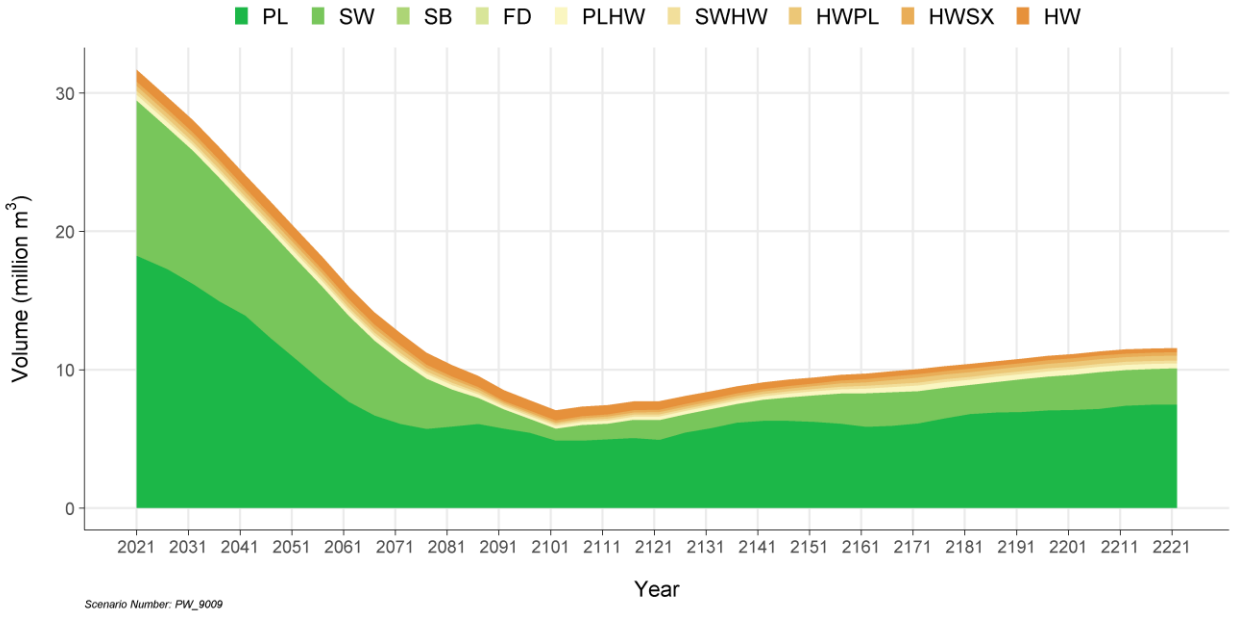


**Figure 5-6.** Operable conifer growing stock by strata for FMU B12

## 5.4 Forest Condition – Area Summaries

Forest condition summaries describe attributes as they are forecasted to exist under the PFMS on the active, passive and gross landbase over the planning horizon. The attributes describe the forest using age, strata and seral stage, in addition to non-timber attributes such as songbird and marten metrics.

### 5.4.1 Strata

The landbase area in each stratum on the gross landbase is stable over time. In FMU B12, there is no conversion or transition between strata, resulting in no change over time (Figure 5-7). The only transition is natural lodgepole pine, converting to RSA lodgepole pine.

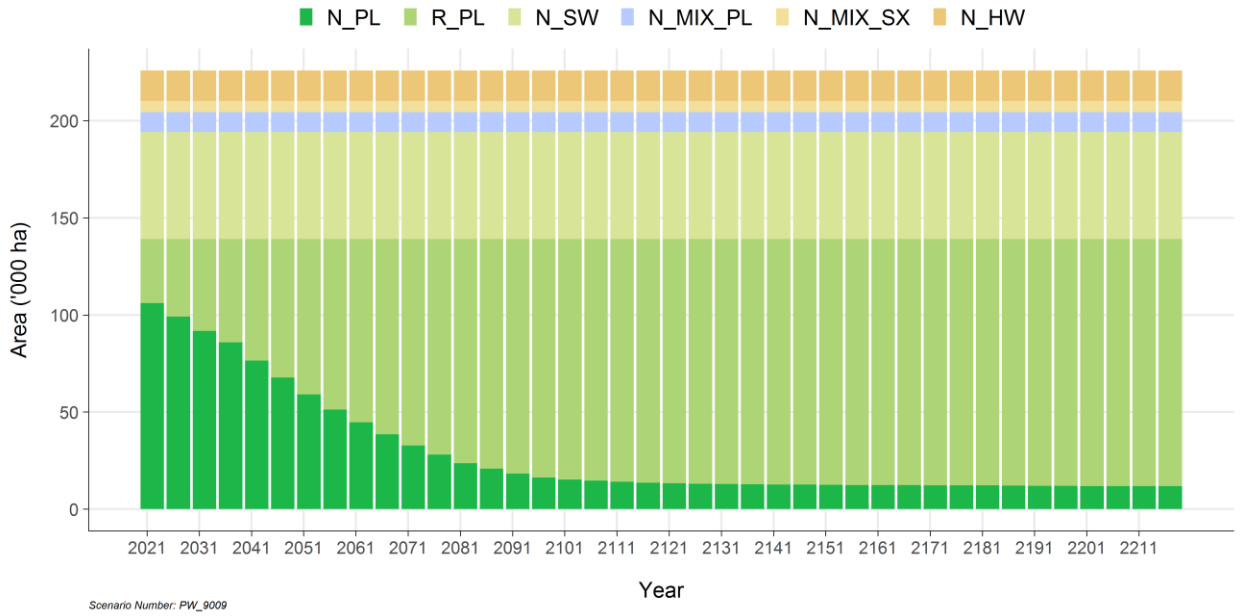


**Figure 5-7.** Strata area on gross landbase for FMU B12

### 5.4.2 Seral Stage

The forecasted seral stage distribution on the active landbase is relatively constant after some initial variation within the first 30 years. The mature and old stages are a significant portion of the area during this time, while the young and immature stages dominate most of the planning horizon (Figure 5-8).

