

FOREST MANAGEMENT LICENSE # 3

2022-2024 OPERATING PLAN

Volume I: Harvest and Renewal Plan



LP CANADA LTD.
SWAN VALLEY FOREST RESOURCES DIVISION

FOREST MANAGEMENT LICENSE # 3

2022 – 2024 two-year OPERATING PLAN

VOLUME 1: HARVEST & RENEWAL PLAN

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1. INTRODUCTION

1.1 TERMS OF REFERENCE

The 2022-2024 two-year Operating Plan (OP) describes forest management activities, such as planning, road building, stream crossings, harvesting, renewal, and research. These activities include Spruce Products Ltd., other softwood and hardwood Quota Holders, and Louisiana-Pacific Canada Ltd. within Forest Management Licence #3 area.

This Operating Plan describes proposed forest management activities that will take place for the two-year period between April 1st, 2022, and April 1st, 2024 (Figure 1-1). A three-year projection of future operations (2024, 2025, and 2026) is also included to provide better understanding of the medium-term locations and strategies involved in the Operating Plan.

The 2022 Operating Plan for Forest Management Licence 3 (FML #3) has been completed, as per paragraph 17 (A) (ii) of the Forest Management License Agreement between the Province of Manitoba and Louisiana-Pacific Canada Limited (LP). The FML #3 Agreement became effective on September 21, 1994. Its purpose was to allocate and to ensure a long-term fiber supply for the operation of the Oriented Strand Board (OSB) mill, which is now a siding mill, located near Minitonas.

The 2022 Operating Plan has been completed within the strategic framework of the 20-Year Forest Management Plan (2020-2039), which was submitted on Dec. 19th, 2019. Both the Forest Management Licence and the Environment Act License (No. 2191E) has been extended until Dec. 31st, 2022, by the Province of Manitoba to allow review of the 20-Year Forest Management Plan.

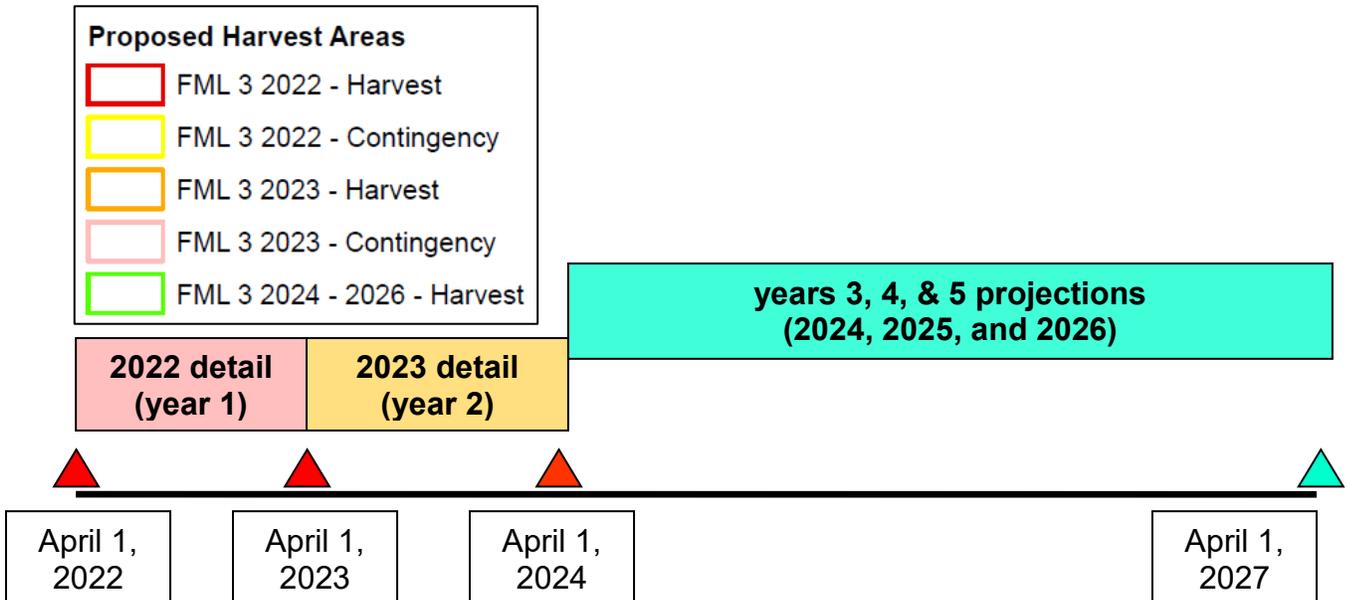
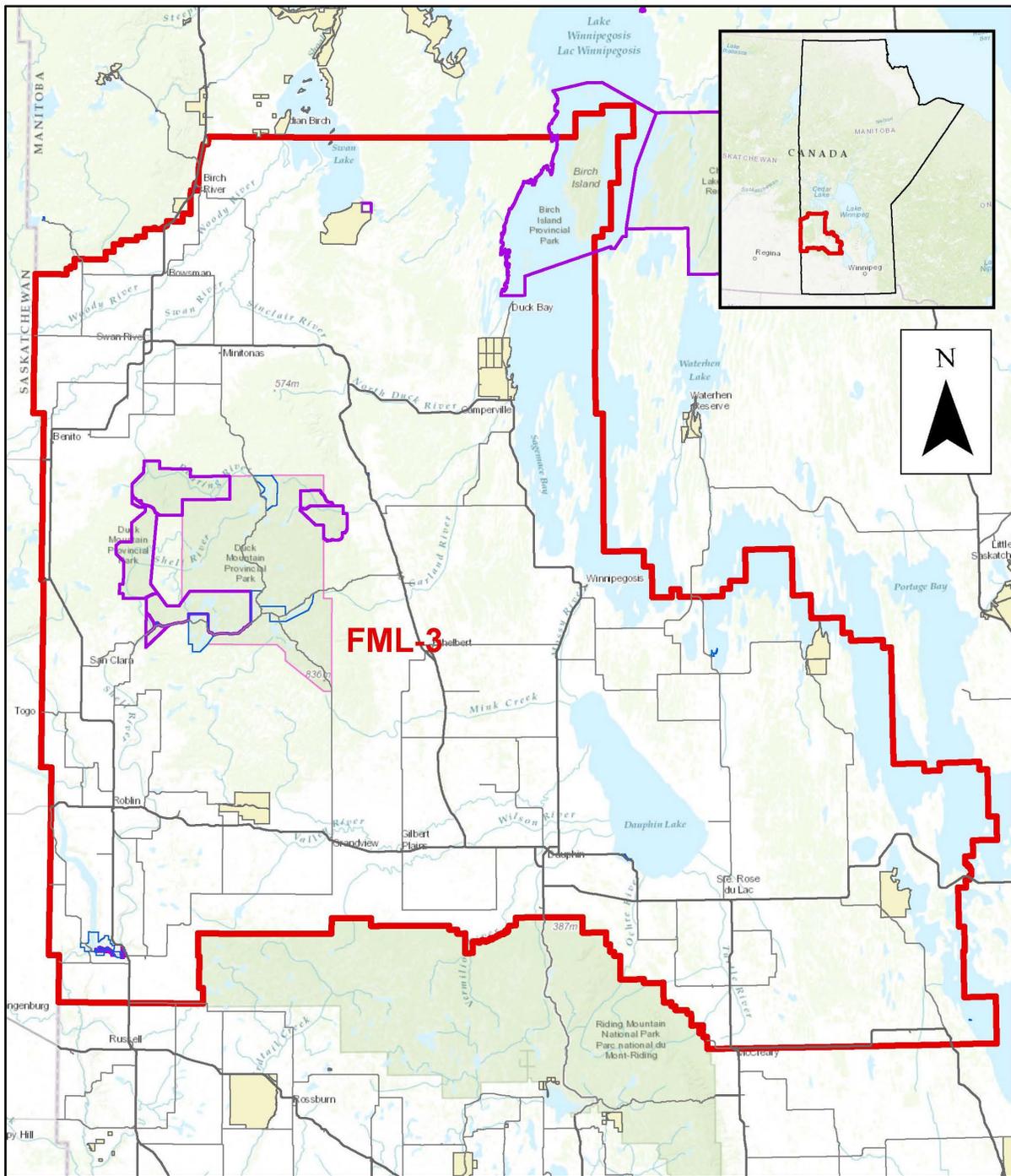


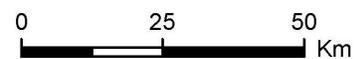
Figure 1-1: Operating Plan timeline.

Forest Management Licence 3, outlined by the thick red line, consists of Forest Management Units (FMUs) 10, 11, and 13 (Figure 1-2).



Legend

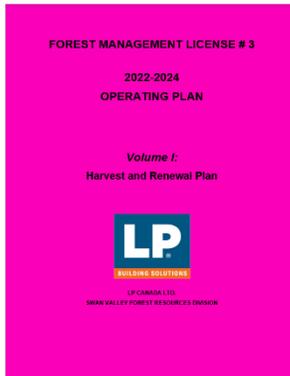
- Provincial Highway
- Provincial Roads
- Aboriginal Lands
- Protected Areas
- Provincial Park
- Recreational Development
- FML3



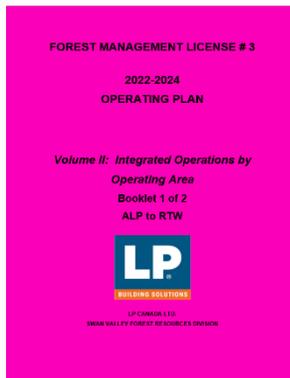
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1.2 OPERATING PLAN FORMAT

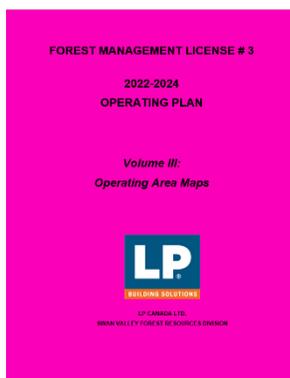
The Operating Plan in FML #3 has three volumes, as described below:



Volume I – Harvest and Renewal Plan (this document) includes landscape-level forest management objectives followed by detailed roads, harvest, and renewal plans for the two-year period 2022-2024. In addition, road, and harvest projections for years three to five (2024, 2025, and 2026) are also included.



Volume II – Integrated Operations by Operating Area (a separate document) includes an overview map, mitigation comments, forest road development and deactivation, watercourse descriptions, water crossing installation and deactivation information, water crossing photos, stream surveys (if any), and proposed harvest and renewal prescriptions for each operating area; and,



Volume III – Operating Area Maps (a separate binder of maps) illustrate proposed roads, crossings, and harvest on 1:30,000 ortho photo maps. In addition, 1:100,000 overview maps show proposed harvest activities and proposed renewal activities in FML #3.

1.3 OPERATING PLAN SUBMISSION, REVIEW AND APPROVAL

The proposed roads, cutblocks, crossings, renewal and survey activities in the Operating Plan are jointly reviewed in a series of mitigation meetings by the Mountain Quota Holder's Association, Louisiana-Pacific Canada Ltd., Mountain Forest Section Renewal Company, and the appropriate branches from the Province of Manitoba before final submission. The Stakeholders Advisory Committee, Indigenous communities, and public are given an opportunity to review and comment on the plan before it is submitted to the Manitoba government.

Many different branches of the provincial government review the Operating Plan. Review comments from Province of Manitoba are due no later than May 30th of each year. Typically, a meeting is held to discuss the plan's review comments. The Province of Manitoba then sends an Operating Plan approval letter to LP, which contains conditions and a request for additional information in an addendum document, if required.

Each Forest Management Unit has a separate operating permit. When LP or Quota Holders submit a work permit application for blocks in a Forest Management Unit the operating permit application is also initiated at this time. LP and Quota Holders receive one operating permit for each FMU they are harvesting in.

The work permit application is submitted with the appropriate information and when approved a number is assigned to the work permit. This process is done by LP for Quota Holders operations in FML #3, as well as LP's operations.

2. FOREST MANAGEMENT PLANNING

This Operating Plan is guided by a strategic plan for future harvest projections. The Operating Plan is also created within the context of relevant strategic plans:

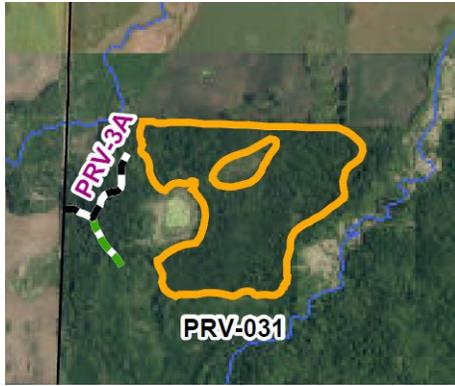
- 1) The Province of Manitoba's long-term forest management plan "**Manitoba's Forest Plan ...Towards Ecosystem Based Management**" (KPMG 1995) which includes the principles of:
 - Ecosystem-Based Management (EBM)
 - maintenance of biodiversity at the forest ecosystem-level
 - understanding the ecosystem to predict limits of sustainability, adopting natural range of variability as a first approximation
 - managing uncertainty through adaptive management

- 2) **FML #3 20-Year Forest Management Plan (2020 - 2039)**, which chose the Moose Emphasis Scenario as the Preferred Management Scenario. The Moose Emphasis scenario has sustainable ecological and economic objectives, and spatially arranges the harvest to benefit moose habitat. Major objectives in this scenario include:
 - Emulate fire by maintaining a balance of young, immature, mature, and old seral stages across the landscape
 - Retaining areas of mature and old forest
 - Maintaining cover groups (H-hardwood, N-hardwood mixedwood, M-softwood mixedwood, and S-softwood) across the landscape over time
 - Reduce forest fragmentation by using fire as a template for patches sizes
 - Reduce the active road network, while still planning for the full sustainable harvest levels as established by the Province of Manitoba
 - Keep all Duck Mountain (FMU 13) watersheds within the 30% maximum disturbance threshold

To implement Sustainable Forest Management, there must be linkages between the 20-year plan (strategic-level) and the Operating Plan (operational-level). Linking the strategic direction of the 20-year plan to the operational implementation of the Operating Plan, ensures that the expected benefits from the strategic objectives will be realized in the Duck Mountain Provincial Forest and surrounding area.

The short-term planning goal is to meet long-term goals at the block level, through an integrated planning process. LP designs harvest areas, prescribes roads, crossings, harvest, renewal and wildlife strategies. Planners lay out cutblocks, which are later Pre-Harvest Surveyed by a field crew. Pre-Harvest Survey data are summarized, and potential block changes are made. The refined roads, crossings, and cutblocks are jointly mitigated by the Province of Manitoba, Mountain Forest Section Renewal Company, and LP. Further review is invited from stakeholders, Indigenous communities, and the public.

2.1 BLOCK LAYOUT



The moose emphasis scenario harvest layout for the 20-year plan was used as guidance for the proposed harvest in this two-year Operating Plan.

These scheduled proposed harvest blocks are a guide to future operations but are not a precise blueprint. The LP planner takes the suggested harvest layout and upgrades it into an operational plan. Some examples of operational modifications to the proposed harvest blocks include:

- incorporating new information (e.g., moose survey results, stakeholder input etc.)
- reducing the amount of road built
- not harvesting small, isolated blocks
- aggregating small adjacent blocks into a bigger block,
- changing a block boundary to follow a natural boundary, and
- leaving additional patches of forest within a proposed cut block.

The planner has a selection of proposed cutblocks to choose from. A sub-set of these cutblocks were chosen to make up three years of proposed harvest to put into the Operating Plan. These blocks will later be operationally refined using aerial imagery, local knowledge, and field visits.

2.2 PRE-HARVEST SURVEYS



Pre-Harvest Surveys (PHS) are completed on all proposed cutblocks, one or more field seasons in advance. The PHS field data is a valuable forest management tool. The provincial Pre-Harvest Survey forest practices guidebook provides recommendations and requirements for collecting PHS data.

The ecological Pre-Harvest Survey information collected by the Mountain Forest Section Renewal Company meets and exceeds the provincial PHS guidelines, including:

- timber measurements (both live trees and snags) such as species, height, diameter, and forest health condition
- soil texture, moisture regime, and humus depth
- vegetation type, overstory, understory, shrubs and moss communities
- ecosite (stand-level vegetation and soil combined)
- heritage resources (if any)
- topography and accessibility
- in-block watercourses (perennial, seasonal, or intermittent)
- wildlife signs, critical habitat features (e.g., mineral licks, nests)
- presence of endangered or rare species
- forest health signs and symptoms

The goal of the Pre-Harvest Survey field work is to evaluate and assess the cutblock prior to harvest, to:

- better plan and prescribe harvest operations and renewal treatments
- collect detailed, site-specific data to address non-timber related management concerns
- obtain site-specific data to create site-specific prescriptions

2.3 PLANNING

To develop a cutblock prescription, a great deal of information and knowledge is needed in many disciplines, such as forest management, operational forestry, silviculture, ecology, and fish and wildlife. To evaluate the Pre-Harvest Survey data and develop a Pre-Harvest Cutblock Prescription, various staff review the block prescriptions and available information regarding each proposed area for each cut block, and the associated roads, water crossings and renewal activities.

Following the review of Pre-Harvest Survey data and maps, a detailed site-specific plan is developed – a Pre-Harvest Cutblock Prescription which includes details such as:

- Season of Harvest (e.g., assign winter, dry-frozen, or all-season to blocks)
- Harvest and Silvicultural System (e.g., Variable Retention, selection, salvage, seed tree, shelterwood, or softwood understory protection)
- Wildlife and Fisheries Objectives (e.g., Leave trees/structure, marten debris piles, buffers, corridors)
- Renewal detail (e.g., natural regeneration or planting; seedling density)
- Monitoring (e.g., Timing of regeneration surveys)

Riparian buffers are an important part of each proposed cutblocks' prescription, many of which have multiple riparian buffers. The provincial Forestry Management Guidelines for Riparian Management Areas (2008) provides guidance on making decisions about forest which is adjacent to riparian areas, while providing flexibility to accommodate site-specific conditions.