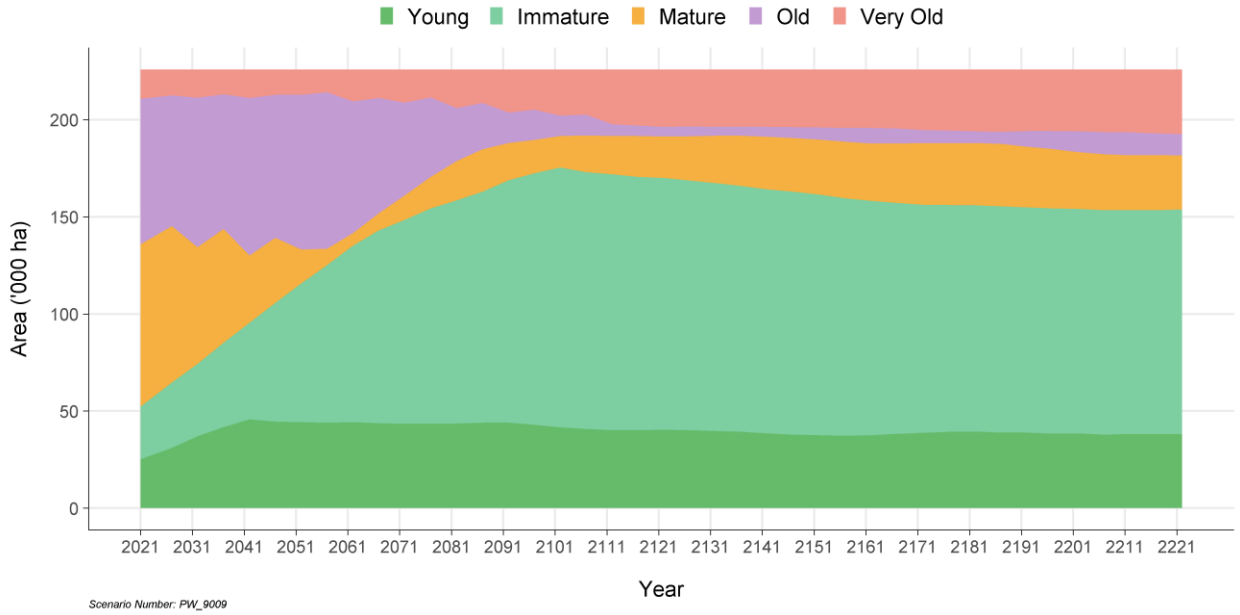


**Figure 5-8.** Active landbase seral stages for FMU B12

Looking only at the percentage of the active landbase that is in the old and very old seral stages, PL strata dominates B12 (Figure 5-9). Coverage does not drop below 20% of the active landbase and is relatively constant by seral stage for the rest of the horizon, increasing slightly as the forest ages. The amount of White spruce in the old and very old is represented by a relatively small amount after about 60 years.

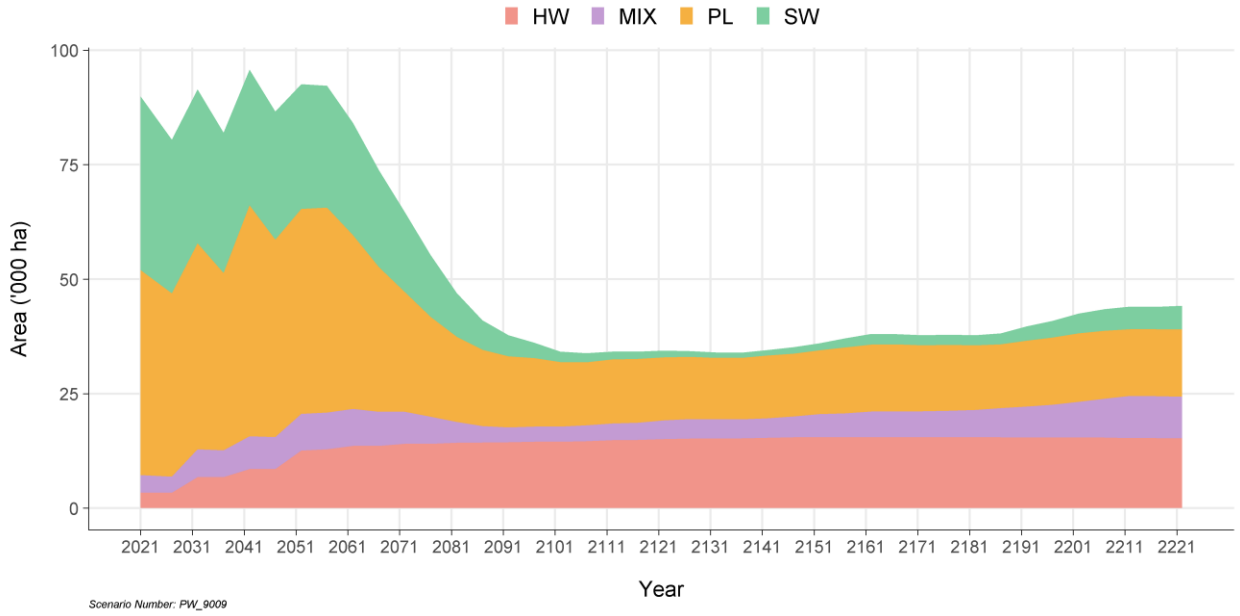


**Figure 5-9.** Area of active landbase in Old and Very Old seral stage by strata for FMU B12

When the "on-par" landbase is used, the white spruce has a more even distribution over the planning horizon. This indicates that much of the white spruce landbase is contained in areas not allowed for harvesting, such as watercourse buffers.

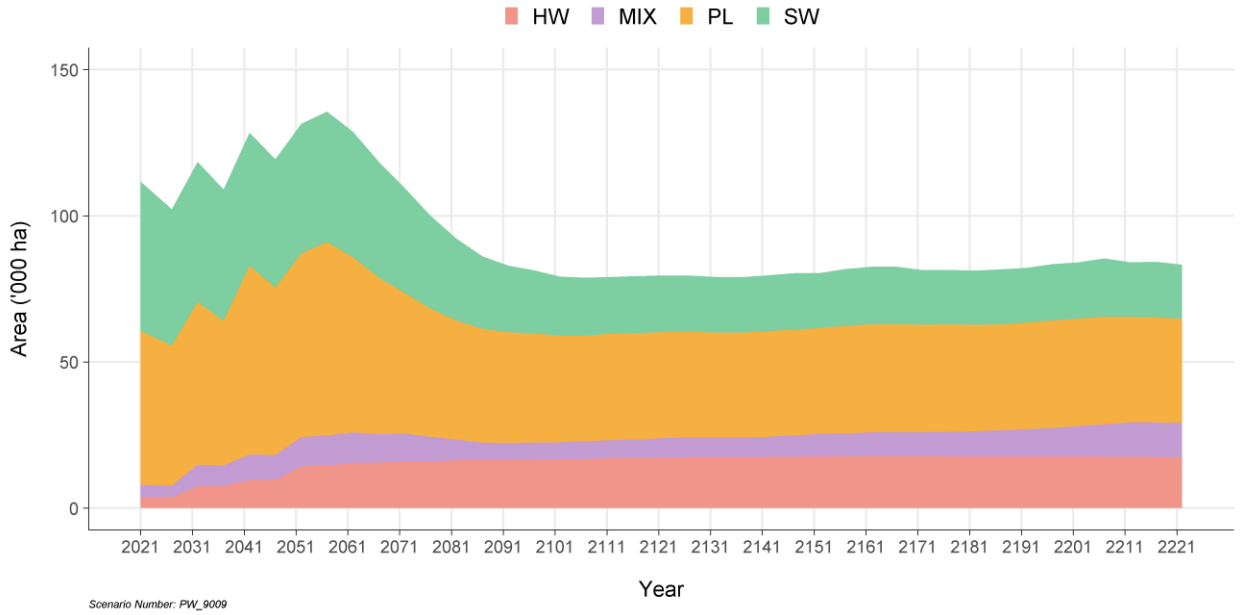


**Figure 5-10.** Area of 'on-par' landbase in Old and Very Old seral stage by strata for FMU B12 (see Section 4.4.2)

## 5.4.3 Wildlife Habitat

This section provides a summary of the outputs for each of the wildlife habitat models. More in-depth reporting on wildlife metrics is found in *Chapter 5 – Values, Objectives, Indicators and Targets*.

### 5.4.3.1 Songbird and Marten

Figure 5-14 through Figure 5-14 illustrate the B12 relative abundance (RA) of the three songbirds and the habitat suitability index (HSI) of marten over the planning horizon. The green shading represents a change of +/- less than 15% from current levels (range of low risk); the yellow indicates a -15 to 30% change (range of moderate risk); and red shows a greater than -30% change (range of high risk). The Brown Creeper (BRCR) and the Ovenbird (OVEN) remain with a relatively constant abundance over the 200-year horizon within the low risk range. The Varied Thrush (VATH) relative abundance and the Marten HIS decrease over the 200-year horizon and are in the medium risk category for much of the planning horizon.

In the 2021 PFMS, the Varied Thrush was the only songbird to drop below the 15% threshold. It has been constrained to maintain no more than a 30% drop from initial conditions in FMU B12. Operational and strategic mitigation strategies will be applied as the Varied Thrush and Marten do not meet the 15% threshold (*Chapter 7 – Plan Implementation and Monitoring* Section 8.2.3 and 8.2.4). No other songbirds were constrained in FMU B12.