2.4 MITIGATION

Provincial government district staff met with LP staff and Spruce Products Ltd., who is the largest Quota Holder. Proposed road locations, access management, proposed cutblock boundaries and buffers, renewal prescriptions, and water crossings were reviewed and modified.

The provincial Integrated Resource Management Team has persons from different branches of the provincial government to provide a variety of perspectives and resource values. These include:

- Forestry Branch
- Wildlife and Fisheries Branch
- Regional Water Operations
- Parks and Natural Areas

Cutblock-level mitigation requirements and mitigation solutions are recorded on each Pre-Harvest Cutblock Prescription form. Mitigation requests and solutions are recorded during each mitigation meeting and reviewed by LP and the Province of Manitoba for confirmation of content and accuracy. General mitigation comments arising included access issues, buffer widths, forest health, elk habitat, and forest renewal. The complete mitigation comments and the action/response to each comment are displayed by operating area within Volume II.

2.5 STAKEHOLDERS INPUT



The Stakeholders Advisory Committee (SAC) continues to be a valuable and integral part of LP's planning process. SAC meetings are held to provide the SAC with an opportunity to review our proposals, have input into the Operating Plan, inform SAC members of current forest management activities and challenges, as well as answering specific questions and concerns from SAC members.

The following organizations (in alphabetical order) are invited to all SAC meetings:

- Duck Mountain Trapper's Association
- Ducks Unlimited Canada (DUC)
- Inter Mountain Watershed District (IMWD)
- Intermountain Snowmobile Association
- Manitoba Agriculture and Resource Development
- Manitoba Naturalists Society (MNS)
- Manitoba Trapper's Association (MTA)
- Midwest Manitoba Lodge and Outfitters (MMLO)
- Mixedwood Forest Society
- Mountain Quota Holder's Association
- Swan Lake Watershed District (SLWD)

- Swan Valley Outdoors Association Inc.
- Swan Valley Snowmobile and ATV
- Swan Valley Sport Fishing Enhancement Inc.
- Swan Valley Regional Secondary School (SVRSS)
- Wellman Lake – Glad Lake Cottage Owner’s Association

The January 2022 stakeholder meeting used Zoom for an on-line meeting, instead of in-person meeting. It focused on the Operating Plan (OP) details. Later, February 2022 public Zoom open houses were completed. There was lots of general interest and a high level of comfort of the proposed two-year Operating Plan, but the stakeholders and the public had no specific suggested changes to the draft Operating Plan.

2.6 CROWN-INDIGENOUS CONSULTATIONS

The Province of Manitoba conducts consultations with Indigenous communities within FML #3 and surrounding area. Proposed forest management activities which may affect Indigenous communities, Metis, and northern communities are part of the Province of Manitoba’s consultation process.

Indigenous communities provide LP with input on both current operations and upcoming plans throughout the year. LP sends informational letters and a map to communities which have expressed interest in being informed of harvest activities. The letters/maps are generally sent whenever harvest is going to occur. This is at least twice a year which includes summer and winter harvest activities.

LP holds open houses once a year in four communities within FML #3 for the public to be informed of LP’s upcoming forest management plans. The First Nation communities are informed of these meetings and are encouraged to attend. Their preference however has been to invite LP to their communities. When invited, LP will present forest management plans to the community leaders (chief, mayor, council) and any band or community members who attend. Concerns, suggestions, and questions from First Nations are documented, and may result in further planning refinements.

First Nations help identify and protect spiritually, historically, or culturally significant sites. If this data is shared with LP it is stored in a GIS layer which is considered confidential and not shared with the public. Many First Nations persons prefer not to reveal where these sites are located. They prefer to protect that knowledge and keep it within their band’s collective knowledge. LP Swan Valley respects this preference, and to protect those sites, maps of proposed forest management activities are shown to First Nations who ‘screen’ the proposed activities by identifying areas which have no conflicts with important sites, but also warn us if any proposed activities may impact important sites.

2.7 PUBLIC INPUT

Public input on the draft Operating Plan was actively solicited by LP during the first full week of February 2022. The draft plan at this stage has been mitigated with the provincial government. The public and the Stakeholder's Advisory Committee also review the proposed plans. Public concerns or comments solicited at the open house meetings can be incorporated into the plan as appropriate, which may result in changes to block boundaries and changes to roads and trail access. There is enough time to make any changes to the plan before the final submission.

2.7.1 Public Open Houses

Two open houses via Zoom on-line were held to solicit input on the draft Operating Plan. In addition to the public open houses, the public could send comments or concerns by e-mail or by phone. LP staff were available to discuss the proposed plans with interested citizens. Concerns and other relevant information were recorded and taken into consideration when finalizing the Operating Plan.

2.7.2 Public Comments and OP Changes

Comments obtained during the Zoom open houses include:

- Concern over the hybrid polar trees planted 50 years ago being harvested (they are not being harvested)
- Questions about logging in the park. LP is not logging in the Duck Mountain Provincial Park, but Quota Holders are logging in the park. They have Quotas that were issued in the 1950's, and the park was changed in 1997.
- Clearcutting (which is not done) vs. Variable Retention (which is done)
- Planting vs. Natural Regeneration
- Questions on 20-Year Forest Management Plan approval by the Manitoba government
- Where will LP log after the Duck Mountains is logged? LP will stay in the Duck Mountains, since there will always be hardwood available, due to sustainability.

2.8 NATURAL FOREST DISTURBANCES

Fires, insects, diseases, and wind throw are natural disturbances that affect the forest. The negative effects of these natural disturbances are minimized by implementing cooperative and pro-active approaches to planning. The sections below describe how forest health is maintained in FML #3.

2.8.1 Fire Protection Plan



As per paragraph 23 of LP's Forest Management License Agreement (1994), the Province of Manitoba is responsible for all forest protection services including protection from fire, insect, and disease within FML #3.

The Mountain Forest Section has many values to a wide variety of stakeholders. The Quota Holders and Louisiana-Pacific cooperate fully with the Province of Manitoba in the prevention, detection, and suppression of forest fires within the Mountain Forest Section. The Fire Protection/Suppression

Plan includes detail regarding equipment, manpower and transportation facilities available for the prevention, detection, and suppression of forest fires in FML #3, as well as Forest Management Units 12 and 14.

2.8.2 Insects and Disease



Insects and diseases are a natural part of forest ecosystems. Insects especially contribute to the food chain and are eaten by birds, bats *etc.* Insects also pollinate many flowering plants.

However, it is important to know when population levels change from normal or endemic levels to localized extremes, or epidemic levels. Harvest and renewal planning must be aware of the presence and severity of insects and disease to properly manage the forest and ensure adequate regeneration. Failure to account for insects and

disease may have serious impacts on the future forest.

The best opportunity to identify any localized forest health problems is during field work, such as a Pre-Harvest Survey, plantation assessment, or forest renewal assessments. The Province of Manitoba's requirements are followed by:

- training field staff to identify significant insects and diseases with help from Province of Manitoba
- tallying trees with health problems at each plot
- rating each pest by tree species and severity level when traveling between plots
- sending forest health data to the Province of Manitoba for a 'coarse filter' screening

Previous year's field work found infestations of Spruce budworm, *Armillaria* root rot, Western gall rust, forest tent caterpillar, hypoxylon canker and poplar borer.



A significant spruce budworm outbreak continues to spread and kill white spruce trees in the Arm Lake, Valley River, and Silver Creek operating areas. The Province of Manitoba, Quota Holders, and LP have mutually agreed to increase harvest in the budworm outbreak area to capture spruce volume before it dies and becomes a salvage logging operation. This is also an attempt to reduce and control the budworm epidemic.

The Forest Management License (FML) Agreement 3 between the Province of Manitoba and Louisiana-Pacific Canada Ltd. (LP) states that:

23 B ii) "Similarly, an annual [insect and disease] plan shall also be submitted on Feb. 1st each year, outlining any activities the Company proposes for the protection and/or management of any known insect or disease problem on FML #3."

Instead of submitting an independent insect and disease plan on February 1st of each year, insect and disease site-specific strategies are integrated into harvest blocks within Volume II of the Operating Plan.

2.9 WATERSHED DRAINAGE BASIN ANALYSIS

LP's Environment Act Licence 2191E states in Section 17 (ii) that:

The Licencee shall: "limit the area in a watershed which is in a harvested and not sufficiently regenerated state, as determined by subsection 17(i) of this Licence"

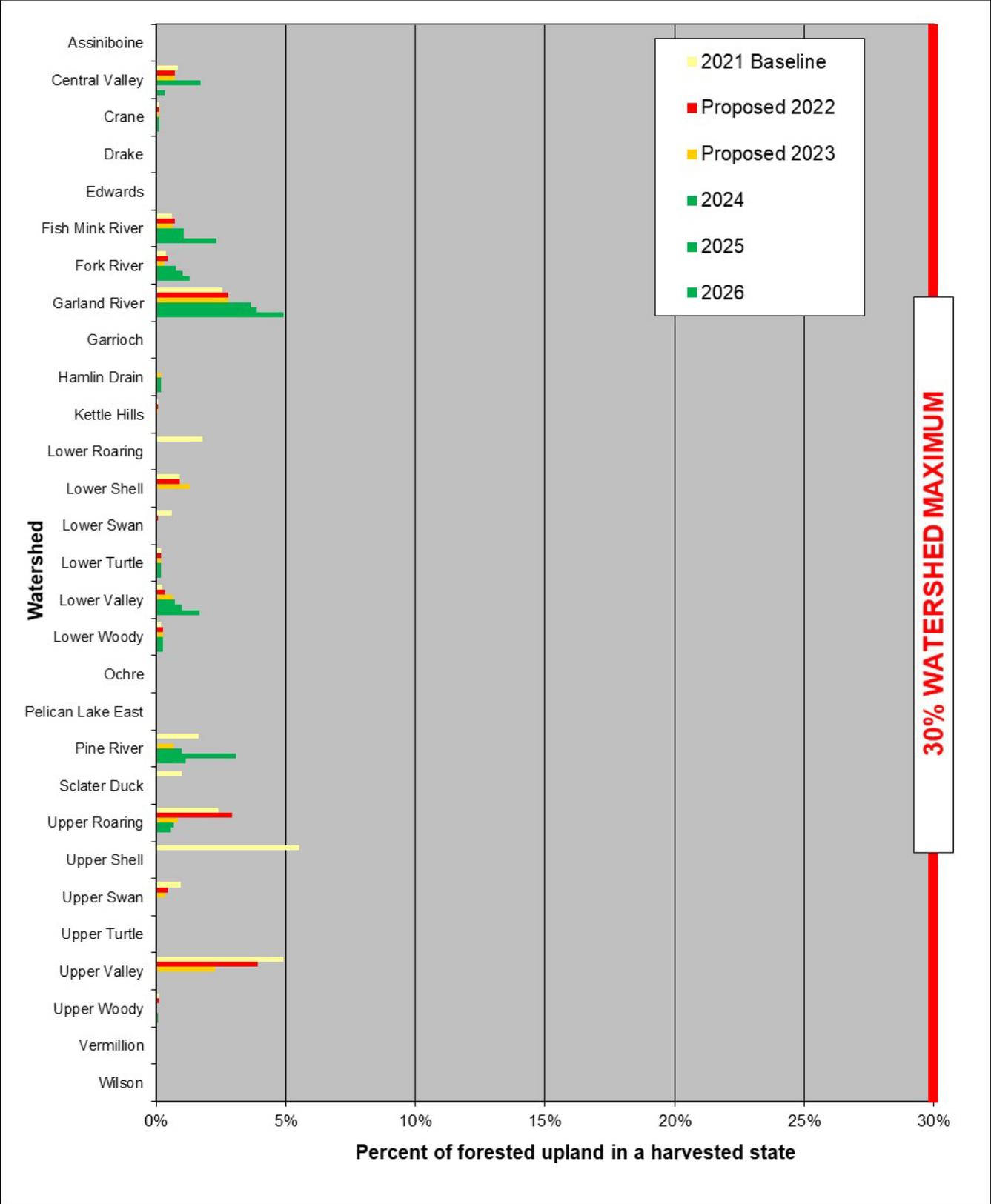
Section 17 (i) of the Environment Act License asked LP to consult with the Department of Fisheries and Oceans (DFO) Canada and others to determine what percent of a forested watershed may be harvested without affecting stream flow. LP and DFO have mutually agreed that this maximum is 30%.

Therefore, a watershed analysis of existing and proposed harvesting operations is completed with each Operating Plan. This analysis tracks the percentage of a watershed within a harvested state, assuming all the proposed harvest blocks are cut. The definition of a harvested state is:

- hardwood and hardwood mixedwoods are in a harvested state from age zero to age five years old
- softwood mixedwoods and softwood blocks are in a harvested state from age zero to age 10 years old

After this period (5 to 10 years), cut blocks are considered 'forested' and no longer in a 'harvested state', since the trees are tall enough to shade the snow on the ground. Shade moderates the spring snow melt and moderates the subsequent meltwater runoff.

The current area that is in a harvested state, is depicted by a yellow bar for each watershed (Figure 2-1). The harvest proposed in this plan by LP and all Quota Holders is shown for each of five years. The percent of productive forest proposed to be in a harvested state, if the full Annual Allowable Cut was harvested for all five years, is significantly less than the existing 30% maximum in all watersheds.



3. ACCESS MANAGEMENT

Access management refers to all aspects of forest access, including the planning, upgrading, construction, management, and decommissioning of road networks and their associated water crossing structures. Access management also involves controlling vehicular traffic, both temporary and permanent. Temporary access management during harvest operations includes the use of gates or temporarily blocking the road with equipment. Permanent access closures include earth berms, slash, debris, and removing water crossings.

This section of the Operating Plan includes details on water crossing installation, erosion control and decommissioning activities for all proposed water crossings within each operating area. In most cases, existing access is returned to previous use. Newly created access is closed after use.

The provincial Forestry Road Management Guidelines (2012) provide general guidelines for planning roads, road construction, and especially management of access during and after forestry operations. The goal of access management is to manage access created for forestry, while addressing the sustainability of other resource and social values. Ungulates, especially moose, are affected by unmanaged road access. Therefore, special attention is given to managing access to minimize effects on moose populations.

It is very important to not decommission a road before all forest operations, such as tree planting, are complete. If necessary, temporary road closures such as an earth berm or slash can be placed at the front of the road after harvest is complete, prior to tree planting.

3.1 ROADS

3.1.1 Road Season of Use

LP uses the following Season of Use definitions for roads.



All-Season Roads – a road for all-weather use, even if it rains. These roads may include ditching and graveling. There are very few all-season forestry roads in existence.



Dry/Frozen Roads – clay base road that is relatively common. These roads can be used in the summer and fall if it is dry. After a rainfall, the road is impassable, and traffic ceases until the road dries out. Sections of dry/frozen roads may need ditching and graveling.



Frozen Roads – winter only roads typically cross wet areas that cannot support vehicular traffic in an unfrozen condition.



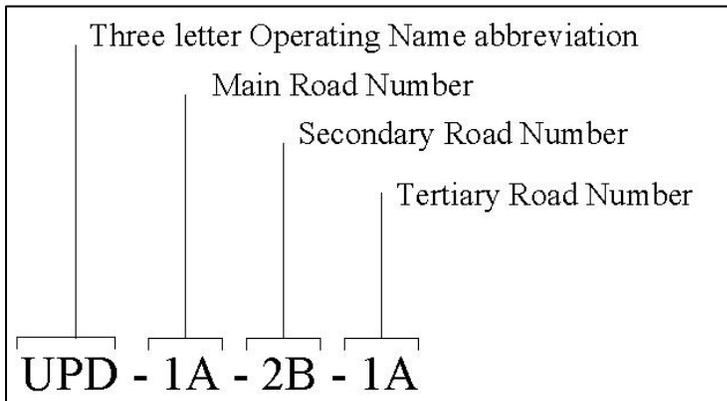
In-block Roads – small, temporary roads within the cutblock boundary. In-blocks roads are used to haul wood out of the cutblock. This picture is an example of a low-impact in-block road.

3.1.2 Road Right of Ways



The development of road Right of Ways (ROWs) is an important component of road construction. During summer harvesting, road ROWs are built wider (typically 20 m) to dry the roads quicker by maximizing air movement and sunlight. During winter operations, right of ways can be narrower (typically 15 m).

3.1.3 Road Network Naming Convention



To plan and manage the existing and proposed road networks, LP uses the following road naming convention. It is organized by operating areas, main, secondary, and tertiary road segments.

3.1.4 Road Construction



Road construction can have a significant effect on any landscape. For that reason, we will continue to utilize existing trails and roads where possible for accessing operating areas and cutblocks. This Operating Plan uses existing access most of the time, with a small portion of new road construction (Table 3-1).

Table 3-1: 2022 and 2023 road utilization and proposed road construction by FMU and season of use.

FMU	Season of Use	Existing Roads (km)	Proposed Roads (km)	Total (km)
10	All Season			0.0
	Dry/Frozen	2.4	1.6	4.0
	Frozen			0.0
11	All Season			0.0
	Dry/Frozen	14.6	13.0	27.6
	Frozen	3.9	3.1	7.0
13	All Season	31.5		31.5
	Dry/Frozen	192.1	61.7	253.8
	Frozen	89.1	47.9	137.0
TOTAL		333.6	127.3	460.9
FML #3 %		72%	28%	100%

3.1.5 Contingency Roads

Contingency roads typically access contingency cutblocks. Contingency roads also provide an alternate route, such as an uninvestigated road suggested through the mitigation process with the Province of Manitoba’s Integrated Resource Management Team. There are often conditions such as weather or beaver activity that may necessitate an alternative contingency access.

3.1.6 Erosion Control on Roads



Erosion control measures are implemented on roads wherever there is a potential risk for soil erosion. LP and the Quota Holders strive to prevent soil erosion through a variety of techniques such as:

- construction of cross-drains or water diversions
- stabilizing exposed mineral soil surfaces
- seeding road right of ways
- distribution of slash and debris on closed roads

3.1.7 Visual Barriers



Visual barriers are designed in the road planning phase, to minimize line-of-sight from the road. Visual barriers are often requested during the mitigation meetings with the local IRMT. Visual barriers have many forms, such as:

- in-block roads planned to utilize topography and terrain as a barrier
- in-block roads have curves intentionally added to provide a visual barrier
- clumps of wildlife trees are left immediately adjacent to the road, especially on corners
- small buffers along roads utilizing the existing immature trees and shrubs often found growing there

3.1.8 Road Closures



Prompt closure of roads is especially important to reducing vehicular access, in order to protect moose populations. Existing roads or trails that were used as forestry roads are returned to their previous level of use (e.g., ATV access) following harvesting and silviculture operations, when existing access is utilized on:

- designated routes
- old resource roads
- old logging trails
- quad trails
- trapper's trails

Newly developed areas and roads will continue to be closed or deactivated. This will be accomplished through a variety of road closure techniques. LP's preferred method of closure that has worked well to date is the distribution of non-merchantable slash and logging debris along forest roads. Aspen stumps, tops, and slash can be effective for both in-block road closures and for closing spur roads outside the cutblocks. In addition, road access will be further limited through the removal of water crossings or through the construction of earth berms.

In cases where follow-up silviculture activities are prescribed, a temporary closure will be constructed until the site preparation equipment and/or planting contractors have completed their work. These areas will be promptly closed following the completion of silvicultural activities.

3.2 WATER CROSSINGS



Water crossings are needed as part of access management. Both permanent and ephemeral streams are common in FML #3. The sensitive nature of aquatic and riparian environments is recognized and acknowledged. Crossings are planned to maintain natural surface run-off and stream flow patterns. Furthermore, crossings are designed to minimize disturbance to fish-bearing or potentially fish-bearing habitats.

Wetlands such as swamps and fens are also common features on the landscape. Forest roads must cross some wetlands by necessity, but significant steps are taken to protect the wetlands by maintaining hydrologic flow. The major wetland class (*i.e.*, bog, fen, swamp, marsh, or shallow open water) needs to be identified with the Boreal Wetland Class field guide (Ducks Unlimited Canada 2015). Once the wetland class is identified, appropriate crossing options can be applied based on the wetlands flow characteristics, described in the Operational Guide - Forest Road Wetland Crossings (Ducks Unlimited Canada 2014).

LP and the Quota Holders are committed to implementing best management practices for water crossings and ensuring compliance with Federal and Provincial laws, regulations, and guidelines to avoid or minimize environmental effects.

3.2.1 Proposed Water Crossing Installation Activities

In this 2022-2024 Operating Plan, culverts are the most common proposed crossing type (Figure 3-1). Round culverts are commonly installed on undefined channels that act as temporary catchments during heavy precipitation events such as the spring flush or rain events. Snow and ice crossings are typically used to cross wet meadows, sheltered marshes or swales in winter. Portable bridges are most often used to cross seasonal and permanent streams that are known to support fish.



Figure 3-1: Examples of crossings - round culvert, snow and ice, portable steel bridge, and the percentages of each proposed crossing type.

During a water crossing installation, erosion and sediment control techniques are applied to prevent any soil material from entering the watercourse. Erosion control techniques include silt fence establishment and operation of a water pump to divert the water around the construction site to a downstream location. Rip rap and vegetative techniques are also commonly applied to crossing locations to help stabilize soil material over the lifespan of the water crossing. All active water crossings are monitored in the spring and fall to ensure the water crossing are following all company standards and Federal and Provincial laws, regulations, and guidelines.

3.2.2 Water Crossing Erosion Control and Decommissioning

Once harvesting is completed and forest roads are to be deactivated, water crossings are removed, and the area is rehabilitated. Road fill material is sloped back from the stream banks and re-contoured back to a near-natural slope condition. Typically, the slope is 'track walked' perpendicular to the length of the slope which creates surface roughening and helps reduce the potential for rilling along the length of the slope. The exposed mineral surface area is then seeded and often covered with erosion control matting (Figure 3-2) which helps protect the seeded area from wind and rain and helps to maintain moisture for seed germination. Further protection is provided by silt fence which filters out silt from run-off water.



Figure 3-2: Examples of water crossing erosion control methods.

4. HARVESTING PLAN

4.1 HARVEST DESIGN

The design of harvest cutblocks is one of the most critical components of forest management. The cutblock design must incorporate and balance site-specific concerns such as wildlife habitat and ecological features and fit into the larger picture of sustainable forest management and conservation of biodiversity. Current research is suggesting that to achieve all these goals, harvest plans must emulate natural disturbances. The boreal forest's primary natural disturbance comes from fire. Forest fires create landscape mosaics of large and small openings with irregular boundaries and leave burned and unburned trees standing. Elements of natural disturbance patterns have been incorporated into harvest block designs.

A landscape containing small, medium, and large openings conserves biodiversity and can maximize the benefits to a variety of wildlife, birds, and insects. Harvest areas are designed to have a variety of sizes. Figure 4-1 illustrates the distribution of harvest block sizes. This two-year Operating Plan proposes 144 harvest cutblocks (excluding contingency blocks). The average proposed cutover size is 46.4 ha, and has a size range from 2 to 203 ha.

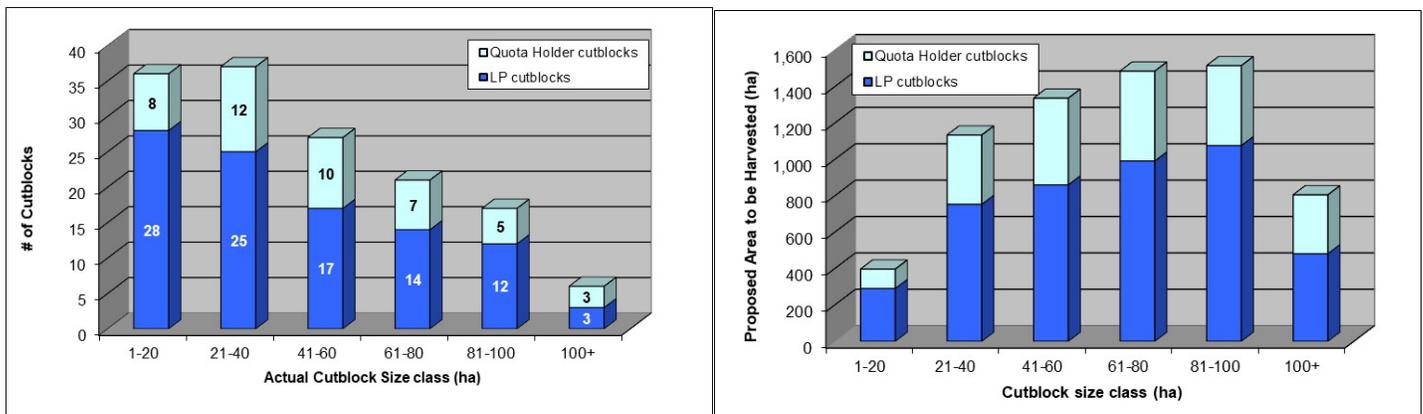


Figure 4-1: Distribution of proposed cut block sizes by number (left); and distribution by area (right).

4.1.1 Harvest and Contingency Blocks

2022 harvest blocks are shown on the overview map as red polygons, and 2023 harvest blocks are shown as orange polygons (Figure 4-2). These proposed blocks are where Quota Holder and LP will likely harvest in the upcoming year, assuming the full Sustainable Harvest Level volume is harvested. In the two-year timeframe of this Operating Plan, 2022 and 2023 blocks, planned or contingency, may be harvested in either year, provided that the Sustainable Harvest Level is not exceeded.

Contingency blocks are shown as yellow polygons for 2022, or pink polygons for the year 2023. Unforeseen circumstances such as wet weather, high fire hazards shutting down operations, mill shutdowns, market changes, or contractor performance can still arise. Therefore, the option exists to harvest contingency blocks, should the need arise.

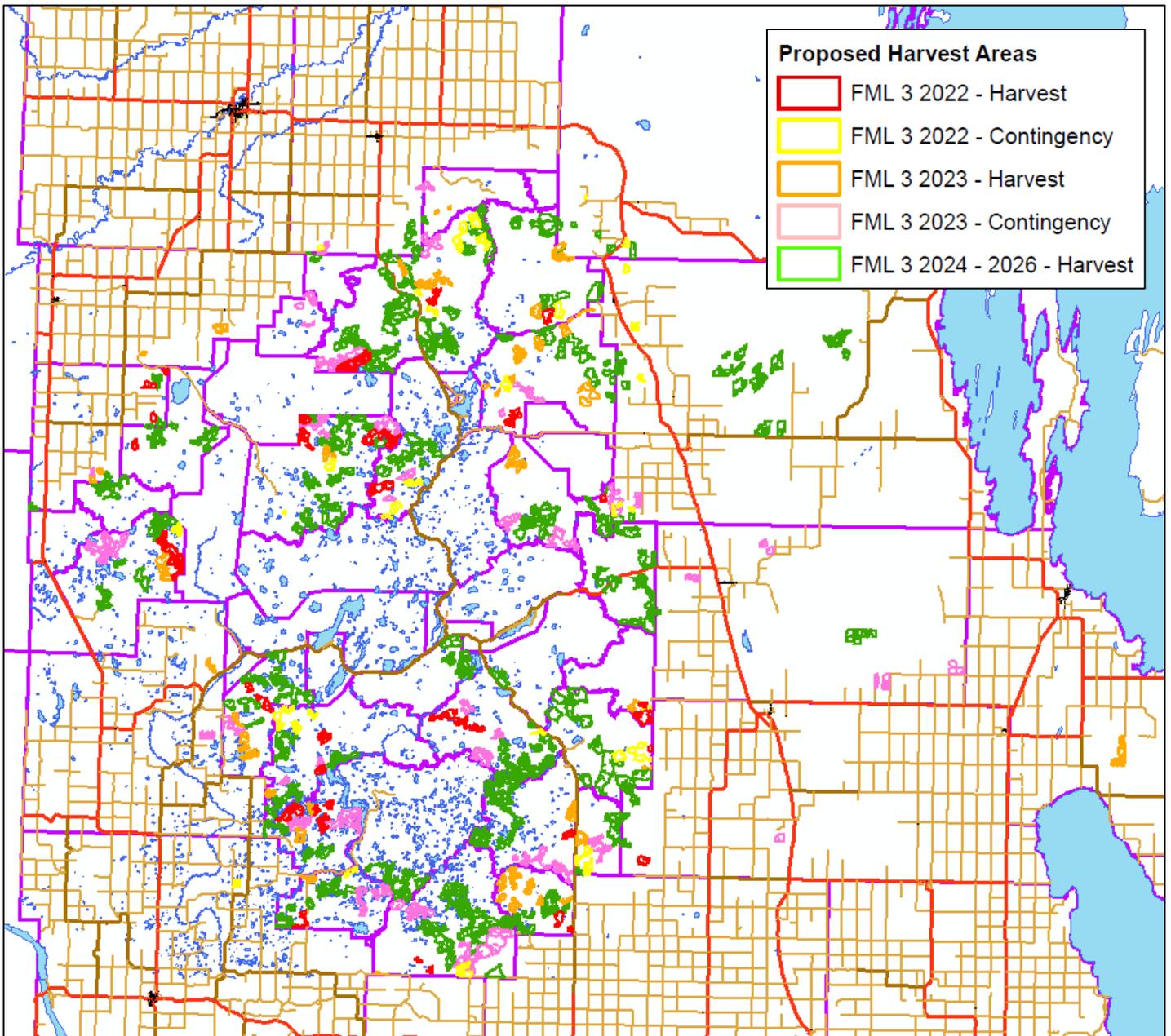


Figure 4-2: Overview map of proposed cutblocks for both Quota Holders and LP in the Duck Mountain Provincial Forest.

4.1.2 Variable Retention Harvest

Variable retention harvest includes in-stand structural diversity as an important aspect of emulating natural disturbance (wildfire) patterns. Structural diversity is achieved by leaving individual trees, patches of trees, or patches of trees with understory protection throughout cut blocks (Figure 4-3).



Figure 4-3: Individual leave trees, snags, and wildlife tree patches within a variable retention harvest.

A set of standard operating guidelines to assist forest operations in maintaining various elements of the forest that would be found after a natural disturbance. This type of variable retention of forest structure provides wildlife habitat and helps to conserve biodiversity at the stand level. Variable retention often refers to live and dead standing wildlife trees, understory vegetation that is left within a residual patch of wildlife trees and coarse woody material left within a harvested area. Depending on site-specific concerns, variable retention strategies within harvested areas may vary. For instance, an operating area known to be a high use marten area may require the retention of both scattered and piled coarse woody material to provide cover and/or prey habitat for the animal. Through an extensive literature review and knowledge gained from current research across Canada, variable retention specifications have been developed to help define variable retention requirements for LP harvest areas.

Maintaining both live and dead standing wildlife trees within harvested areas is very important. Live wildlife trees left by themselves or in patches provide wildlife habitat. Small mammals use these areas as *refugia* as they travel through the harvested area, birds use the trees for nesting and resting perches as they fly from place to place, and forest insects use these areas throughout their life cycle. Dead standing trees provide forage, nesting, and cover habitat for primary and secondary cavity dependent species as well. Over time, the forest structure maintained in a cutover and takes on a new role in the forest. For example, dead standing structure falls and becomes coarse woody material, the live trees become snags and the

surrounding vegetation becomes a new living forest. The forest habitat needed to conserve the presence of native animal species is always provided.

LP and the Quota Holders retain a minimum of 8 to 12 wildlife trees per hectare on harvest blocks larger than 10 hectares. Wildlife trees are left as patches of trees, or as single trees. Snags (*i.e.*, dead, standing trees) are also maintained within harvest areas. Snags are most often found in combination with wildlife tree patches. Wildlife trees and understory vegetation are maintained around small wetlands and in-block watercourses and are left standing on steep slopes to help maintain soil stability.

4.1.3 Wildlife Debris Piles

Wildlife debris piles (Figure 4-4) have been prescribed for operating areas that are known to support marten populations or have good marten habitat. Several Provincial governments and private industries across Canada have incorporated best management practices and/or habitat provision guidelines to help maintain marten populations within the forest. Marten are a significant species in terms of their social and economic value to trappers and First Nations groups. As part of managing forests in a sustainable manner, these values must also be taken into consideration and practices implemented to ensure the long-term viability of species such as the marten.



Figure 4-4: Examples of wildlife debris piles.

Coarse woody debris piles inside the harvest areas and adjacent to the forest edge provide habitat for small mammals, which are consumed by marten. The wildlife debris piles also provide den habitat and contribute to travel corridors through harvest areas. The maintenance of coarse woody debris piles can enhance habitat over the short-term and will also ensure critical habitat availability into the future.

4.1.4 Cut Block Numbering Convention

The cutblock numbering convention includes a three-letter operating area code followed by a three-digit number (*e.g.*, BGC-002). Most LP cutblocks will use numbers 001 to 799, while most Quota Holder cutblocks will use numbers 800 to 999 (*e.g.*, ALP-802). An exception to this procedure occurs if LP harvests and block with 800 or 900 series. Another exception to the procedure occurs if the Quota Holders cut a harvest block in the 001 to 799 series. Leased crown land blocks have an 'L' in the block label (*e.g.*, BSN-L02).

4.2 WOOD SUPPLY

4.2.1 Sustainable Harvest Level

The Sustainable Harvest Level is the volume of wood that can be harvested each year on a long-term sustainable basis. The Sustainable Harvest Level is determined and regulated on a Forest Management Unit (FMU) basis by the Province of Manitoba.

The proposed harvest volumes in this two-year Operating Plan (hardwood and softwood) are from both LP and Quota Holders proposed cutblocks. 2022 and 2023 proposed harvest volumes from Open Crown Land are compared to the Annual Allowable Cut (AAC) for each Forest Management Unit (Table 4-1) in the licence area.

Table 4-1: Total hardwood and softwood volume proposed for harvest versus the Sustainable Harvest Level from Open Crown Land in FML #3.

		Hardwood			Softwood		
		Proposed Harvest Volume (m ³)	Provincial AAC (m ³)	% of AAC	Proposed Harvest Volume (m ³)	Provincial AAC (m ³)	% of AAC
FMU 10	2022	11,292	7,850	144%	31	210	15%
	2023	8,985	7,850	114%	819	210	390%
FMU 11	2022	18,914	92,004	21%	1,809	26,819	7%
	2023	31,558	92,004	34%	4,548	26,819	17%
FMU 13	2022	316,151	311,934	101%	224,675	234,022	96%
	2023	312,523	311,934	100%	216,423	234,022	92%
TOTAL	2022	346,357	411,788	84%	226,515	261,051	87%
FML #3	2023	353,066	411,788	86%	221,790	261,051	85%

There have been multiple previous years of undercut in Forest Management Units 10, which would easily balance any harvesting above the annual Sustainable Harvest Level for a single year. Proposed softwood volumes are at or below the Annual Allowable Cut for Forest Management Units 11 and 13.

2022 and 2023 proposed harvest volumes from Leased Crown Land are compared to the Annual Allowable Cut (AAC) for each Forest Management Unit (Table 4-2) in the licence area.

Table 4-2: Total hardwood and softwood volume proposed for harvest versus the Sustainable Harvest Level from Leased Crown Land in FML #3.

		Hardwood			Softwood		
		Proposed Harvest Volume (m ³)	Provincial AAC (m ³)	% of AAC	Proposed Harvest Volume (m ³)	Provincial AAC (m ³)	% of AAC
FMU 10	2022	0	128,220	0%	0	2,020	0%
	2023	10,672	128,220	8%	0	2,020	0%
FMU 11	2022	5,580	92,890	6%	0	4,280	0%
	2023	0	92,890	0%	0	4,280	0%
TOTAL	2022	5,580	221,110	3%	0	6,300	0%
FML #3	2023	10,672	221,110	5%	0	6,300	0%

4.2.2 Fiber Procurement

Cruised Pre-Harvest Survey volumes by cutblock are detailed in Appendix II. Proposed contingency blocks that have no survey have an estimated volume based on area and historical harvest volumes. Projected harvest volumes and allocations are also detailed in Appendix II.