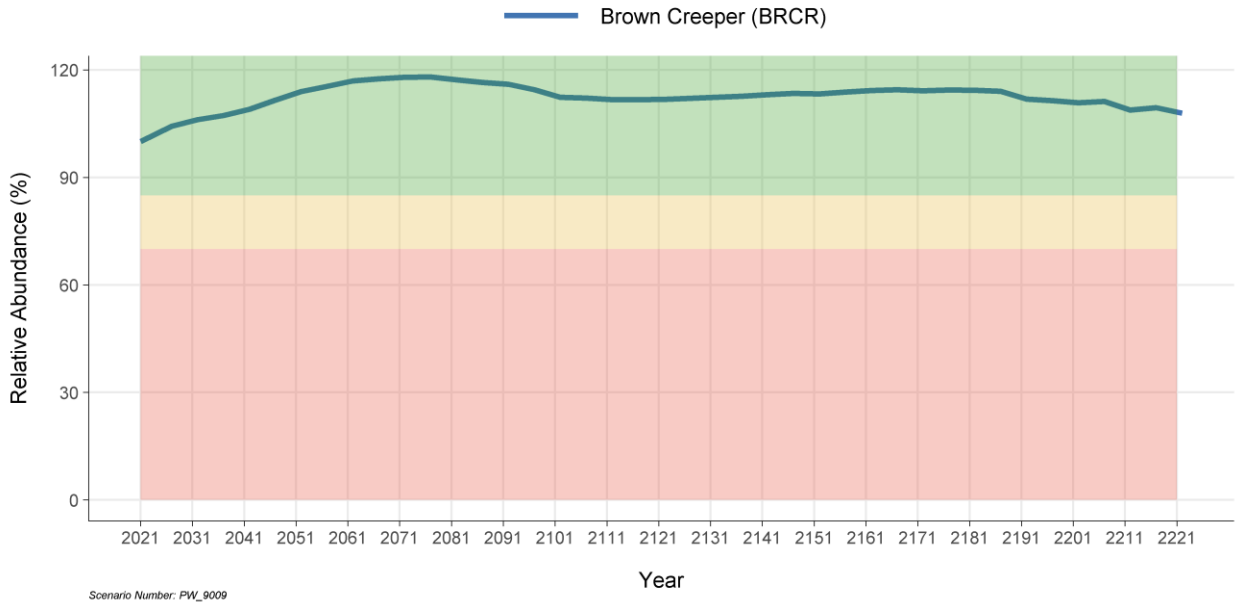


**Figure 5-11.** Brown Creeper relative abundance for FMU B12

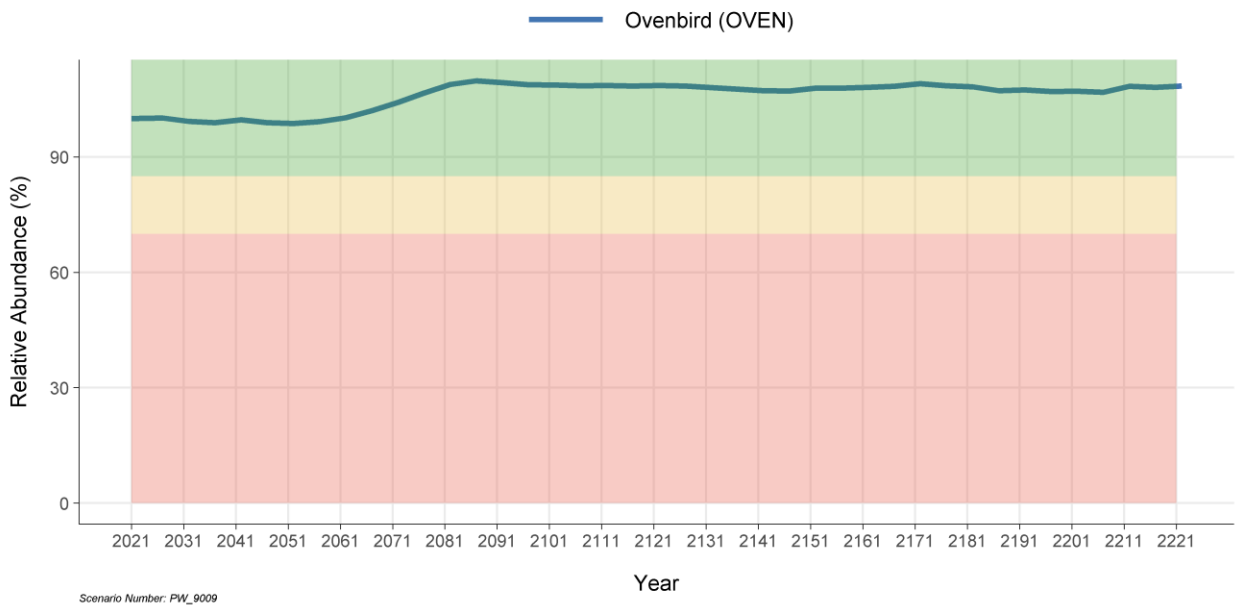


**Figure 5-12.** Ovenbird relative abundance for FMU B12

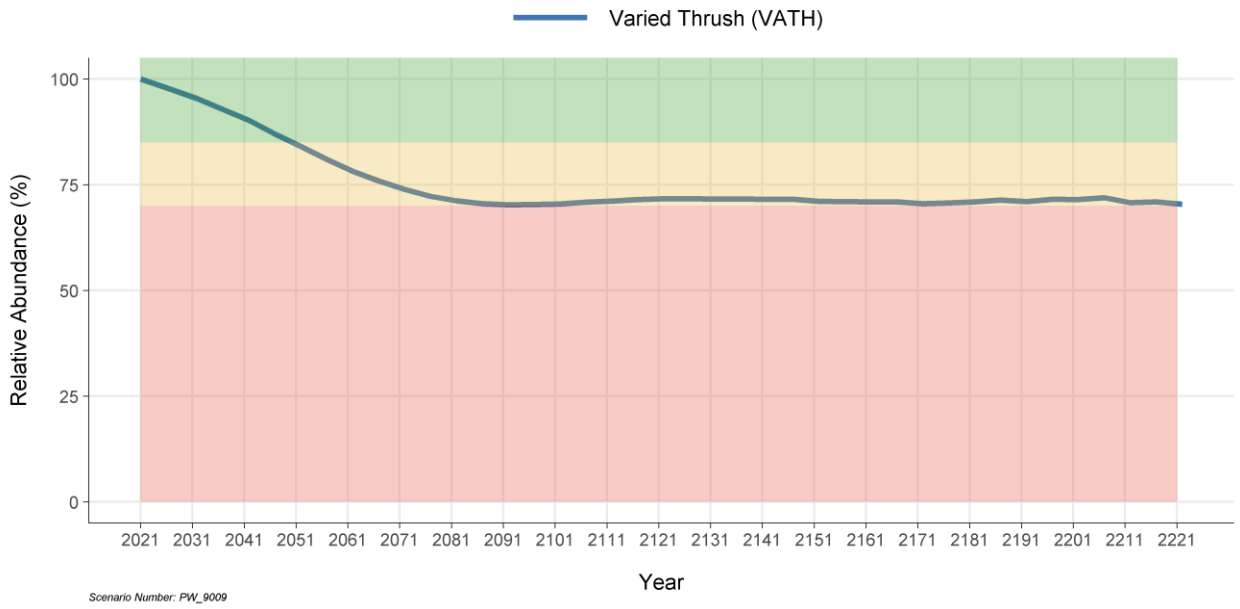


**Figure 5-13.** Varied Thrush relative abundance for FMU B12

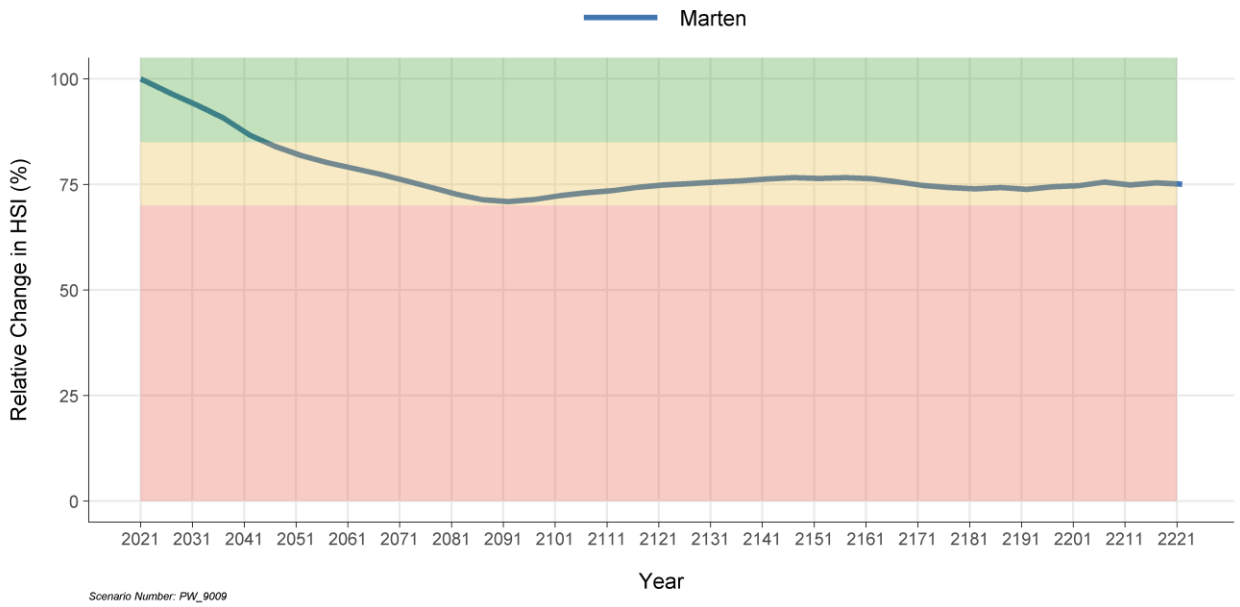


**Figure 5-14.** Marten habitat suitability index for FMU B12

### 5.4.3.2 Barred Owl

Barred Owl results were compiled for the time periods of year 0, 10, 20, 50, 100 and 200. The Barred Owl model was post-processed from Patchworks PFMS outputs. All time periods were run on the gross landbase, which was aged appropriately for each time period processed.

Figure 5-15 and Figure 5-16 display the number of potential breeding pairs and RSF values over the specified time periods. The overall number of breeding pairs and RSF values are fairly stable over time. The overall level of Barred Owl in FMU B12 is small, and changes little as a result of the PFMS, as the majority of the FMU is pure coniferous strata, and currently does not contribute to Barred Owl habitat (*Chapter 7 – Plan Implementation and Monitoring* Section 8.2.2).