4.2.3 Quota Holders Fiber Procurement

The Operating Plan also describes forest management activities and operations of the various Quota Holders. Timber sale holders and their associated volume quotas are shown in Appendix II. The Province of Manitoba has assigned Resource Management - Land Use Category in 1997 to the area traditionally harvested by Quota Holders since the 1950's.

4.2.4 Incidental Hardwood and Softwood Volumes

The forests of FMU 13 are largely comprised of mixedwood stand types (*i.e.*, hardwood and softwood in same stand). Each year LP has attempted to integrate operations with as many Quota Holders as possible. Integrated operations result in less roads, which likely benefits moose management, yet acquires the same volume of wood. In past years, several Quota Holders have harvested or acquired their softwood and/or hardwood volume allocation from LP cutblocks, or Quota Holder cut blocks. LP has also benefited by acquiring incidental hardwood harvested by Quota Holders and will continue to work cooperatively with Quota Holders who acquire residual softwood volumes from LP cut blocks.

5. FOREST RENEWAL PLAN

5.1 INTRODUCTION

Louisiana-Pacific Canada Ltd. was responsible for both hardwood and softwood renewal in FML #3 (Duck Mountain Provincial Forest and surrounding area) from 1996 to 2007. On April 1st, 2007, the Mountain Forest Section Renewal Company Ltd. (MFSRC) assumed the responsibility and obligations of softwood renewal in FML #3. MFSRC performs all softwood reforestation activities within FML #3, financed by a Forest Renewal & Stand Management Account. Management and reforestation fees are charged on all merchantable softwood harvested from FML #3. These funds are used by MFSRC to ensure reforestation of harvested forest ecosystems and responsible forest management is carried out and ensures that all softwood harvested areas within FML #3 are regenerated.

MFSRC's forest renewal strategy at the landscape level is to reforest harvested ecosystems to their original tree species composition. This objective will be achieved using silvicultural systems and treatments, which balance the ecology of the forest and the silvics of the tree species. Overview maps of all renewal activities for 2022-2024 are shown in Volume III of this Operating Plan.

Louisiana-Pacific Canada Ltd. continues their responsibility for all hardwood renewal in FML #3, both Quota Holder hardwood blocks and Louisiana-Pacific hardwood blocks. Louisiana-Pacific performs all hardwood reforestation activities within FML #3, financed by a hardwood renewal account.

5.2 REGENERATION STRATEGIES AND TACTICS



MFSRC and LP will continue to implement a variety of silviculture systems, including:

- natural regeneration (from root suckers or from seed) (left)
- assisted regeneration or planting of conifer seedlings (middle)
- understory protection of conifer understory trees (right)

Natural regeneration of harvested hardwood ecosystems (aspen, balsam poplar, and white birch) has been very successful. Hardwood regeneration stocking levels from 1996 to present have averaged 96% (80% stocking is the minimum required by provincial standards).

Assisted regeneration from planting of conifers has been consistently successful. The successful softwood regeneration is due to planting large, high-quality container seedlings combined with planting sites immediately after harvest.

All silvicultural management interpretations and prescriptions are based on forest ecosystem field data from the Pre-Harvest Survey, including ecosites (Arnup *et al.* 2006), vegetation types (V-types), and soil types (S-types) identified within the Forest Ecosystem Classification for Manitoba Field Guide (Zoladeski *et al.* 1995). This management philosophy encompasses all prescriptions for each ecosystem classification type, the silviculture system, site limitations, harvesting constraints, regeneration method, regeneration species, and future monitoring of the treatments.

The forest ecosystems harvested within FML #3 have been placed into one of the following categories:

- Hardwood ecosystems
- Mixedwood ecosystems
- White Spruce ecosystems
- Black Spruce ecosystems
- Black Spruce – Jack Pine mixed conifer ecosystems
- Jack Pine ecosystems

5.2.1 Hardwood Ecosystems



A significant portion of the landbase is pure hardwood or hardwood mixedwood stands. Typical harvest areas are predominantly aspen, but also contain some balsam poplar, white birch, and residual white spruce.

Modified clear cutting is the most appropriate silvicultural system utilized within the hardwood ecosystem. Aspen, black poplar, and birch are aggressive pioneer species that can regenerate vegetatively by 'suckering' from the roots (Figure 5-1) or coppice growth from the root collar of the stump. Removal of the overstory tree canopy creates hormonal changes, stimulating suckering. Increased soil temperatures also trigger aggressive

suckering, resulting in dense, vigorous natural regeneration. Hardwood ecosystems regenerate quickly after logging, and establish a dense, vigorous hardwood stand.



Figure 5-1: Typical thick and vigorous aspen regeneration.

There are many factors which influence the regeneration capacity of young hardwood stands. These factors include:

- machine traffic levels, especially skidding and avoidance of soil compaction
- previous site disturbances ('high-grade' logging of conifer from mixedwood stands)
- competition from grasses and shrubs
- quantity of residual overstory and leave tree structure density, health, and vigour

All harvested areas are surveyed three to five years post-harvest to determine regeneration stocking. If a significant portion of a hardwood cutblock is inadequately regenerated, supplementary silvicultural treatments will be applied if possible.

5.2.2 Mixedwood Ecosystems



The mixedwood ecosystems are composed of mixtures of softwoods (white spruce, black spruce, balsam fir) and hardwoods (aspen, poplar, birch). Some mixedwoods are hardwood-dominated, while other mixedwoods are softwood-dominated. Mixedwood ecosystems are harvested by modified clearcutting with protection of white spruce understory if present. Conservation of the existing white spruce understory in these mixedwood ecosystems

is a management priority. Excessive coniferous slash can dramatically reduce the number of plantable microsites, therefore portions of mixedwoods cutblocks may be delimited at roadside and the slash piles burnt.

The regeneration challenge in mixedwoods is to maintain coniferous component of the mixedwood, while allowing the hardwood to regenerate and form part of the future stand. Ideally, the hardwood portion acts as a 'nurse' crop to the conifer trees and shelter them for frost and insects when they are young. However, too many hardwood trees can suppress or stunt conifer tree growth. The balance of conifer and hardwood densities makes mixedwood sites the most complex and challenging to manage.

Site preparation of these mixedwood ecosystems on rich, clay soils is not recommended, due to greatly increased competition from grass, weeds, and aspen. Disturbing the soil promotes excessive aspen suckering and opens the seed bank stored in the upper soil horizons. Therefore, portions of mixedwood sites are area-planted with no site preparation at densities of 1,400 – 1,800 spruce trees per hectare (Figure 5-2). Natural regeneration (suckering) of the hardwood tree species is expected and encouraged on mixedwood sites.



Figure 5-2: Young aspen and white spruce mixedwood regeneration (overhead view).

Post-planting conifer regeneration success is dependent upon:

- the creation of desirable seedling microsites, or the ability to effectively manage slash loading
- proper microsite selection during planting
- planting large, high-quality seedlings
- planting soon after harvest, before highly competitive plant species (e.g., grasses and shrubs) become established

Areas harvested that utilize understory protection are identified as ‘Leave For Natural’ (LFN) regeneration spruce regenerated areas. Typically, the skid trails within the protected white spruce understory areas are directly planted with conifer seedlings.

5.2.3 White Spruce Ecosystems



Mature pure white spruce ecosystems are not common in the Duck Mountains. There are no young pure stands less than 70 years old, based on the last two forest inventories. Older white spruce is commonly found in small pockets within spruce-aspen mixedwoods. The forest management challenge is to maintain these white spruce ecosystems across the landscape.

The management of logging debris, especially spruce limbs, during the time of harvest is crucial to the number of plantable microsites. Excessive slash loading from spruce limbs has been encountered during planting, reducing the number of available microsites for reforestation.

MFSRC’s stand management objective and fundamental principle will be to rely on a variety of silvicultural systems, within the white spruce and white spruce dominant mixedwood ecosystems, with a reliance on planting and protection of white spruce understory (Figure 5-3).



Figure 5-3: White spruce planted (left) and advanced regeneration (right).

A variety of silvicultural systems are prescribed within the white spruce (and dominant white spruce mixedwood) associations. If natural regeneration is desired then a single or group seed tree, understory protection, selection, or shelterwood silvicultural (harvest) system may be prescribed.

Areas managed with the modified/retention clear-cut silvicultural system will be scheduled for direct planting (1,600 to 1,800 stems per hectare) immediately following harvest.

Selection and shelterwood silviculture systems are typically prescribed to the smaller volume softwood Quota Holders where:

- i) assisted regeneration is impractical nor economical, since such small volumes are removed annually; and
- ii) loggers seek only large trees of one species.

5.2.4 Black Spruce Ecosystems



Black spruce stands occur on wet organic, wet mineral, or upland mineral soils. Black spruce most commonly grows as pure stands on organic soils, but also occurs as mixed conifer (black spruce and tamarack – organic soil; or black spruce and jack pine on mineral soil). There are some black spruce mixedwood stands (black spruce and aspen) on mineral soils.

Modified clearcutting is used as a harvest method, but retention of single black spruce trees or small patches as in-block structure is not recommended, since the single trees often blow down immediately. Furthermore, *Armillaria* root rot, if present, is promoted. Therefore, large leave patches of black spruce are left, in addition to wet organic black spruce areas that are typically free from disease.

Upland black spruce sites are scarified and/or planted (Figure 5-4) immediately after harvest. The black spruce ecosystems are not well suited for understory protection, since the understory trees are typically not wind firm due to their shallow roots and many branches.



Figure 5-4: Assisted black spruce regeneration.

The black spruce ecosystems are regenerated with a combination of assisted and natural regeneration techniques. Natural regeneration strategies are prescribed in areas where seeds can be dispersed onto a Sphagnum moss seedbed from the adjacent residual forest. The residual stand edge will also provide shade and protection to the young black spruce germinants. If inadequate black spruce regeneration occurs, the cutblock will be area planted. Lowland black spruce sites are either LFN (Leave For Natural) regeneration or area planted with black spruce seedlings. Like all harvested areas within FML #3, black spruce sites are surveyed for regeneration success.

5.2.5 Black Spruce – Jack Pine Mixed Conifer Ecosystems



Black spruce - jack pine mixed conifer ecosystems are often scarified with anchor chains and shark-fin barrels after harvest. Scarification promotes natural regeneration, as well as creating a favorable planting microsite for seedlings. Both black spruce and jack pine seedlings are planted at a density range from 2,000 to 2,200 seedlings per hectare, based upon the pre-harvest composition of black spruce - jack pine stand.

5.2.6 Jack Pine Ecosystems



Modified clear cutting is the silviculture system recommended for jack pine ecosystems. Jack pine is an early successional, pioneer species that requires direct sunlight (*i.e.*, shade intolerant) to germinate and grow. After clear cutting, jack pine germination and establishment can occur from either natural seeding or from planting jack pine seedlings (Figure 5-5). It is extremely important that jack pine trees are delimited at the stump after felling, to leave the branches, cones, and seeds on site, prior to the tree stems being skidded to roadside. Delimiting at the stump ensures that adequate cones and seeds are available for natural regeneration.

Mineral soil exposure is crucial to the establishment of natural pine germinants. Sites that do not obtain adequate mineral soil exposure, typically harvested during the winter months, will be scarified to create mineral soil exposure. Natural regeneration is easily attained within jack pine ecosystems if they are harvested correctly.

After harvesting the tree canopy, solar heat is increased and opens the serotinous cones, which are still attached to the tree limbs. As the cones open, jack pine seeds are deposited onto the mineral soil and then germinate.



Figure 5-5: Jack pine regeneration from seed (left) and planting (right).

Jack pine cutovers are regeneration surveyed to monitor stocking and density levels. If there are any areas within a jack pine cutover that do not regenerate to acceptable stocking levels and densities, they will be assisted by planting trees.

There are some jack pine stands heavily infected with western gall rust (*Endocronartium harknessii*) in the Duck Mountain Provincial Forest. Heavily infected jack pine stands will likely re-infect adjacent pine plantations. This concern has been communicated to the Province of Manitoba and we will continue to work closely with provincial forest pathologists and entomologists.

5.3 WHITE SPRUCE UNDERSTORY PROTECTION

Modified or variable retention harvesting is still the predominant harvest system prescribed. LP, MFSRC, and the Province of Manitoba jointly identify areas where alternative silvicultural systems make better ecological and economic sense. The provincial softwood understory protection guidelines (2017) provide operational direction on understory protection strategies.

Understory protection in hardwood (H) and hardwood-dominated mixedwood (N) stands occurs where advanced white spruce regeneration is present (Figure 5-6). Modifications to the harvesting practices have allowed protection of the existing white spruce understory. This will assist natural regeneration and require fewer seedlings to be planted by MFSRC.



Figure 5-6: Retention of white spruce understory within a wildlife tree patch.

Many areas within the proposed harvest blocks have patches of conifer understory large enough to warrant understory protection.

5.4 SOFTWOOD MANAGEMENT AT THE LANDSCAPE LEVEL

The objective in FML #3 is to maintain the existing amount of softwood at the landscape-level in the Duck Mountain Provincial Forest. All proposed harvest areas or treatment units within a harvest block are classified into a provincial regeneration standard or renewal cover type, based on the percentage volume of softwood and hardwood tree species:

- 'S' Softwood
- 'M' Softwood-Dominated Mixedwood
- 'N' Hardwood-Dominated Mixedwood
- 'H' Hardwood

Forest stands are dynamic and will often change cover type (e.g., from N to M) over the lifetime of the stand. The general trend is more hardwood in the early stages, with more softwood in the later stages, followed by softwood-dominated old stands.

Harvested areas meeting the provincial definition of hardwood ('H') or hardwood-dominant mixedwood ('N') are typically not identified for planting of conifers. However, it is important to note that most of the conifer understory protection occurs in the 'H' and 'N' regeneration standard. Through the protection of the advanced white spruce regeneration, it is believed that many of these harvested areas will succeed to a mixedwood stand over time.

Harvested areas classified as 'M' mixedwood are typically identified for area planting. Harvested areas classified as softwood ('S') are scheduled for planting and will be renewed as young coniferous ('S') forests. A portion of conifer stands may require tending in the future if excessive competition exists. Through these efforts, the softwood component within FML #3 will be maintained over time.

Many proposed harvest blocks with FML #3 show evidence of past harvesting disturbance, typically the selective removal of spruce from mixedwood stands. Through this practice, many mixedwood stands were converted to an open crown closure hardwood 'H' or hardwood-mixedwood 'N' stand. When evidence of this past activity is known, the company identifies it on the Pre-Harvest Cutblock Prescription sheet. During block mitigation meetings past harvesting disturbance is discussed. Historically, areas for assisted softwood regeneration, or the area is managed by LP to a hardwood (H) or hardwood-dominated mixedwood ('N') stand.

5.5 SITE PREPARATION

Site preparation (Figure 5-7) changes unfavorable site conditions into good planting microsites. Site preparation improves seedlings establishment, survival, and growth. 242 ha of site preparation is scheduled for 2022. 2023 site preparation will depend on the area of softwood blocks harvested.



Figure 5-7: Site preparation of a cutover using shark-fin barrels and anchor chains.

However, if applied incorrectly, site preparation can create unfavorable growing conditions or site degradation. Excessive machine traffic and scarification can negatively affect biodiversity, by reducing dead organic matter and species such as small mammals or invertebrates that rely on dead organic matter as part of their life requirements. Minimizing intensive site preparation helps maintain coarse woody debris and thus helps maintain biodiversity (Carey and Johnson 1995).

MFSRC's philosophy towards site preparation is 'less is best'. The intensity (depth and percent coverage) of the treatment is site-specific to each forest ecosystem. Site preparation prescriptions are developed after reviewing Pre-Harvest Survey data such as ecosite, V-Type, access, LFH thickness, surface soil texture, slash loading, and stoniness. A preferred and an alternative treatment are identified. All areas identified for site preparation receive a final field inspection during or immediately after harvesting, to finalize the prescription. Operator training and supervision of the equipment during the site preparation ensures that the desired results are being achieved.

When determining the desirable number of plantable microsites per hectare to be created within an area, the appropriate provincial stocking standards, stand management objective and pre-harvest V-Type must be considered. Before site preparation begins, the acceptable seeding/planting microsites to be created must be clearly defined. Based on current forest renewal standards, MFSRC will have the following microsites per hectare targets for coniferous tree species:

- Softwood Sites –2,000 to 2,200 microsites per hectare
- Mixedwood Sites -1,400 to 1,800 microsites per hectare

When determining the actual number of microsites to be created on a specific site, seedling mortality and natural regeneration must also be considered.

Site preparation will not typically be considered on hardwood and mixedwood sites since these sites will aggressively regenerate by suckering after the harvesting removes the tree overstory. Research projects at the University of Alberta are showing that site preparation can

significantly increase the number of aspen stems per hectare but can negatively impact the health of the regenerating stand. Aspen roots are cut, scraped, and wounded during scarification, creating a vector for forest pathogens (rot and decay) to enter the young saplings, and spread throughout the stand.

Site preparation is the preferred treatment identified for the jack pine and black spruce ecosystems. The objective is to expose mineral soil to create germination microsites, and to distribute cone-bearing slash from treetops. In addition, site preparation accelerates thawing of the surface soil, promotes natural regeneration, and facilitates tree planting. Shark-fin barrels and anchor chains are used to disturb the LFH surface soil layer, creating plantable mineral soil microsites.

Pre-work meetings are held with the site preparation contractor and the equipment operator. In addition, company field assessments or inspections of quality and spacing (number of microsites created per hectare) are performed during or after each site preparation treatment. The assessment will ensure that adequate microsite densities and quality are being achieved and maintained. The assessment ensures that favorable microsites (quality and quantity) for seed or seedlings are being created and that detrimental site disturbances such as excessive soil displacement, compaction, and treatment of steep slopes are not occurring.