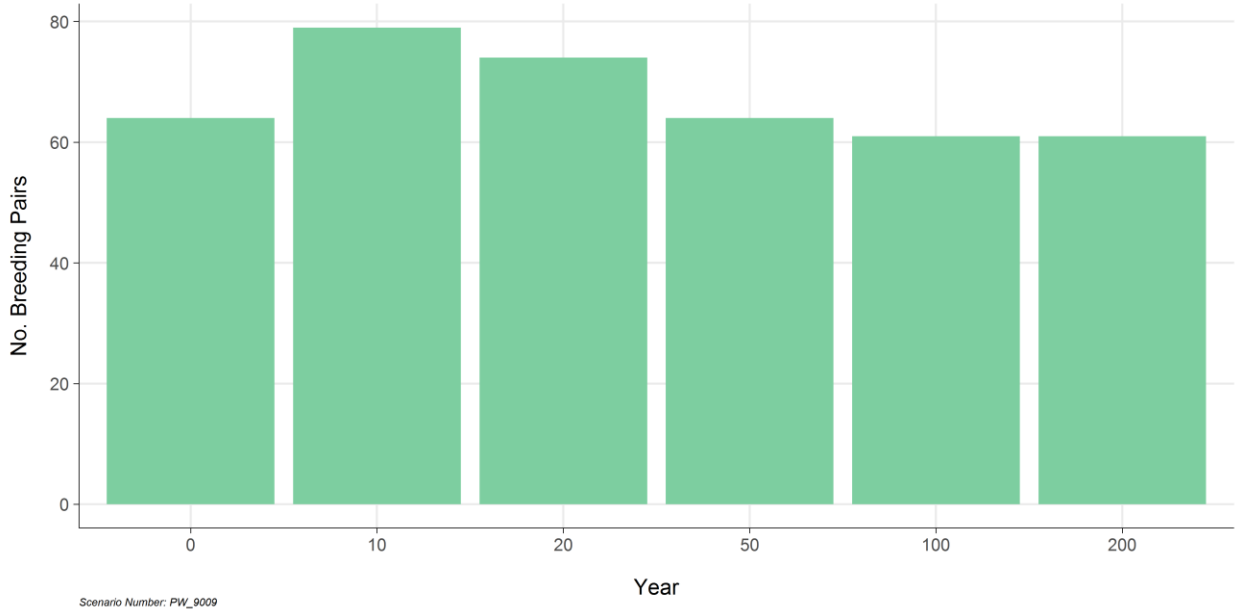

**Figure 5-15.** Trend of Barred Owl potential breeding pair values over time and the percent change relative to time zero

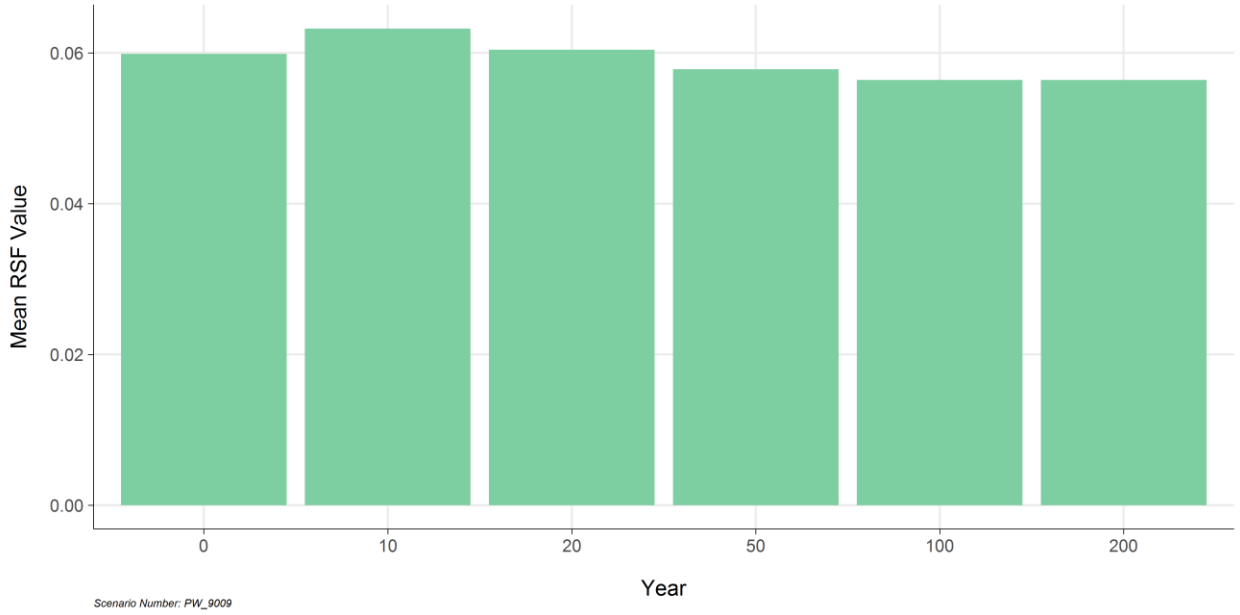


**Figure 5-16.** Trend of Barred Owl RSF values over time and the percentage change relative to time zero

### 5.4.3.3 Grizzly Bear

As directed by the GoA, specific reporting metrics are required for Grizzly Bear modeling (Table 5-3 for Clearwater and Table 5-4 for Livingstone). Grizzly bear metrics were not constrained in the timber supply model, and there are no additional planned permanent forestry roads within the Grizzly Bear management areas during the FMP period.

**Table 5-3.** Grizzly Bear *Habitat States* model summary for the Clearwater management zone

| Habitat Zone | Habitat Type | 2021 | 2031 | | | 2041 | | |
|---|---|---|---|---|---|---|---|---|
| | | Area (ha) | Area (ha) | Difference from Year 0 (ha) | Change from Year 0 (%) | Area (ha) | Difference from Year 0 (ha) | Change from Year 0 (%) |
| Core | Primary | 4,371 | 5,302 | 932 | 21 | 5,930 | 1,560 | 36 |
| | Secondary | 3,903 | 3,612 | -291 | -7 | 2,777 | -1,125 | -29 |
| | Non-Critical | 3,840 | 2,876 | -965 | -25 | 2,031 | -1,810 | -47 |
| | Secondary Sink | 3,992 | 3,805 | -188 | -5 | 3,768 | -225 | -6 |
| | Primary Sink | 11,344 | 11,855 | 511 | 5 | 12,944 | 1,600 | 14 |
| Secondary | Primary | 21,413 | 24,148 | 2,735 | 13 | 26,245 | 4,831 | 23 |
| | Secondary | 16,627 | 15,508 | -1,119 | -7 | 14,376 | -2,251 | -14 |
| | Non-Critical | 27,775 | 23,521 | -4,254 | -15 | 20,780 | -6,995 | -25 |
| | Secondary Sink | 17,732 | 18,048 | 316 | 2 | 18,031 | 299 | 2 |
| | Primary Sink | 39,472 | 41,794 | 2,321 | 6 | 43,586 | 4,114 | 10 |

**Table 5-4.** Grizzly Bear *Habitat States* model summary for the Livingstone management zone

| Habitat Zone | Habitat Type | 2021 | 2031 | | | 2041 | | |
|---|---|---|---|---|---|---|---|---|
| | | Area (ha) | Area (ha) | Difference from Year 0 (ha) | Change from Year 0 (%) | Area (ha) | Difference from Year 0 (ha) | Change from Year 0 (%) |
| Core | Primary | 75,634 | 72,204 | -3,430 | -5 | 69,028 | -6,606 | -9 |
| | Secondary | 17,872 | 16,363 | -1,508 | -8 | 14,979 | -2,892 | -16 |
| | Non-Critical | 24,561 | 30,175 | 5,614 | 23 | 34,958 | 10,397 | 42 |
| | Secondary Sink | 6,889 | 6,500 | -389 | -6 | 6,432 | -457 | -7 |
| | Primary Sink | 18,788 | 18,501 | -287 | -2 | 18,347 | -442 | -2 |

## 5.4.4 ECA

Within B12, approximately 80% has an area weighted ECA value of between 0 and 29 across the planning horizon (Figure 5-17). At some points in the planning horizon, there are some partial watersheds along the eastern edge of the DFA that are marginally in the > 50 category.

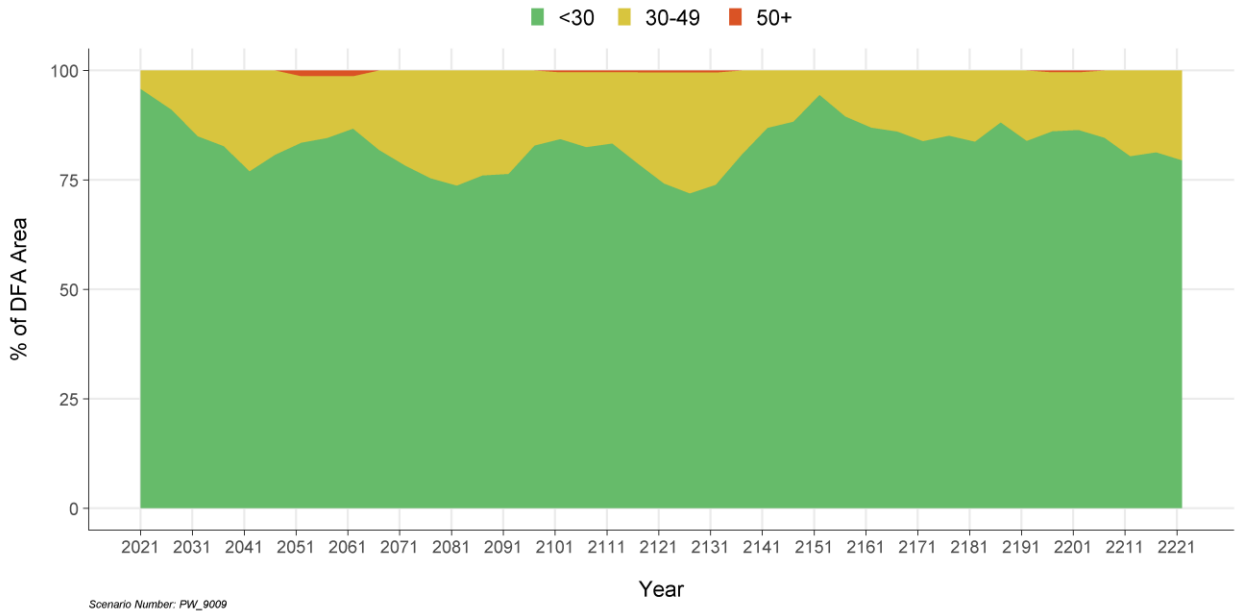


**Figure 5-17.** Area weighted ECA values over 200 years for FMU B12

## 5.4.5 HUC 10

The HUC 10 has almost no area over the 50% threshold over the 200 years, and less area over the 30% threshold than the ECA watersheds (Figure 5-18).

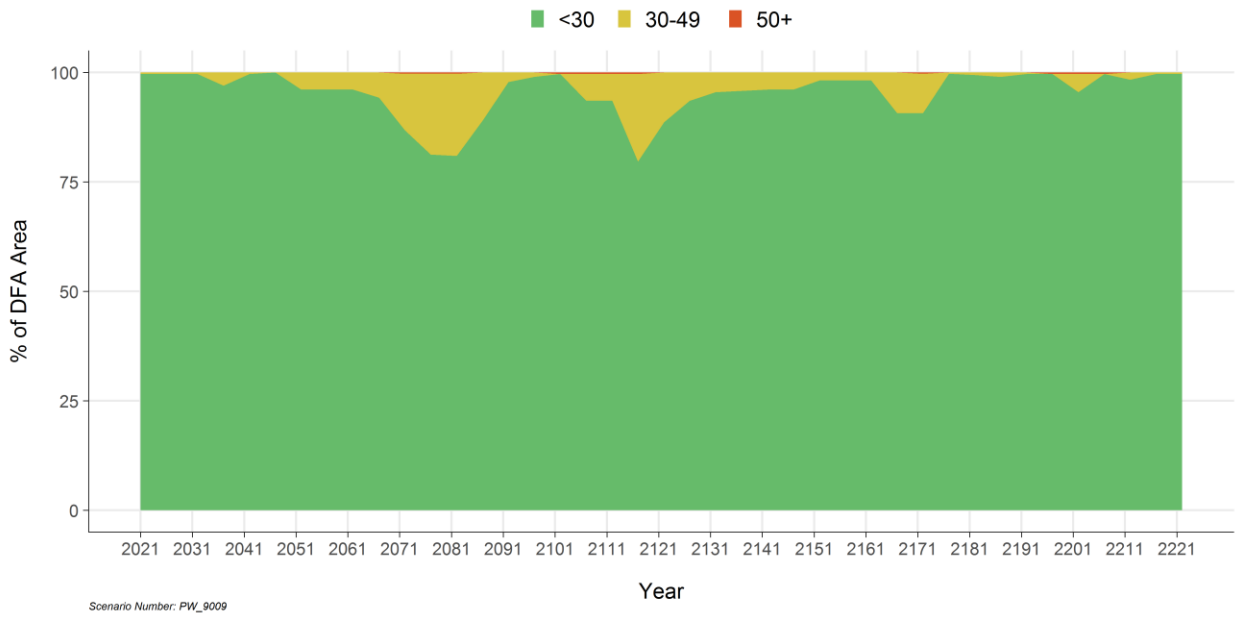


**Figure 5-18.** HUC 10 watershed analysis values over 200 years for FMU B12

## 5.4.6 Interior Old Forest

The interior old forest metric is the area on the gross forested landbase that is greater than 120 years old and is in patches greater than 120 ha in size (Figure 5-19). As this metric is produced as the model is actually running, it is used as a proxy for the actual buffered metric. The area in interior core patches increases in the first 40 years of the planning horizon and then declines back to close to the current amount.