5.6 SEED INVENTORIES

Maintaining an adequate seed inventory is crucial to the company's ability to grow conifer seedlings for out-planting into harvested areas. Ideally, a minimum of ten years of seed for each conifer species is kept.

All seed was locally collected within the proper seed zone. Collected cones are processed to extract the seeds, and then stored at Pacific Regeneration Technologies (PRT) nursery located in Prince Albert, SK. The Hadashville, MB nursery is now closed. Black spruce cones will be collected in 2022 and 2023.

5.7 SEEDLING REQUIREMENTS

In the spring of 2022, MFSRC is scheduled to plant 0.8 million white spruce and black spruce seedlings. The 2023 tree plant will depend on the level of harvest in softwood stands but will likely plant approximately 1.0 million seedlings.

MFSRC is committed to planting seedlings of the highest quality. A 'balance' is found between seedling size and seedling performance. Bigger seedlings cost more money but have better survival and growth response after out-planting. Research has quantified significant gains in growth, successfully outgrowing competing grass and woody competitors, and meeting renewal standards by planting large conifer seedlings (Sharma *et. al.* 2010).

5.8 TREE PLANT

In the spring of 2022, MFSRC will area plant (Figure 5-8) 0.8 million seedlings from mid-May until mid-June. The 2022 information will be supplied at the work permit level or during mitigation. The actual startup date will be dependent upon spring weather conditions and the surface soil thawing. Typically, temperatures become warm, and the risk of frost is low enough that spring planting can commence by the third week in May. Some sites identified for spring planting will be scarified in late April, prior to planting.



Figure 5-8: Area planting conifer seedlings in recently harvested cutovers.

Occasionally, some portion of a conifer or mixedwood cutblock may have excessive slash loading, preventing area-planting since the planter cannot dig through slash to plant a tree. Excessive slash loading is proactively avoided by either limbing at roadside, or by slash piling and later burning the slash pile. The provincial Biomass Management Guidebook (2015) prefers delimiting to occur at the stump but does allow roadside delimiting if excessive slash loading will impede tree planting.

The planting window and dates mentioned are extremely important, as they allow seedlings to maximize their growth potential and minimize the risk of loss to frost damage and drought. Over-wintered seedlings are planted in the spring, which then flush and initiate shoot and root growth soon after out-planting. Therefore, spring planting must be completed by the end of June, in order that the phenology of the seedling remains synchronous with natural conditions. Completion of the spring plant by late-June allows the seedlings adequate time to grow, set bud and harden-off prior to the fall frosts, which typically occur by early to mid- September. Failure to allow the seedling adequate time to harden-off can cause severe frost damage to the seedling and reductions in potential growth rates and survival.

The objective is to continue area planting without scarification, especially on the mixedwood sites. Tree planters are trained to identify microsites and are closely monitored on their ability of 'microsite selection'. Areas identified for area planting include:

- areas that are too wet, where a scarification treatment may cause site degradation or reduce the sites productivity
- areas where alternative silvicultural systems (understory protection, shelterwood, etc.) and the retention of wildlife trees make scarification treatment impractical
- areas where erosion and soil compaction or 'hard panning' is of concern (fine-textured soils)

- areas that are too small to justify scarification treatment
- areas which are too costly to access and impractical for scarification treatment
- areas of high heritage/archeological values
- portions of blocks where topography (*i.e.*, steep slopes) has prevented scarification from occurring
- harvest blocks where aggressive hardwood regeneration is anticipated

5.9 SURVEYS AND MONITORING



MFSRC's primary reforestation goal is to regenerate all softwood cutblocks, while LP will regenerate all hardwood cutblocks. All harvested blocks, both softwood and hardwood, must meet or exceed provincial forest renewal standards to acquire a "Certificate of Reforestation".

MFSRC and LP will be performing forest renewal assessments on hardwood, mixedwood, and softwood harvested areas. Surveys in hardwood harvest areas provide a comprehensive assessment of seedling/sapling quantity, quality, health, height and spatial distribution. A survey summary and all data are sent to the Province of Manitoba to receive a 'Certificate of Reforestation' for all successfully regenerated blocks.

The survey data collected by LP and MFSRC will provide multiple benefits, such as:

- quantifying the regeneration status of harvested areas
- providing data for strategic forest management models
- analysis of site-specific treatment responses
- the establishment of relationships and trends

All persons performing these surveys will be certified by the Province of Manitoba. In addition, surveyors are periodically check-surveyed by their company and by the Province of Manitoba, to ensure survey quality. Methods and procedures are outlined within the Forest Renewal Assessment (Forestry Branch 2019) manual.

5.10 STAND TENDING AND MAINTENANCE

MFSRC has identified harvest blocks eligible for potential stand tending and maintenance in the 2022 and 2023 field seasons. A more comprehensive tending plan (*i.e.*, treatment unit and block-level details) will be developed and submitted to the Province of Manitoba if a tending program becomes a reality. All stand maintenance activities will be approved through a 'Pesticide Use Permit' and Work Permit, prior to the commencement of any tending treatments.

6. RESEARCH & MONITORING PLAN

Louisiana-Pacific Canada Ltd. Swan Valley – Forest Resources Division has a research and monitoring program to reflect a strong commitment of practicing Sustainable Forest Management in FML #3. The knowledge gained from the research and monitoring program has enhanced LP's understanding and subsequent decision-making of Ecosystem Based-Management. Previous research efforts have also enabled both planning strategies and operational practices to be improved at both the landscape and stand-levels.

Research projects are sub-divided into three main categories:

1. LP Directed Research and Monitoring Projects
2. Collaborative Research Projects
3. Research and Conservation Partnerships

6.1 LP Directed Research and Monitoring Projects

The projects included within this section (Table 6-1) are solely funded by Louisiana-Pacific Canada Ltd. Swan Valley Forest Resources Division. Project coordination, implementation, and field work are conducted by company staff.

Table 6-1: Louisiana-Pacific Canada Ltd. research and monitoring projects.

Researcher	Project Title	Project Objectives	Linkage to Practice	Project Timelines
LP Canada Ltd. Bird recordings in proposed summer cutblocks (Enid Cummings in Saskatoon, SK.)	Summer Bird Monitoring Project	Identify any rare or endangered bird species in proposed summer harvest blocks.	Implement management practices that help to protect and conserve rare or uncommon forest bird species.	Annually (2009 to present)
LP Canada Ltd. Paul LeBlanc, LP District Forester and Brian Nickel, LP Planning Technician	Western Boreal Growth and Yield Cooperative (WESBOGY) Permanent Sample Plots https://wesbogy.ualberta.ca	Complete the 23 rd year full remeasurement in the spring of 2022. To quantify the effects of mixedwood management strategies. To provide aspen-spruce data for the Mixedwood Growth Model (MGM). https://mgm.ualberta.ca/	Contribute to the development of mixedwood forest succession models. Development of guidelines that promote the sustainability of mixedwood forests. Demonstration that mixedwood forests produce sawlog-quality white spruce without being sprayed.	1998 – present

6.2 Collaborative Research Projects

This section describes collaborative research projects between Louisiana-Pacific Canada Ltd. and one or more cooperating agencies (Table 6-2). These agencies are conservation groups, universities, and research organizations.

These joint projects are supported by Louisiana-Pacific Canada Ltd. and other partners in various ways, depending on project requirements. Support may include direct research funds, or in-kind contributions such as baseline data, GIS thematic information, aerial imagery, and LP forest management professional staff time.

Table 6-2: Collaborative research projects.

Researcher	Project Title	Project Objectives	Linkage to Practice	Project Timelines
Dr. David Andison Multi-partner industry and government (BC, AB, SK, and MB) supported project	Benefits of Disturbance	To show the ecological, economic, and social benefits of disturbance	Implementation of fire emulation benefits	2021 to 2023

6.3 Research and Conservation Partnerships

Louisiana-Pacific Canada Ltd. has partnered with research organizations that are comprised of a network of research scientists from universities, government agencies, forest and other resource industries, First Nation communities, conservation organizations and public stakeholders. Each organization contributes annual funding in support of selected research and monitoring projects associated with the various components of sustainable forest management. The following is a summary of partnerships and associated projects that are ongoing or planned for the Operating Plan.

6.3.1 Conservation Organizations

Louisiana-Pacific Canada Ltd. is actively involved in developing partnerships with several conservation organizations across the Province of Manitoba (Table 6-2). The current partnerships have been established to pursue research and monitoring related projects to enhance sustainable forest management planning and operational practices on crown and private lands. These joint ventures demonstrate the ability to apply a holistic approach in managing the forest land base for all values (biological, social and economic) in order to achieve an effective model of forest sustainability.

Table 6-3: Partnership research and monitoring projects with conservation organizations.

Partner/Researcher	Project Title	Project Objectives	Linkage to Practice	Project Timelines
<p>Ducks Unlimited Canada (Western Boreal Program)</p>  <p>10-year Conservation Agreement signed Jan 2020.</p>	<p>Conservation Agreement 2020 to 2029</p>	<p>A shared commitment to wetland stewardship through planning and operational wetland best management practices.</p>	<p>Development of forest management strategies to promote sustainable management of aquatic resources through appropriate watershed-based management planning and operations</p> <p>Collaborate on the development of BMP's and implementation of research and monitoring projects and share information and research results related to water, wetlands, riparian areas and watersheds</p> <p>Develop and participate in an implementation project in the Duck Mountains to test the effects and effectiveness of new planning and management approaches</p>	<p>2020 to 2029</p>

6.3.2 Academic or Forest Research Institutions

Louisiana-Pacific Canada Ltd. has fostered partnerships with universities and forestry research organizations across Canada (Table 6-3) in order to conduct research towards understanding and gaining new knowledge on the various components of sustainable forest management and ecosystem-based management. LP has provided a list of the projects currently ongoing with academic and forestry research organizations.

Table 6-4: Partnership research and monitoring projects with academic or forest research organizations.

Partner/Researcher	Project Title	Project Objectives	Linkage to Practice	Project Timelines
Dr. David Andison - Multi-partner industry and government (BC, AB, SK, and MB) supported project LandWeb	Historical Landscape Condition Benchmarks for Western Boreal Canada	- Define the Natural Range of Variation (NRV) of landscape conditions for the major ecological zones of western boreal Canada - create a spatial modeling framework for future scenario evaluation across western boreal Canada.	-scientifically based understanding of local landscape dynamics -ecologically based foundation in which to compare desired future landscape scenarios developed by long-terms plans etc.	2015 – 2025
Dr. Phil Comeau and Dr. Mike Bokalo	MGM – Mixedwood Growth Model https://mgm.ualberta.ca/	To continue development of MGM to improve modeling of stand responses to climate, site and silviculture.	Take regeneration survey data and ‘grow’ the stand forward in time using quantified relationship on height, diameter, mortality <i>etc.</i>	1988 +

7. LITERATURE CITED

- Arnup, R., LeBlanc, P.A., and G. Becker. 2006.** Field Guide to Ecosites of the Mid-Boreal Upland Ecoregion of Manitoba. Louisiana-Pacific Canada Ltd., Forest Resources Division, Swan River, MB in partnership with Manitoba Conservation - Forestry Branch. 200 Saulteaux Crescent, Winnipeg MB. 122 pp plus appendices.
- Carey, A.B. and M.L. Johnson. 1995.** Small mammals in managed, naturally young and old-growth forests. *Ecol. Appl.* 5:336-352.
- Ducks Unlimited Canada. 2014.** Operational Guide – Forest Road Wetland Crossings. Version 1.0 Edmonton, AB. 43 pp.
- Ducks Unlimited Canada. 2015.** Field Guide – Boreal Wetland Classes in the boreal plains ecozone of Canada. Version 1.1 Edmonton, AB. 86 pp.
- KPMG Management Consulting. 1995.** Manitoba's Forest Plan...Towards Ecosystem Based Management. Report to Manitoba Natural Resources. Canada-Manitoba Partnership Agreement in Forestry. Vol. 3:83-85.
- Louisiana-Pacific Canada Ltd. 1996.** Forest Management Licence 3 Ten Year Forest Management Plan 1996-2005. Volume 1. Swan River, MB. 129 p. plus appendices.
- Louisiana-Pacific Canada Ltd. 2006.** Twenty-Year Sustainable Forest Management Plan (2006-2026). Swan River, MB. 8-70 p. plus appendices.
- Louisiana-Pacific Canada Ltd. 2010.** Hardwood Regeneration Summary 1996 – 2009. Forest Management Licence 3. LP Canada Ltd. Swan Valley - Forest Resources Division. February 28th, 2010. 5 p.
- Manitoba Conservation – Forestry Branch. 2004.** Circular C-1 (DIR 19). Harvest control on forest management licence agreement area. 2 p.
- Manitoba Conservation – Forestry Branch. 2004.** Circular B-9b (FEM 10). Timber harvesting on agricultural development requests in FML Area 3 held by LP Canada. 6 p.
- Manitoba Conservation – Forestry Branch. 2008.** Forest Management Guidelines for Riparian Management Areas. 47 p. http://www.gov.mb.ca/conservation/forestry/forest-practices/pdfs/riparian_mgmt_final.pdf
- Manitoba Conservation – Forestry Branch. 2015.** Biomass Management Guidebook. 14 p. http://www.gov.mb.ca/conservation/forestry/forest-practices/pdfs/brush_disposal.pdf
- Manitoba Conservation – Forestry Branch. 2019.** Manitoba Hardwood Renewal Survey Manual. Manitoba Conservation and Water Stewardship. Forestry Branch, Forest Health and Renewal section. 200 Saulteaux Crescent, Winnipeg, MB. 28 pp. plus appendices.
- Manitoba Conservation and Water Stewardship. 2012.** Forestry Road Management. 24 p. <http://www.gov.mb.ca/conservation/forestry/practices/guidelines.html>
- Manitoba Conservation and Water Stewardship. 2014.** Pre-Harvest Survey Guidelines. Manitoba Conservation forest practices guidebook. 28 p.
- Manitoba Conservation and Water Stewardship, Forestry and Peatlands Management Branch. 2016.** Wood supply analysis report for forest management units 11 and 12. Manitoba Conservation and Water Stewardship, Forestry and Peatlands Management Branch. 200 Saulteaux Crescent, Winnipeg, MB. 44 pp. plus appendices.
- Manitoba Conservation – Parks and Natural Areas. 2003.** Duck Mountain Provincial Park Draft Management Plan. 31 p.
- Manitoba Environment. 1996.** Manitoba Environment Act Licence No. 2191 E. Manitoba Environment, Environ. Manage, Winnipeg, Manitoba. 12 p.
- Manitoba Natural Resources. 1995.** Manitoba's Forest Plan... Towards Ecosystems Based Management. Canada-Manitoba Partnership Agreement in Forestry. Prepared by KPMG Management Consulting. Winnipeg, Manitoba. 12 – 6 p.
- Manitoba Sustainable Development. 2017.** Protection of Softwood Understorey. 18 pp.

Province of Manitoba. 1994. Forest Management Licence Agreement dated as of the 21st day of September 1994 between the Province of Manitoba, Minister of Natural Resources and Louisiana-Pacific Canada Ltd. 49 pp. plus schedules.

Sharma, M, Bell, F. W., White, R.G., Morneault, A. and W.D. Towill. 2010. Seedling size and woody competition most important predictors of growth following free-to-grow assessments in four boreal forest plantations. March/April 2010. Vol. 86, No. 2- The Forestry Chronicle. pages 213 – 224.

Zoladeski C.A., Wickware G.M., Delorme R.J., Sims R.A., and Corns I.G.W. 1995. Forest Ecosystem Classification for Manitoba: Field Guide. Canada. Natural Resources, Canada Canadian Forest Service, Northwest region, Northern Forest Centre. Edmonton, Alberta. Special Report. 205 p.

8. GLOSSARY OF TERMS

Area Planting – planting seedlings directly into the soil, without previous site preparation.

Conventional Logging - a logging system that includes chain saw felling of trees and cable-line skidders.

Crown Land - lands owned by the Province of Manitoba

Cutblock – a designated area within which harvesting has been proposed or taken place.

Duck Mountain Provincial Forest – an administration area defined by the provincial government that surrounds the Duck Mountains. The boundary is the same as Forest Management Unit 13.

Duck Mountain Provincial Park – a provincial park inside and smaller than the Duck Mountain Provincial Forest. The park is sub-divided into three land use categories: i) backcountry zones; ii) the recreation zones; and iii) resource management zone.

Ecosite - unique and distinct combinations of soil moisture, soil texture, and tree/shrub cover. Ecosites are also spatial entities that are map able at the stand level.

Existing Road Upgrade - Where an existing road or trail was utilized but significant road work was required to allow logging trucks to move efficiently and safely. (e.g., widening of right-of-way, “cat work”, grading etc.)

Forest Ecosystem Classification (FEC) - a management-oriented classification system for Manitoba Forests. It is intended to identify and describe accurately the major forest conditions in Manitoba including vegetation and soil types and management interpretations.

Forest Management License (FML) Area 3 - the area in western Manitoba described within the Forest Management License Agreement between the Province of Manitoba and LP.

Forest Management Plan (FMP) – a long-term strategic plan consisting of forest management goals and how to implement them. Typically, FMPs are a plan for 20 years, with sustainability modeling of the forest resource over 200 years.

Forest Management Unit (FMU) - administrative areas (boundaries) of forest in the Province of Manitoba, as defined by the Province of Manitoba.

Forest Renewal – any project or all projects collectively that are aimed at establishing and maintaining a new forest on a site following a disturbance.

Hardwood - tree species with the typical broad-leafed appearance. These tree species lose their foliage during the winter months. Species included in the hardwood group include balsam poplar, trembling aspen, white birch, Manitoba maple, green ash and bur oak.

Integrated Resource Management Team (IRMT) - a regional team organized to review natural resource issues. They are comprised of various branches from the Province of Manitoba.

Mechanical Logging - a logging system that uses machinery for all phases of logging, including felling, skidding, slashing, processing, and loading.

Modified Clearcutting – a harvesting system which does not cut all trees but leaves clumps of trees and single trees behind to purposefully conserve biodiversity and break up line-of-sight.

Mountain Forest Section – an administrative area defined by the Province of Manitoba, and contains Forest Management Units 10, 11, 12, 13 & 14.

Mountain Forest Section Renewal Company (MFSRC) – a company formed under Spruce Products Ltd., who is the largest Quota Holder. This company was formed to do all softwood renewal in the Mountain Forest Section, including both the Duck and Porcupine Provincial Forests.

New Road Construction - where no road or trail existed previously, a new road requires design, layout and complete construction. (e.g., Harvesting and stumping of right-of-way, cut and fill leveling, grading etc.)

Operating Area - a designated area used for the operational management of timber harvesting. These areas are often delineated based on natural features and or access routes.

Operating Plan (OP) – a two-year detailed plan of proposed forest management activities, such as road building, harvesting and silviculture. OPs also have projections for future years, but with less detail than years one and two.

Permanent Sample Plots (PSPs) - a research plot that is established so that it can be relocated and conditions within it re-measured. Measurements in the plot are taken at establishment and repeated at intervals to monitor changes over time.

Pre-Harvest Cutblock Prescription (PHCP) - a detailed site-specific management plan for a cut block developed prior to harvesting.

Pre-Harvest Surveys (PHS) - a detailed site-specific assessment of a proposed cutblock conducted prior to harvest.

Private Land - land owned by individuals, typically farmers.

Quota Holders - parties other than LP that have been granted the right to harvest timber within FML #3 area by the Government of Manitoba.

S-Type – soil type, as defined by the Manitoba Forest Ecosystem Classification. Soil types are classified by soil texture and moisture.

Silviculture - the science and art of growing and tending a forest based on the knowledge of the forest species requirement.

Site Preparation - the treatment of a harvest cutblock prior to planting to enhance the growth of desired tree species.

Softwood - conifer tree species with the typical “evergreen” appearance. Species included in this softwood group are black spruce, white spruce, jack pine, balsam fir and tamarack.

Stakeholders Advisory Committee (SAC) - a group of individuals representing the various stakeholders within the FML area. The SAC plays an integral role in the planning process by reviewing LP’s Operating Plans and Standard Operating Procedures. SAC members bring local knowledge and local concerns to LP’s planning process.

Standard Operating Guidelines – formerly known as ‘standard operating procedures’ these are a documented methodology for performing a certain task or action, such as leaving wildlife trees in a cutblock.

Sustainable Forest Management – forest management that considers social, economic and ecological factors. SFM also maintains the productive and renewal capacities, as well as the genetic, species and ecological diversity of forest ecosystems.

Sustainable Harvest Level – the annual volume of wood that can be harvested from an area on a sustainable yield basis. In Manitoba, sustainable volumes are determined by the Province of Manitoba.

Variable Retention – retaining trees within a cutblock in a variable amount which changes from cutblock to cutblock

V-Type - vegetation type as described in the Forest Ecosystem Classification field guide of Manitoba.

APPENDICES

APPENDIX I: ROADS

2022 and 2023 detailed existing road use and proposed new road construction.

APPENDIX II: CROSSINGS

Crossing Overview Map

Proposed Crossings table

Existing Crossings table

APPENDIX III: HARVEST VOLUME PROJECTIONS

Operating area names and codes by Forest Management Unit, within Forest Management Licence 3

Timber sale holders and their associated volume quotas by species group and Forest Management Unit

2022 harvest volumes and allocations by FMU and cutblock.

2022 contingency volumes and allocations by FMU and cutblock.

2023 harvest volumes and allocations by FMU and cutblock.

2023 contingency volumes and allocations by FMU and cutblock.

Three-year projection of Open Crown Land harvest volumes by FMU.

APPENDIX IV: RENEWAL PLAN DETAILS

2022 and 2023 site preparation estimates.

2022 and 2023 tree plant estimates.

2022 and 2023 forest renewal assessment survey block estimates.

2022 and 2023 ground stand tending estimates by block.

2022 and 2023 aerial tending estimates by block.

APPENDIX V: FIRE PROTECTION/SUPPRESSION PLAN FOR THE 2022 FIRE SEASON

APPENDIX VI: PUBLIC OPPORTUNITIES

APPENDIX I: ROADS

Table A1.1 2022 and 2023 detailed existing road use and proposed new road construction.

FMU	Operating Area	Proposed Road Name	Road Name	Road Length (km)	Season of Use	Proposed or Existing
10	Boggy Creek	BGC-3A (existing)		1.58	Dry/Frozen	existing
10	Boggy Creek	BGC-3B	BGC-3A	1.15	Dry/Frozen	proposed
10	Boggy Creek	BGC-5A (existing)	Municipal road	0.83	Dry/Frozen	existing
10	Ethelbert	ETH-6A	Municipal road	0.49	Dry/Frozen	proposed
11	Alpine	ALP-12A (existing)	Municipal road	0.25	Dry/Frozen	existing
11	Alpine	ALP-12B	ALP-12A	1.64	Dry/Frozen	proposed
11	Alpine	ALP-5A (existing)		0.34	Dry/Frozen	existing
11	Alpine	ALP-5A-2A	ALP-5A	0.98	Dry/Frozen	proposed
11	Alpine	ALP-5B	ALP-5B	0.80	Dry/Frozen	proposed
11	Alpine	ALP-6A	Municipal road	0.27	Dry/Frozen	proposed
11	Alpine	ALP-7A (existing)		2.04	Frozen	existing
11	Cowan East	CWE-2A (existing)	CWW-1E	0.43	Dry/Frozen	existing
11	Cowan East	CWE-2A-1A (existing)	CWE-2A	0.45	Dry/Frozen	existing
11	Cowan East	CWE-2B	CWE-2A-1A	0.94	Dry/Frozen	proposed
11	Pretty Valley	PRV-3A (existing)		0.32	Dry/Frozen	existing
11	Pretty Valley	PRV-6A (existing)	Municipal road	0.85	Dry/Frozen	existing
11	Pretty Valley	PRV-6A-1A (existing)	PRV-6A	0.17	Dry/Frozen	existing
11	Renwer	RWR-13A		1.72	Dry/Frozen	proposed
11	Renwer	RWR-7A (existing)	Municipal road	0.80	Frozen	existing
11	Renwer	RWR-7A-1A, 1B and 1C	RWR-7A	1.84	Frozen	proposed
11	Renwer	RWR-7A-1B-1A		0.33	Dry/Frozen	proposed
11	Sclater	SLT-11A and 11B (existing)		2.34	Dry/Frozen	existing
11	Sclater	SLT-11A-1A	SLT-11A	0.69	Dry/Frozen	proposed
11	Sclater	SLT-11C	SLT-11C	0.25	Dry/Frozen	proposed
11	Sclater	SLT-11C-1A		0.61	Dry/Frozen	proposed
11	Sclater	SLT-12A	Municipal Road	1.23	Frozen	proposed
11	Sclater	SLT-21A	Municipal road	1.83	Dry/Frozen	proposed
11	Sclater	SLT-21A-1A		0.89	Dry/Frozen	proposed
11	Sclater	SLT-4A and 4B (existing)	Hwy 10	2.76	Dry/Frozen	existing
11	Sclater	SLT-4C (existing)	SLT-4C	0.38	Dry/Frozen	existing
11	Sclater	SLT-4D	SLT-4C-1A	1.53	Dry/Frozen	proposed
11	Sclater	SLT-7A (existing)	Hwy 10	1.11	Frozen	existing
11	Swan Lake	SWL-2A (existing)	Kettle Hills road	5.03	Dry/Frozen	existing
11	Swan Lake	SWL-2A-2A (existing)	SWL-2A	0.36	Dry/Frozen	existing
11	Swan Lake	SWL-2A-2B	SWL-2A-2A	0.54	Dry/Frozen	proposed
11	Swan Valley	SWV-1A (existing)	WFL-8A	0.92	Dry/Frozen	existing

FMU	Operating Area	Proposed Road Name	Road Name	Road Length (km)	Season of Use	Proposed or Existing
13	Arm Lake	ARL-1A to 1D (existing)		3.24	Dry/Frozen	existing
13	Arm Lake	ARL-1E to 1G (existing)	ARL-1D	7.10	Frozen	existing
13	Arm Lake	ARL-1E-1A to 1C (existing)	ARL-1E	2.76	Frozen	existing
13	Arm Lake	ARL-1E-1C-1A	ARL-1E-1C	0.53	Frozen	proposed
13	Arm Lake	ARL-1E-1D	ARL-1E-1C	0.62	Frozen	proposed
13	Arm Lake	ARL-1E-2A (existing)	ARL-1E	1.27	Frozen	existing
13	Arm Lake	ARL-1E-2A-1A	ARL-1E-2A	1.85	Frozen	proposed
13	Arm Lake	ARL-1E-2B	ARL-1E-2A	1.41	Dry/Frozen	proposed
13	Arm Lake	ARL-1F-2A	ARL-1F	0.22	Frozen	proposed
13	Clearwater Creek	CWC-1A to 1E (existing)	Beaver Lake Road	3.79	Dry/Frozen	existing
13	Clearwater Creek	CWC-1E-1A (existing)	CWC-1D	0.14	Frozen	existing
13	Clearwater Creek	CWC-1E-1B	CWC-1E-1A	2.00	Frozen	proposed
13	Clearwater Creek	CWC-1E-1B-1A		0.32	Frozen	proposed
13	Clearwater Creek	CWC-1E-1C		0.87	Frozen	proposed
13	Clearwater Creek	CWC-1E-1C-1A		1.17	Frozen	proposed
13	Clearwater Creek	CWC-5A to 5C (existing)	Municipal Road	4.69	Frozen	existing
13	Clearwater Creek	CWC-5B-1A (existing)	CWC-5B	0.00	Dry/Frozen	existing
13	Clearwater Creek	CWC-5D to 5L (existing)	CWC-5C	8.09	Frozen	existing
13	Clearwater Creek	CWC-5D-2A	CWC-5D	0.46	Frozen	proposed
13	Clearwater Creek	CWC-5K-1A to 1C (existing)	CWC-5K	2.07	Frozen	existing
13	Clearwater Creek	CWC-5L-1A and 1B (existing)	CWC-5L	3.61	Frozen	proposed
13	Clearwater Creek	CWC-5L-1C	CWC-5L-1B	1.03	Frozen	proposed
13	Clearwater Creek	CWC-5M (existing)	CWC-5L	2.60	Frozen	existing
13	Cowan West	CWW-4A	CWC-5C (Windy Hill Road)	1.56	Dry/Frozen	proposed
13	Cowan West	CWW-4A-1A		0.66	Frozen	proposed
13	Cowan West	CWW-4B		1.16	Dry/Frozen	proposed
13	Cowan West	CWW-4B-1A		0.60	Dry/Frozen	proposed
13	Cryderman's Pit	CRP-5A & 5B (existing)		3.84	Frozen	existing
13	Crydermans's Pit	CRP-5C & 5D (existing)	CRP-5B	2.81	Frozen	existing
13	Drifting River	DFR-3A (existing)	Hwy 366	0.27	Dry/Frozen	existing
13	Drifting River	DFR-3B	DFR-3A	0.82	Dry/Frozen	proposed

FMU	Operating Area	Proposed Road Name	Road Name	Road Length (km)	Season of Use	Proposed or Existing
13	Drifting River	DFR-3C		1.21	Dry/Frozen	proposed
13	Drifting River	DFR-3D (existing)	DFR-1C	0.27	Frozen	existing
13	Drifting River	DFR-3E (existing)	DFR-1D	0.69	Frozen	existing
13	Drifting River	DFR-3E-1A	DFR-1E	0.20	Frozen	proposed
13	Drifting River	DFR-3F		0.99	Frozen	proposed
13	Drifting River	DFR-3G to 3I		2.63	Frozen	proposed
13	Drifting River	DFR-3G-1A		0.48	Frozen	proposed
13	Drifting River	DFR-5A	Hwy 366	0.11	Dry/Frozen	proposed
13	Drifting River	DFR-6A	Hwy 366	0.14	Dry/Frozen	proposed
13	Drifting River	DFR-7A		0.88	Dry/Frozen	proposed
13	Drifting River	DFR-7B		0.80	Dry/Frozen	proposed
13	Drifting River	DFR-7C		0.45	Dry/Frozen	proposed
13	East Favel	EAF-2A to 2F (existing)	Hwy 366	3.77	Frozen	existing
13	East Favel	EAF-2A-2A (existing)	EAF-2A	1.48	Frozen	existing
13	East Favel	EAF-2A-3A (existing)	EAF-2A	0.00	Frozen	existing
13	East Favel	EAF-5E (existing)		0.99	Frozen	proposed
13	East Favel	EAF-5E-1A		0.60	Frozen	proposed
13	East Favel	EAF-5E-2A	EAF-5E	1.58	Frozen	proposed
13	East Favel	EAF-5E-2B		1.81	Frozen	proposed
13	East Favel	EAF-5E-2B-1A		1.08	Frozen	proposed
13	East Favel	EAF-5F		0.45	Frozen	proposed
13	East Favel	EAF-5G		0.76	Frozen	proposed
13	East Favel	EAF-5H		0.45	Frozen	proposed
13	East Favel	EAF-5I		1.04	Frozen	proposed
13	East Favel	EAF-5J		0.91	Frozen	proposed
13	East Favel	EAF-7A to 7E (existing)	Hwy 366	6.02	Frozen	existing
13	East Favel	EAF-7A-1A and 1B (existing)	EAF-7A	0.97	Frozen	existing
13	East Favel	EAF-7B-1A (existing)	EAF-7B	0.39	Frozen	existing
13	East Favel	EAF-7B-1B (existing)	EAF-7B-1A	1.21	Frozen	existing
13	East Favel	EAF-7E-1A	EAF-7E	1.92	Frozen	proposed
13	Ethelbert Trail	EBT-1A (existing)		1.85	Dry/Frozen	existing
13	Ethelbert Trail	EBT-1A-3A (existing)	EBT-1A (Ethelbert Trail)	0.55	Dry/Frozen	proposed
13	Ethelbert Trail	EBT-1A-4A (existing)	EBT-1A	0.70	Dry/Frozen	existing
13	Ethelbert Trail	EBT-1A-4B	EBT-1A-4A	0.55	Dry/Frozen	proposed
13	Island Lake	ISL-1A to 1H (existing)	Hwy 366	11.27	Dry/Frozen	existing
13	Island Lake	ISL-1F-2A (existing)	ISL-1F	1.69	Dry/Frozen	existing
13	Island Lake	ISL-1F-2B	ISL-1F-2A	0.23	Dry/Frozen	proposed
13	Island Lake	ISL-1H-1A (existing)	ISL-1H	2.25	Dry/Frozen	existing
13	Island Lake	ISL-1H-1A-1A	ISL-1H-1A	4.00	Dry/Frozen	proposed
13	Island Lake	ISL-1H-1B (existing)	ISL-1H-1A	0.96	Dry/Frozen	existing
13	Jackfish Lake	JFL-1A to 1E (existing)	Hwy 366	7.89	Dry/Frozen	existing
13	Jackfish Lake	JFL-1D-2A	JFL-1D	0.12	Dry/Frozen	proposed

FMU	Operating Area	Proposed Road Name	Road Name	Road Length (km)	Season of Use	Proposed or Existing
13	Jackfish Lake	JFL-1E-1A and 1E-1B (existing)	JFL-1E	0.90	Dry/Frozen	existing
13	Jackfish Lake	JFL-1E-3A	JFL-1E	0.99	Dry/Frozen	proposed
13	Jackfish Lake	JFL-6A (existing)	Hwy 366	0.16	Dry/Frozen	proposed
13	Jackfish Lake	JFL-7A	Hwy 366	0.13	Dry/Frozen	proposed
13	Jackfish Lake	JFL-8A	Hwy 366	0.14	Dry/Frozen	proposed
13	Line Lake	KTC-7A (existing)	Hwy 366	1.71	Dry/Frozen	existing
13	Line Lake	LNK-1A and 1B (existing)	Hwy 366	2.09	Dry/Frozen	existing
13	Line Lake	LNK-1B-1A to 1B-1C (existing)	LNK-1B	2.07	Dry/Frozen	existing
13	Line Lake	LNK-1B-1C-1A	LNK-1B-1C	0.88	Dry/Frozen	proposed
13	Line Lake	LNK-1B-1D	LNK-1B-1C	0.89	Frozen	proposed
13	Line Lake	LNK-1B-1E		1.20	Dry/Frozen	proposed
13	Line Lake	LNK-1C and 1D	LNK-1B	2.11	Dry/Frozen	proposed
13	Line Lake	LNK-1D-1A		0.75	Dry/Frozen	proposed
13	Line Lake	LNK-7B and 7C (existing)	LNK-7C	0.93	Dry/Frozen	existing
13	Line Lake	LNK-7B-1A		0.53	Dry/Frozen	proposed
13	Madge Lake	MGL-10A to 10D (existing)	Hwy 83	2.68	Dry/Frozen	existing
13	River Hill	RVH-1F-1A (existing)	RVH-1F	0.88	Frozen	existing
13	River Hill	RVH-1G	RVH-1F	0.46	Frozen	proposed
13	River Hill	VMR-1B-1A-1A (existing)	VMR-1B-1A	2.57	Frozen	existing
13	Route H	RTH-2A to 2D (existing)		4.18	Dry/Frozen	existing
13	Route H	RTH-2C-1A	RTH-2A	0.80	Dry/Frozen	proposed
13	Route H	RTH-2E	RTH-2D	0.60	Dry/Frozen	proposed
13	Route H	RTH-6A (existing)	Municipal road	1.78	Frozen	existing
13	Route H	RTH-6A-1A	RTH-6A	0.64	Frozen	proposed
13	Route W	RTW-1A to 1D (existing)		6.00	Dry/Frozen	existing
13	Route W	RTW-1D-2A to 1D-2D (existing)	RTW-1D	4.54	Frozen	existing
13	Route W	RTW-2A and 2B (existing)		3.19	Dry/Frozen	existing
13	Route W	RTW-2A-1A to 1C (existing)	RTW-2A	2.35	Dry/Frozen	existing
13	Route W	RTW-2A-1D	RTW-2A-1C	1.25	Dry/Frozen	proposed
13	Route W	RTW-2C	RTW-2B	1.09	Dry/Frozen	proposed
13	Sarah Lake	SRL-01 to 05 (existing)	Municipal Road	24.57	All season	existing
13	Sarah Lake	SRL-4A and 4B (existing)	Municipal Road	2.76	Dry/Frozen	existing
13	Silver Creek	SLC-2A and 2B (existing)		3.97	Dry/Frozen	existing
13	Silver Creek	SLC-2A-1A (existing)	SLC-2A	0.00	Dry/Frozen	existing
13	Silver Creek	SLC-2B-2A and 2B	SLC-2B	5.33	Dry/Frozen	proposed