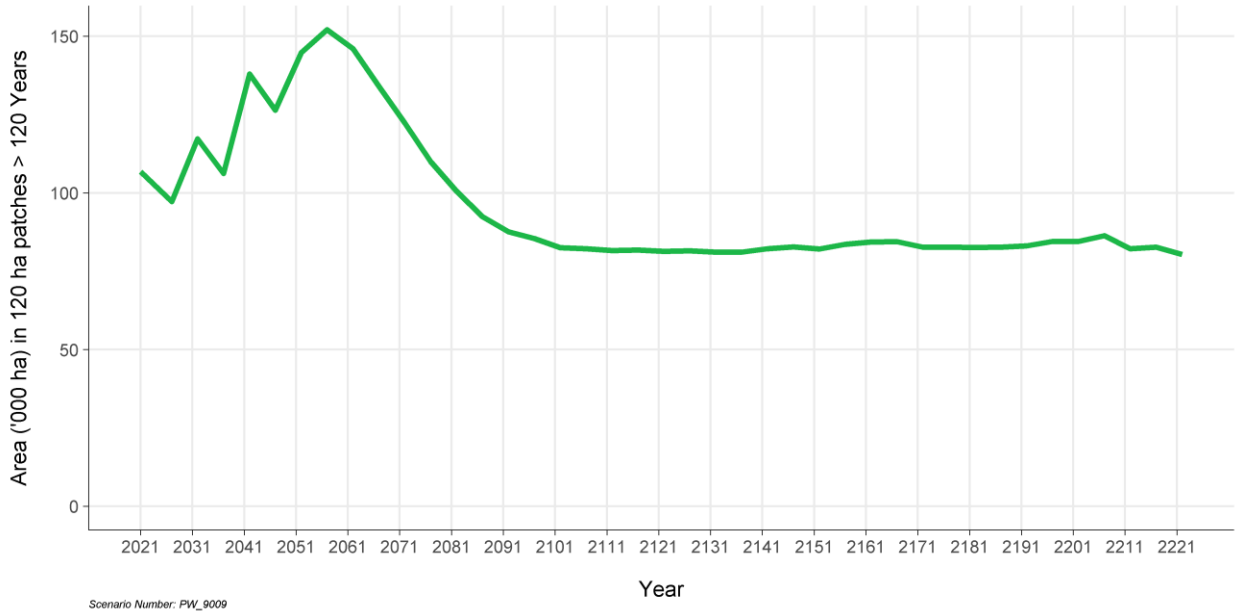


**Figure 5-19.** Interior Old Forest. Area greater than 120 years old in patches greater than 120 ha

## 5.5 Operational Constraints

Two modeling tools were used to improve the operability of the PFMS during and beyond the SHS period. Improved operability beyond the SHS period was undertaken to incorporate the AAC impacts of current operational behavior.

### 5.5.1 Access Control

Access control is used to define hard limits on which stands are available or not available for harvest. The *ACCESS_C5* field was used in the PFMS scenario to control the stand availability in the first 20 years of the model. This final version is the culmination of several refinements to the harvest sequence in previous scenarios leading up to the PFMS. As the SHS was modified by the model and company planners to achieve a variety of operational and non-timber goals, more stands were locked into the sequence. By the final scenario, all blocks in the first 20 years are locked down and pre-determined from previous scenarios. As a result, the final access control only shows that stands are locked into the chosen sequence for the 20-year SHS. The maps provided in *Annex VII – Spatial Harvest Sequence* show the desired spatial pattern.

### 5.5.2 Opening Patch Size

Harvest blocks were controlled to achieve a distribution of sizes. Small harvest blocks less than 5 ha were discouraged, with the majority of harvest blocks targeted for between 10 and 200 ha in size. Polygons within 5 meters of each other could be aggregated into a harvest block. Figure 5-20 represents the distribution of harvest block sizes in FMU B12 for the conifer landbase.

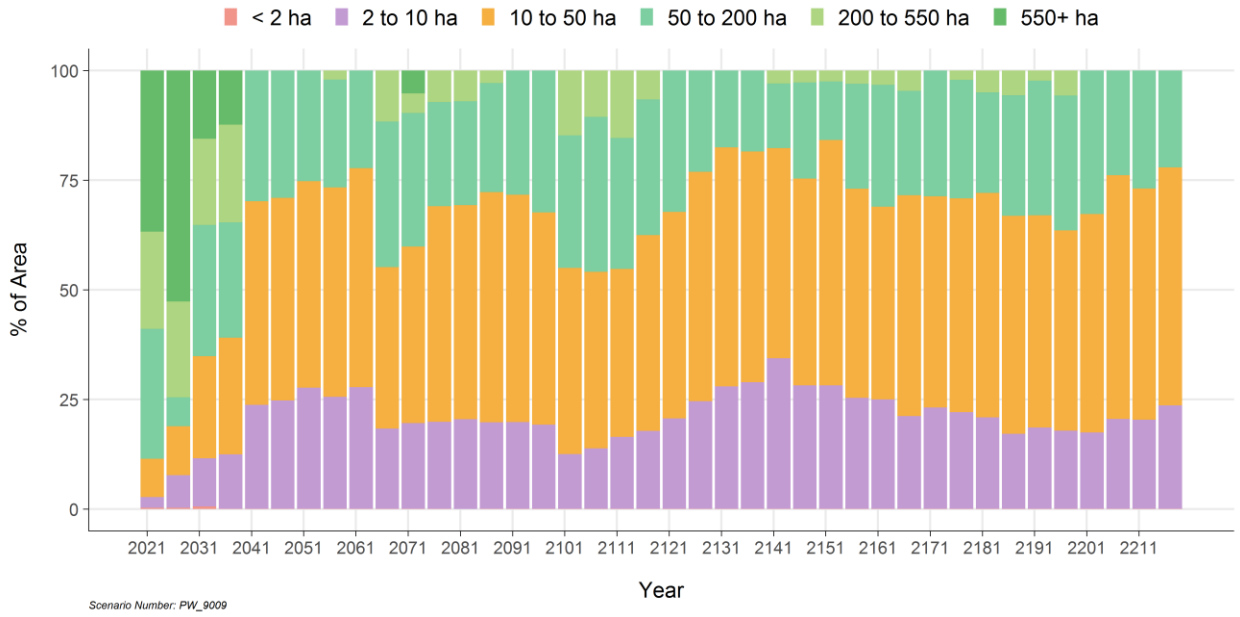


**Figure 5-20.** Conifer harvest block size distribution for FMU B12

# 6. References

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# Appendix I – PFMS AAC Tables

This appendix contains the tables comprising Table 1 of Annex 1 from the Planning Standard required for AAC approval. Draft table values are included and will be revised and completed during FMP review.