FMU	Operating Area	Proposed Road Name	Road Name	Road Length (km)	Season of Use	Proposed or Existing
13	Silver Creek	SLC-3A (existing)	Boundary road	1.87	Frozen	existing
13	Silver Creek	SLC-5A to 5I (existing)	Forest boundary road	11.68	Dry/Frozen	existing
13	Silver Creek	SLC-8A (existing)	Provincial Forest Boundary	0.68	Frozen	existing
13	Sinnott Lake	SNL-1A to 1D (existing)	UPD-1D	4.20	Dry/Frozen	existing
13	Sinnott Lake	SNL-1C-1A to 1C-1E (existing)	SNL-1C	2.56	Dry/Frozen	existing
13	Sinnott Lake	SNL-1C-1F	SNL-1C-1E	0.59	Dry/Frozen	proposed
13	Sinnott Lake	SNL-1D-1A	SNL-1D	0.38	Dry/Frozen	proposed
13	Sinnott Lake	SNL-1D-1B		0.99	Dry/Frozen	proposed
13	Sinnott Lake	SNL-2A to 2C (existing)	UPD-1A	4.90	Dry/Frozen	existing
13	Sinnott Lake	UPD-1A to 1C (existing)	Merridale Road	6.94	All season	existing
13	Stoski Road	STR-1A to 1J (existing)	Hwy 366	10.56	Frozen	existing
13	Stoski Road	STR-1B-4A (contingency)	STR-1B	1.45	Frozen	proposed
13	Stoski Road	STR-1F-1A and 1B (existing)	STR-1F	0.39	Frozen	existing
13	Stoski Road	STR-1G-1A	STR-1G	1.54	Frozen	proposed
13	Stoski Road	STR-1H-1A	STR-1H	1.33	Frozen	proposed
13	Stoski Road	STR-4A (existing)	Hwy 367	0.16	Dry/Frozen	existing
13	Stoski Road	STR-4B	STR-4A	2.09	Dry/Frozen	proposed
13	Tee Lakes	TEL-1A to 1K (existing)	SRL-03	18.87	Dry/Frozen	existing
13	Tee Lakes	TEL-1F-3A (existing)	TEL-1F	1.59	Frozen	existing
13	Tee Lakes	TEL-1K-1A (existing)	TEL-1K	0.68	Frozen	existing
13	Tee Lakes	TEL-1L and 1M	TEL-1K	3.41	Frozen	proposed
13	Tee Lakes	TEL-1N		0.68	Frozen	proposed
13	Tee Lakes	TEL-1N-1A		0.68	Frozen	proposed
13	Tee Lakes	TEL-9A to 9F (existing)	SRL-02 Sarah Lake Road	5.40	Dry/Frozen	existing
13	Tee Lakes	TEL-9F-1A	TEL-9F	2.28	Dry/Frozen	proposed
13	Tee Lakes	TEL-9G (existing)	TEL-9F	3.69	Dry/Frozen	existing
13	Tee Lakes	TEL-9G-1A	TEL-9G	2.28	Dry/Frozen	proposed
13	Valley River	VLR-1A to 1D (existing)		6.87	Dry/Frozen	existing
13	Valley River	VLR-1D-1A to 1D-1C (existing)	VLR-1D	8.73	Dry/Frozen	existing
13	Valley River	VLR-1D-1A-1A and 1B	VLR-1D-1A	1.81	Dry/Frozen	proposed
13	Valley River	VLR-1D-1C-1A	VLR-1D-1C	0.64	Dry/Frozen	proposed
13	Valley River	VLR-1E (existing)	VLR-1D	3.28	Dry/Frozen	existing
13	Valley River	VLR-4A (existing)		1.67	Dry/Frozen	existing
13	Valley River/WNL	WNL-1B and 1C (existing)	WNL-1A	3.20	Dry/Frozen	existing

FMU	Operating Area	Proposed Road Name	Road Name	Road Length (km)	Season of Use	Proposed or Existing
13	Valley River/WNL	WNL-1D (existing)	WNL-1C	1.74	Dry/Frozen	existing
13	Valley River/WNL	WNL-1D-1A (existing)	WNL-1D	0.76	Dry/Frozen	existing
13	Valley River/WNL	WNL-1E	WNL-1D	1.03	Dry/Frozen	proposed
13	Vimy Ridge	VMR-1A and 1B (existing)	Municipal road (Vimy Ridge Road)	10.21	Dry/Frozen	existing
13	Vimy Ridge	VMR-1A-4A (existing)		0.30	Dry/Frozen	existing
13	Vimy Ridge	VMR-1B-1A (existing)	VMR-1B	0.40	Dry/Frozen	existing
13	Vimy Ridge	VMR-1B-1B to 1B-1C (existing)	VMR-1B-1A	3.41	Dry/Frozen	existing
13	Vimy Ridge	VMR-1B-1C-1A (existing)	VMR-1B-1C	0.32	Frozen	existing
13	Vimy Ridge	VMR-1B-1C-1B	VMR-1B-1C-1A	0.58	Frozen	existing
13	Vimy Ridge	VMR-1B-1C-2A	VMR-1B-1C	1.24	Frozen	proposed
13	Vimy Ridge	VMR-1B-3A and 1B-3B (existing)	VMR-1B	4.06	Dry/Frozen	existing
13	Vimy Ridge	VMR-1B-3B-1A (existing)	VMR-1B-3B	4.29	Frozen	existing
13	Vimy Ridge	VMR-1B-3B-1B-1A		0.22	Frozen	proposed
13	Vimy Ridge	VMR-1B-3B-1B-2A		1.04	Frozen	proposed
13	Vimy Ridge	VMR-1C and 1D (existing)	VMR-1C	3.41	Frozen	existing
13	Vimy Ridge	VMR-1D-1A-3A	VMR-1D-1A	2.06	Frozen	proposed
13	Watjask Lake	WJL 1A to 1Q (existing)	Hwy 83	16.48	Dry/Frozen	existing
13	Watjask Lake	WJL-1K-1A	WJL-1K	0.92	Dry/Frozen	proposed
13	Watjask Lake	WJL-1K-1A-1A		3.08	Dry/Frozen	proposed
13	Watjask Lake	WJL-1K-1B		3.24	Dry/Frozen	proposed
13	Watjask Lake	WJL-1K-1B-1A		0.33	Dry/Frozen	proposed
13	Watjask Lake	WJL-1K-1B-2A		0.70	Dry/Frozen	proposed
13	Watjask Lake	WJL-1Q-1A (existing)	WJL-1Q	0.93	Dry/Frozen	existing
13	Watjask Lake	WJL-1Q-1B (existing)	WJL-1Q-1A	1.58	Dry/Frozen	existing
13	Watjask Lake	WJL-1Q-1B-1A	WJL-1Q-1B	2.47	Dry/Frozen	proposed
13	Watjask Lake	WJL-1Q-1B-2A	WJL-1Q-1B	0.91	Dry/Frozen	proposed
13	Watjask Lake	WJL-1Q-1C	WJL-1Q-1B	0.90	Dry/Frozen	proposed
13	Watjask Lake	WJL-1R (existing)	WJL-1Q	2.17	Dry/Frozen	existing
13	Watjask Lake	WJL-1R-1A	WJL-1R	2.11	Dry/Frozen	proposed
13	West Favel	WEF-3J-1A (existing)	WEF-3J	1.96	Frozen	existing
13	West Favel	WEF-3J-1A-1A (existing)	WEF-3J-1A	0.60	Frozen	existing
13	West Favel	WEF-3J-1B	WEF-3J-1A	1.41	Frozen	proposed
13	West Favel	WEF-3J-1C		1.05	Frozen	proposed

FMU	Operating Area	Proposed Road Name	Road Name	Road Length (km)	Season of Use	Proposed or Existing
13	West Favel	WEF-3K and 3L (existing)	RTW-1D-2D	2.28	Frozen	existing
13	Wine Lake	WNL-1A (existing)	Municipal road	3.12	Dry/Frozen	existing
13	Wine Lake	WNL-1A-4A (existing)	WNL-1A	0.32	Dry/Frozen	existing
13	Wine Lake	WNL-1A-6A (existing)	WNL-1A	0.99	Dry/Frozen	existing
13	Wine Lake	WNL-1A-6B	WNL-1A-6A	2.54	Dry/Frozen	proposed
13	Wine Lake	WNL-1A-6C		0.60	Frozen	proposed
13	Wine Lake	WNL-7A to 7C (existing)	Municipal road	2.69	Dry/Frozen	existing
13	Wine Lake	WNL-7B-1A (existing)	WNL-7B	1.04	Dry/Frozen	existing
13	Wine Lake	WNL-7C-1A	WNL-7C	0.39	Dry/Frozen	proposed
13	Wine Lake	WNL-7C-2A	WNL-7C	1.55	Dry/Frozen	proposed

APPENDIX II: CROSSINGS

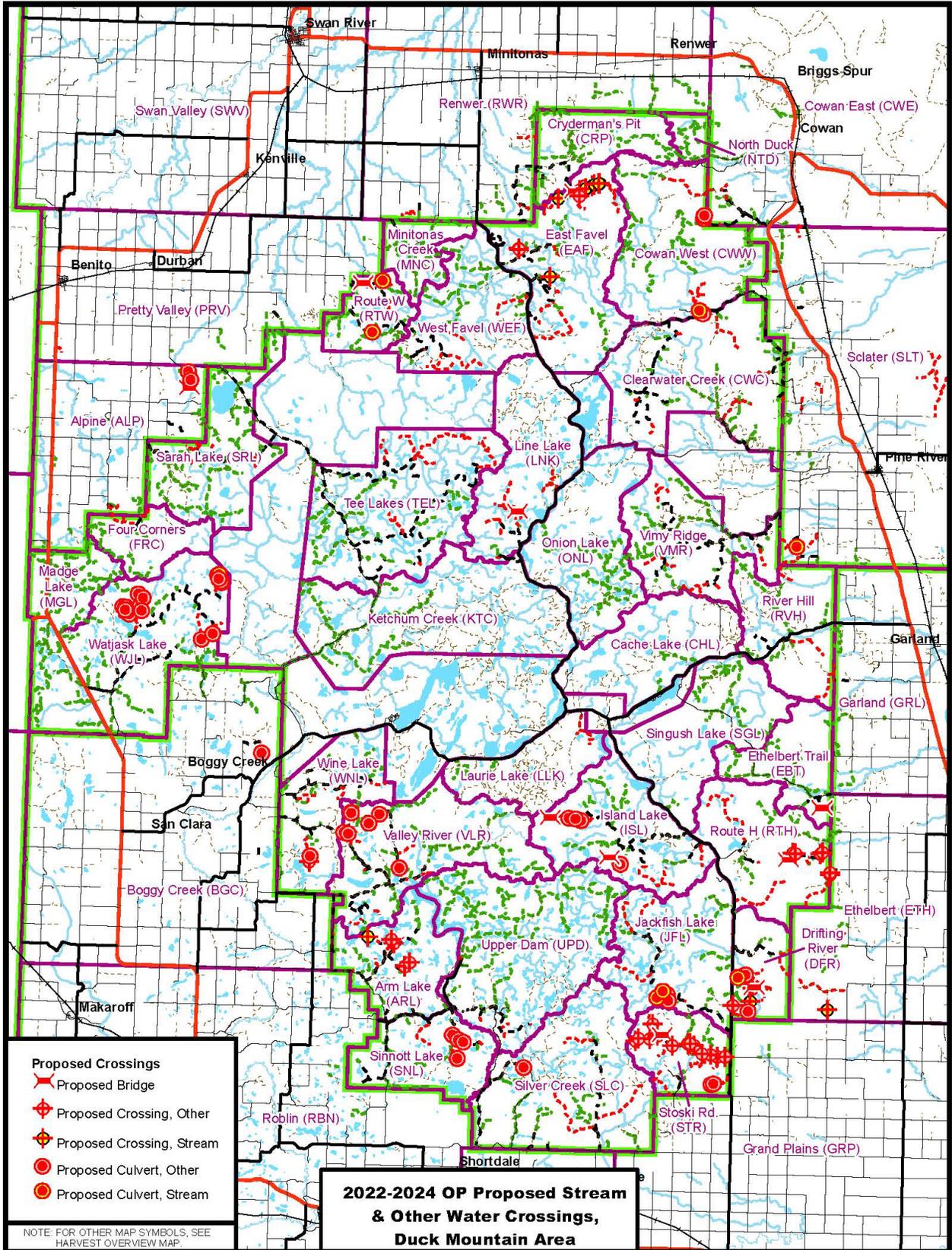


Table A2.1 Proposed crossings for 2022 and 2023.

Op Area	Crossing #	Type	Install	Life span	Assessed	Owner	Roll Over	Size
Alpine	ALP-C01	Culvert	Sep-22	Temp		Quota	No	12 in
Alpine	ALP-C09	Culvert	Sep-22	Temp		Quota	No	12 in
Alpine	ALP-C10	Bridge	Sep-22	Temp		Quota	No	30 ft
Arm Lake	ARL-C01	Snow/Ice	Dec-22	Temp		LP	Yes	NA
Arm Lake	ARL-C02	Snow/Ice	Dec-22	Temp		LP	No	NA
Arm Lake	ARL-C15	Snow/Ice	Dec-22	Temp		LP	No	NA
Arm Lake	ARL-C16	Snow/Ice	Dec-22	Temp		LP	No	NA
Arm Lake	ARL-C17	Snow/Ice	Dec-22	Temp		LP	No	NA
Boggy Creek	BGC-C01	Culvert	Sep-22	Temp		LP	No	12 in
Cowan West	CWW-C22	Culvert	Sep-22	Temp		SPL	Yes	18 in
Cowan West	CWW-C23	Culvert	Sep-22	Temp		SPL	Yes	18 in
Cowan West	CWW-C24	Culvert	Sep-22	Temp		SPL	Yes	18 in
Cowan West	CWW-C25	Culvert	Sep-23	Temp		LP	Yes	18 in
Cowan West	CWW-C26	Culvert	Sep-23	Temp		LP	Yes	18 in
Cowan West	CWW-C27	Culvert	Sep-23	Temp		LP	Yes	18 in
Drifting River	DFR-13282302-01-2	Snow/Ice	Dec-22	Temp		LP	Yes	NA
Drifting River	DFR-C04	Snow/Ice	Dec-22	Temp		LP	Yes	NA
Drifting River	DFR-C05	Bridge	Dec-22	Temp		LP	Yes	30 ft
Drifting River	DFR-C06	Culvert	Sep-22	Perm		LP	Yes	24 in
Drifting River	DFR-C07	Culvert	Sep-22	Temp		LP	Yes	18 in
Drifting River	DFR-C08	Culvert	Sep-22	Temp		LP	Yes	12 in
Drifting River	DFR-C09	Culvert	Sep-22	Temp		LP	Yes	18 in
Drifting River	DFR-C10	Culvert	Sep-22	Temp		LP	Yes	12 in
Drifting River	DFR-C11	Culvert	Sep-22	Temp		LP	Yes	12 in
Drifting River	DFR-C12	Snow/Ice	Dec-22	Temp		LP	Yes	NA
East Favel	EAF-133425S1-01-1	Snow/Ice	Dec-22	Temp		Quota	Yes	NA
East Favel	EAF-C05	Bridge	Dec-22	Temp		LP	Yes	45 ft
East Favel	EAF-C06	Snow/Ice	Dec-22	Temp		LP	Yes	NA
East Favel	EAF-C07	Snow/Ice	Dec-22	Temp		LP	Yes	NA
East Favel	EAF-C08	Snow/Ice	Dec-22	Temp		LP	Yes	NA
East Favel	EAF-C09	Snow/Ice	Dec-22	Temp		LP	Yes	NA
East Favel	EAF-C10	Snow/Ice	Dec-23	Temp		LP	No	NA
East Favel	EAF-C11	Snow/Ice	Dec-23	Temp		LP	No	NA
East Favel	EAF-C18	Snow/Ice	Dec-22	Temp		LP	Yes	NA
East Favel	EAF-C19	Bridge	Dec-22	Temp		LP	Yes	45 ft
East Favel	EAF-C20	Snow/Ice	Dec-22	Temp		LP	Yes	NA
East Favel	EAF-C21	Snow/Ice	Dec-22	Temp		LP	Yes	NA
East Favel	EAF-C22	Snow/Ice	Dec-22	Temp		LP	Yes	NA
East Favel	EAF-C27	Snow/Ice	Dec-23	Temp		LP	No	NA
Ethelbert	ETH-C05	Culvert	Jul-22	Temp		LP	Yes	24 in
Island Lake	ISL-C12	Culvert	Jul-22	Temp		SPL	No	18 in
Island Lake	ISL-C13	Culvert	Jul-22	Temp		SPL	No	12 in
Island Lake	ISL-C14	Bridge	Jul-22	Temp		SPL	No	20 ft
Island Lake	ISL-C15	Culvert	Jul-22	Temp		SPL	No	18 in
Island Lake	ISL-C17	Bridge	Jul-23	Temp		SPL	No	30 ft
Island Lake	ISL-C18	Culvert	Jul-23	Temp		SPL	No	12 in
Jackfish Lake	JFL-C22	Culvert	Sep-23	Temp		LP	Yes	18 in
Jackfish Lake	JFL-C25	Culvert	Sep-23	Temp		LP	Yes	12 in