**Table 6-1.** Spray Lake Sawmills 2021 FMP Recommended AAC

| Company Name | Disposition ID | FMU | Landbase Management Type | Source | AAC Volume Allocation | | Decade 1 [1] | | Decade 2 [2] Volume ($m^3$) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | % | $m^3$ | Unused Volume ($m^3$) | Decade Volume ($m^3$) [4] | |
| **Conifer Allocations** | | | | | | | | | |
| Spray Lake Sawmills (1980) Ltd | FMA0100038 | B12 | Single Combined | FMA-Only | 83.5 | 346,320 | 250,000 | 3,713,200 | 3,463,200 |
| Spray Lake Sawmills (1980) Ltd.[3] | CTQB120001 | B12 | Single Combined | Non-FMA | 7.9 | 32,580 | - | 325,800 | 325,800 |
| Sundre Forest Products Inc.[5] | CTQB120002 | B12 | Single Combined | All-FMU | 0.8 | 3,500 | - | 35,000 | 35,000 |
| J.H. Neilson Forest Products Ltd.[5] | CTQB120003 | B12 | Single Combined | All-FMU | 0.8 | 3,500 | - | 35,000 | 35,000 |
| Precision Forest Industries Ltd.[5] | CTQB120004 | B12 | Single Combined | All-FMU | 0.8 | 3,500 | - | 35,000 | 35,000 |
| Precision Forest Industries Ltd.[5] | CTQB120005 | B12 | Single Combined | All-FMU | 0.8 | 3,500 | - | 35,000 | 35,000 |
| Canadian Forest Products Ltd.[5] | CTQB120006 | B12 | Single Combined | All-FMU | 3.3 | 13,810 | - | 138,100 | 138,100 |
| Community Timber Program – Old B9 FMU[5] | Permits | B12 | Single Combined | All-FMU | 0.8 | 3,500 | - | 35,000 | 35,000 |
| Community Timber Program – Old B10 FMU[5] | Permits | B12 | Single Combined | All-FMU | 1.2 | 4,790 | - | 47,900 | 47,900 |
| **Total Coniferous** | | | | | | 415,000 | 250,000 | 4,400,000 | 4,150,000 |
| **Deciduous Allocations** | | | | | | | | | |
| Spray Lake Sawmills (1980) Ltd | FMA0100038 | B12 | Single Combined | FMA-Only | 85.1 | 31,678 | 21,786 | 338,566 | 316,780 |
| Spray Lake Sawmills (1980) Ltd[3] | DTAB120001 | B12 | Single Combined | Non-FMA | 13.6 | 5,071 | - | 50,710 | 50,710 |
| Community Timber Program – Old B10 FMU[5] | Permits | B12 | Single Combined | All-FMU | 1.3 | 500 | - | 5,000 | 5,000 |
| **Total Deciduous** | | | | | | 37,249 | 21,786 | 394,276 | 372,490 |

[1] Decade 1 is Quadrant period: May 1, 2021 - April 30, 2026 and Quadrant period: May 1, 2026 - April 30, 2031.
[2] Decade 2 is Quadrant period: May 1, 2031 - April 30, 2036 and Quadrant period: May 1, 2036 - April 30, 2041.
[3] Quota calculated from 20-year SHS from non-fma area. [4] Total volume, including Unused Volume.
[5] Volume based license.

**Table 6-2.** Utilization

| Disposition Number | Utilization to determine harvest level (PFMS) | | | | Operational Utilization | | | | | | Marginal Dues Utilization | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Top Diameter (cm) | Butt Diameter (cm) | Min. Length (m) | Stump Height (cm) | Top Diameter (cm) | Butt Diameter (cm) | Min. Length (m) | Stump Height (cm) | Deciduous AAC ($m^3$) based on operational utilization | Coniferous AAC ($m^3$) based on operational utilization | Top Diameter (cm) | Butt Diameter (cm) | Min. Length (m) | Stump Height (cm) |
| B12 | 11 | 15 | 4.88 | 30 | 11 | 15 | 4.88 | 30 | | 415,000 | | | | |
| B12 | 10 | 15 | 4.88 | 30 | 10 | 15 | 4.88 | 30 | 38,338 | | | | | |

**Table 6-3.** Chargeability

| Disposition Number | Deciduous Species Used in AAC | Coniferous Species Used in AAC | Species Not Chargeable to AAC | Rights to Species Not Chargeable to AAC | Structure Retention (%) | Structure Retention (%) Accounted for in AAC | Net Landbase Variations (net landbase not included in AAC, by covertype or by species) | Net Landbase Variation: Rights to Timber | Industrial Salvage Accounted for in AAC |
|---|---|---|---|---|---|---|---|---|---|
| FMA0100038 | Aw, Pb and Bw | Fb, Pl, Sb, Sw, & Lt | N/A | | 3% | 3% | 0 | 0 | N/A |
| CTQB120001 | | Fb, Pl, Sb, Sw, & Lt | N/A | | 3% | 3% | 0 | 0 | N/A |
| CTQB120002 | | Fb, Pl, Sb, Sw, & Lt | N/A | | 3% | 3% | 0 | 0 | N/A |
| CTQB120003 | | Fb, Pl, Sb, Sw, & Lt | N/A | | 3% | 3% | 0 | 0 | N/A |
| CTQB120004 | | Fb, Pl, Sb, Sw, & Lt | N/A | | 3% | 3% | 0 | 0 | N/A |
| CTQB120005 | | Fb, Pl, Sb, Sw, & Lt | N/A | | 3% | 3% | 0 | 0 | N/A |
| CTQB120006 | | Fb, Pl, Sb, Sw, & Lt | N/A | | 3% | 3% | 0 | 0 | N/A |
| DTAB120001 | Aw, Pb and Bw | | N/A | | 3% | 3% | 0 | 0 | N/A |

**Table 6-4.** Fiber assignment agreements

| Assignment Type (e.g. FMA, DTA, VSA, CTQ) | Directed to (Company Name) | Disposition Number | Species (Coniferous or Deciduous) | Volume ($m^3$) |
|---|---|---|---|---|
| **None at this time** | | | | |

FORCORP - Project Number: P825

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