Op Area	Crossing #	Type	Install	Life span	Assessed	Owner	Roll Over	Size
Jackfish Lake	JFL-C31	Culvert	Sep-23	Temp		LP	No	12 in
Jackfish Lake	JFL-C33	Culvert	Sep-23	Temp		LP	No	18 in
Jackfish Lake	JFL-C34	Culvert	Sep-23	Temp		LP	No	18 in
Line Lake	LNK-C15	Bridge	Sep-23	Temp		Quota	No	30 ft
Route H	RTH-C02	Snow/Ice	Dec-23	Temp		LP	Yes	NA
Route H	RTH-C03	Snow/Ice	Dec-23	Temp		LP	Yes	NA
Route H	RTH-C04	Snow/Ice	Dec-23	Temp		LP	Yes	NA
Route H	RTH-C05	Snow/Ice	Dec-23	Temp		LP	Yes	NA
Route H	RTH-C06	Snow/Ice	Dec-23	Temp		LP	Yes	NA
Route H	RTH-C10	Snow/Ice	Dec-23	Temp		Quota	Yes	NA
Route H	RTH-C11	Snow/Ice	Dec-23	Temp		Quota	Yes	NA
Route W	RTW-13342701-C2	Culvert	Jul-22	Perm		LP	No	36 in
Route W	RTW-13342701-C4	Bridge	Sep-23	Temp		Bresky	No	45 ft
Route W	RTW-C18	Culvert	Sep-23	Temp		Bresky	No	18 in
Sclater	SLT-C60	Culvert	Sep-22	Temp		LP	Yes	24 in
Silver Creek	SLC-C13	Culvert	Sep-23	Temp		LP	Yes	18 in
Sinnott Lake	SNL-13272601-C2	Culvert	Sep-22	Perm		LP	Yes	24 in
Sinnott Lake	SNL-C01	Culvert	Sep-22	Temp		LP	Yes	NA
Sinnott Lake	SNL-C10	Culvert	Sep-22	Temp		LP	Yes	18 in
Sinnott Lake	SNL-C14	Culvert	Sep-22	Temp		LP	Yes	18 in
Stoski Road	STR-C01	Snow/Ice	Dec-23	Temp		LP	Yes	NA
Stoski Road	STR-C02	Snow/Ice	Dec-23	Temp		LP	Yes	NA
Stoski Road	STR-C03	Snow/Ice	Dec-23	Temp		LP	Yes	NA
Stoski Road	STR-C04	Snow/Ice	Dec-23	Temp		LP	Yes	NA
Stoski Road	STR-C05	Snow/Ice	Dec-23	Temp		LP	Yes	NA
Stoski Road	STR-C06	Snow/Ice	Dec-23	Temp		LP	Yes	NA
Stoski Road	STR-C07	Snow/Ice	Dec-23	Temp		LP	Yes	NA
Stoski Road	STR-C08	Snow/Ice	Dec-23	Temp		LP	Yes	NA
Stoski Road	STR-C09	Bridge	Dec-23	Temp	Yes	LP	Yes	30 ft
Stoski Road	STR-C10	Snow/Ice	Dec-23	Temp		LP	Yes	NA
Stoski Road	STR-C11	Snow/Ice	Dec-23	Temp		LP	Yes	NA
Stoski Road	STR-C12	Snow/Ice	Dec-23	Temp		LP	Yes	NA
Stoski Road	STR-C13	Snow/Ice	Dec-23	Temp		LP	Yes	NA
Stoski Road	STR-C21	Snow/Ice	Dec-23	Temp		LP	Yes	NA
Stoski Road	STR-C24	Culvert	Sep-22	Temp		Quota	No	18 in
Stoski Road	STR-C25	Culvert	Sep-22	Temp		Quota	No	24 in
Valley River	VLR-132927S2-C1	Culvert	Sep-22	Temp		LP	Yes	18 in
Valley River	VLR-C10	Culvert	Sep-22	Temp		LP	Yes	18 in
Valley River	VLR-C15	Culvert	Sep-22	Temp		LP	Yes	12 in
Valley River	VLR-C16	Culvert	Sep-22	Temp		LP	Yes	12 in
Valley River	VLR-C17	Culvert	Sep-22	Temp		LP	Yes	12 in
Valley River	VLR-C18	Culvert	Sep-22	Temp		LP	Yes	12 in
Watjask Lake	WJL-C28	Culvert	Jul-23	Temp		LP	Yes	12 in
Watjask Lake	WJL-C29	Culvert	Jul-23	Temp		LP	Yes	12 in
Watjask Lake	WJL-C30	Culvert	Jul-23	Temp		LP	Yes	12 in
Watjask Lake	WJL-C31	Culvert	Jul-23	Temp		LP	Yes	12 in
Watjask Lake	WJL-C32	Culvert	Jul-22	Temp		LP	No	18 in

Op Area	Crossing #	Type	Install	Life span	Assessed	Owner	Roll Over	Size
Watjask Lake	WJL-C33	Culvert	Jul-22	Temp		LP	No	18 in
Watjask Lake	WJL-C34	Culvert	Jul-23	Temp		LP	No	18 in
Watjask Lake	WJL-C35	Culvert	Jul-23	Temp		LP	No	18 in
Watjask Lake	WJL-C36	Culvert	Jul-23	Temp		LP	No	12 in
Watjask Lake	WJL-C37	Culvert	Jul-23	Temp		LP	No	12 in
Watjask Lake	WJL-C38	Culvert	Jul-23	Temp		LP	No	12 in
Watjask Lake	WJL-C39	Culvert	Jul-23	Temp		LP	No	12 in
Watjask Lake	WJL-C40	Culvert	Jul-23	Temp		LP	No	18 in
Watjask Lake	WJL-C41	Culvert	Jul-23	Temp		LP	No	24 in
Watjask Lake	WJL-C42	Culvert	Jul-23	Temp		LP	No	24 in
Wine Lake	WNL-C07	Culvert	Dec-22	Temp		LP	Yes	NA
Wine Lake	WNL-C13	Snow/Ice	Dec-23	Temp		SPL	No	NA
Wine Lake	WNL-C22	Culvert	Sep-23	Temp		SPL	No	18 in

Table A2.2 Existing crossings.

FMU	Op Area	Plan	Crossing #	Type	Year Installed	Assessed	Owner
13	Arm Lake	22 Existing	ARL-13282601-01-1	Snow/Ice	2018	No	LP
13	Arm Lake	22 Existing	ARL-13282601-01-3	Snow/Ice	2018	No	LP
13	Arm Lake	22 Existing	ARL-C05	Snow/Ice	2018	No	LP
13	Arm Lake	22 Existing	ARL-C06	Snow/Ice	2018	No	LP
13	Arm Lake	22 Existing	ARL-C07	Snow/Ice	2018	No	LP
13	Arm Lake	22 Existing	ARL-C08	Snow/Ice	2018	No	LP
13	Arm Lake	22 Existing	ARL-C09	Snow/Ice	2018	No	LP
13	Arm Lake	22 Existing	ARL-C10	Snow/Ice	2018	No	LP
13	Arm Lake	22 Existing	ARL-C11	Snow/Ice	2018	No	LP
13	Arm Lake	22 Existing	ARL-C12	Snow/Ice	2018	No	LP
13	Arm Lake	22 Existing	ARL-C13	Snow/Ice	2018	No	LP
13	Arm Lake	22 Existing	ARL-C14	Snow/Ice	2020	No	LP
13	Clearwater Creek	23 Existing	CWC-133324CW-C1	Culvert	1980?	No	LP
13	Clearwater Creek	23 Existing	CWC-133324CW-C8	Culvert	1980?	No	LP
13	Clearwater Creek	22 Existing	CWC-C01	Bridge	2003	No	SPL
13	Clearwater Creek	22 Existing	CWC-C07	Bridge	2005	No	SPL
13	Clearwater Creek	22 Existing	CWC-C12	Culvert	1980?	No	SPL
13	Clearwater Creek	22 Existing	CWC-C13	Culvert	1980?	No	SPL
13	Clearwater Creek	22 Existing	CWC-C14	Snow/Ice	2002	No	SPL
13	Clearwater Creek	22 Existing	CWC-C15	Snow/Ice	2002	No	SPL
13	Clearwater Creek	22 Existing	CWC-C16	Snow/Ice	2002	No	SPL
13	Clearwater Creek	22 Existing	CWC-C17	Snow/Ice	2002	No	SPL
13	Clearwater Creek	22 Existing	CWC-C18	Snow/Ice	2002	No	SPL
13	Clearwater Creek	22 Existing	CWC-C34	Snow/Ice	2007	No	SPL
13	Clearwater Creek	22 Existing	CWC-C35	Bridge	2007	Yes	SPL
13	Clearwater Creek	22 Existing	CWC-C36	Snow/Ice	2007	No	SPL
13	Clearwater Creek	23 Existing	CWC-C42	Snow/Ice	2012	No	SPL
13	Clearwater Creek	23 Existing	CWC-C43	Snow/Ice	2018	No	SPL
13	Clearwater Creek	23 Existing	CWC-C44	Snow/Ice	2012	No	SPL
13	Clearwater Creek	23 Existing	CWC-C47	Snow/Ice	2012	No	SPL
13	Clearwater Creek	23 Existing	CWC-C48	Snow/Ice	2014	No	SPL
13	Cryderman's Pit	22 Existing	CRP-C12	Snow/Ice	2012	No	LP

FMU	Op Area	Plan	Crossing #	Type	Year Installed	Assessed	Owner
13	Cryderman's Pit	22 Existing	CRP-C21	Snow/Ice	2021	No	LP
13	Cryderman's Pit	22 Existing	CRP-C22	Snow/Ice	2021	No	LP
13	Cryderman's Pit	22 Existing	CRP-C98	Snow/Ice	2012	No	LP
13	East Favel	23 Existing	EAF-13242501-03-4	Snow/Ice	2007	No	LP
13	East Favel	23 Existing	EAF-13242501-C1	Snow/Ice	2007	No	LP
13	East Favel	23 Existing	EAF-13242501-C2	Snow/Ice	2007	No	LP
13	East Favel	23 Existing	EAF-13242501-C3	Snow/Ice	2007	No	LP
13	East Favel	22 Existing	EAF-C24	Snow/Ice	2010	No	Quota
13	Ethelbert Trail	23 Existing	EBT-C11	Culvert	2021	No	Quota
13	Island Lake	22 Existing	ISL-C01	Culvert	2000	No	LP
13	Island Lake	22 Existing	ISL-C02	Culvert	2000	No	LP
13	Island Lake	23 Existing	ISL-C05	Culvert	2009	No	SPL
13	Island Lake	23 Existing	ISL-C06	Culvert	2009	No	SPL
13	Island Lake	22 Existing	ISL-C07	Culvert	2017	Yes	SPL
13	Island Lake	22 Existing	ISL-C10	Culvert	2000	No	SPL
13	Island Lake	22 Existing	ISL-C11	Culvert	2000	No	SPL
13	Island Lake	23 Existing	ISL-C19	Culvert	2000	No	SPL
13	Jackfish Lake	22 Existing	JFL-C27	Snow/Ice	2021	No	Quota
13	Jackfish Lake	22 Existing	JFL-C28	Snow/Ice	2021	No	Quota
13	Line Lake	22 Existing	LNK-C13	Culvert	2019	No	Quota
13	Line Lake	22 Existing	LNK-C14	Culvert	2019	No	Quota
13	Madge Lake	23 Existing	MGL-C30	Culvert	2016	No	LP
13	Madge Lake	23 Existing	MGL-C31	Culvert	2016	No	LP
13	Madge Lake	23 Existing	MGL-C32	Culvert	2016	No	LP
13	Madge Lake	23 Existing	MGL-C33	Culvert	2016	No	LP
13	Madge Lake	23 Existing	MGL-C34	Culvert	2016	No	LP
13	Madge Lake	23 Existing	MGL-C35	Culvert	2016	No	LP
13	Route W	23 Existing	RTW-13342701-04-1	Culvert	1999	No	Bresky
13	Route W	22 Existing	RTW-13342701-C3	Culvert	1998	No	Bresky
13	Route W	23 Existing	RTW-13342701-C5	Culvert	1999	No	Bresky
13	Route W	22 Existing	RTW-C04	Culvert	1998	No	Bresky
13	Route W	23 Existing	RTW-C06	Culvert	2012	No	Bresky
13	Route W	22 Existing	RTW-C15	Culvert	2019	No	Bresky
13	Route W	22 Existing	RTW-C19	Snow/Ice	2021	No	Bresky
13	Route W	22 Existing	RTW-C20	Snow/Ice	2021	No	Bresky
11	Sclater	22 Existing	SLT-C01	Bridge	2002	Yes	SPL
11	Sclater	23 Existing	SLT-C06	Snow/Ice	2014	No	LP
13	Silver Creek	23 Existing	SLC-C11	Culvert	2005	No	LP
13	Sinnott Lake	22 Existing	SNL-13272601-C1	Culvert	1999	No	LP
13	Sinnott Lake	22 Existing	SNL-C09	Culvert	1999	No	LP
13	Tee Lakes	22 Existing	TEL-C06	Culvert	2001	No	SPL
13	Tee Lakes	22 Existing	TEL-C07	Bridge	2008	No	SPL
13	Tee Lakes	22 Existing	TEL-C10	Bridge	2005	No	SPL
13	Tee Lakes	22 Existing	TEL-C11	Culvert	2020	No	SPL
13	Tee Lakes	22 Existing	TEL-C13	Culvert	2005	No	SPL
13	Tee Lakes	22 Existing	TEL-C19	Bridge	2013	No	SPL
13	Tee Lakes	22 Existing	TEL-C20	Culvert	2013	No	SPL

FMU	Op Area	Plan	Crossing #	Type	Year Installed	Assessed	Owner
13	Tee Lakes	22 Existing	TEL-C21	Culvert	2013	No	SPL
13	Tee Lakes	22 Existing	TEL-C28	Bridge	2018	No	SPL
13	Tee Lakes	22 Existing	TEL-C32	Culvert	2019	No	SPL
13	Tee Lakes	22 Existing	TEL-C33	Snow/Ice	2021	No	SPL
13	Upper Dam	22 Existing	UPD-km0.4	Culvert	1997	No	LP
13	Upper Dam	22 Existing	UPD-km1.15	Culvert	1997	No	LP
13	Upper Dam	22 Existing	UPD-km2.4	Culvert	1997	No	LP
13	Upper Dam	22 Existing	UPD-km2.7 WR	Culvert	1997	No	MB-CWS
13	Upper Dam	22 Existing	UPD-km3.0	Culvert	1997	No	LP
13	Upper Dam	22 Existing	UPD-km3.7 WR	Culvert	1997	No	MB-CWS
13	Upper Dam	22 Existing	UPD-km4.3	Culvert	1997	No	LP
13	Upper Dam	22 Existing	UPD-km5.5 WR	Culvert	1997	No	MB-CWS
13	Valley River	22 Existing	VLR-13292602-05-01	Culvert	1970?	No	SPL
13	Valley River	22 Existing	VLR-13292602-05-02	Culvert	1970?	No	SPL
13	Valley River	22 Existing	VLR-13292602-05-03	Culvert	1970?	No	SPL
13	Valley River	22 Existing	VLR-13292602-05-04	Culvert	1970?	No	SPL
13	Valley River	22 Existing	VLR-13292602-05-05	Culvert	1970?	No	SPL
13	Valley River	22 Existing	VLR-13292602-05-06	Culvert	1970?	No	SPL
13	Valley River	22 Existing	VLR-13292602-05-07	Culvert	1970?	No	SPL
13	Valley River	22 Existing	VLR-13292602-05-21	Culvert	1970?	No	SPL
13	Valley River	22 Existing	VLR-C11	Culvert	1970?	No	SPL
13	Valley River	22 Existing	VLR-C21	Culvert	1970?	No	SPL
13	Valley River	22 Existing	VLR-C22	Culvert	1970?	No	SPL
13	Vimy Ridge	22 Existing	VMR-C02	Culvert	1990?	Yes	SPL
13	Vimy Ridge	22 Existing	VMR-C03	Culvert	1990?	No	SPL
13	Vimy Ridge	22 Existing	VMR-C04	Culvert	1990?	No	SPL
13	Vimy Ridge	23 Existing	VMR-C05	Culvert	2008	No	SPL
13	Vimy Ridge	23 Existing	VMR-C06	Culvert	2008	No	SPL
13	Vimy Ridge	23 Existing	VMR-C07	Culvert	2008	No	SPL
13	Vimy Ridge	23 Existing	VMR-C08	Culvert	2008	No	SPL
13	Vimy Ridge	23 Existing	VMR-C09	Culvert	2012	No	SPL
13	Vimy Ridge	23 Existing	VMR-C10	Culvert	2012	No	SPL
13	Vimy Ridge	23 Existing	VMR-C11	Culvert	2012	No	SPL
13	Vimy Ridge	23 Existing	VMR-C12	Culvert	2012	No	SPL
13	Vimy Ridge	23 Existing	VMR-C13	Culvert	2012	No	SPL
13	Watjask Lake	22 Existing	WJL-C03	Culvert	2014	No	LP
13	Watjask Lake	22 Existing	WJL-C04	Culvert	2015	No	LP
13	Watjask Lake	22 Existing	WJL-C15	Culvert	2015	No	LP
13	Watjask Lake	22 Existing	WJL-C16	Culvert	2017	No	LP
13	Watjask Lake	22 Existing	WJL-C17	Culvert	2017	No	LP
13	Watjask Lake	22 Existing	WJL-C18	Culvert	2017	No	LP
13	West Favel	22 Existing	WEF-C04	Snow/Ice	2004	Yes	LP
13	Wine Lake	22 Existing	WNL-C01	Culvert	2021	No	LP
13	Wine Lake	22 Existing	WNL-C02	Culvert	2021	No	LP
13	Wine Lake	22 Existing	WNL-C03	Culvert	2021	No	LP
13	Wine Lake	22 Existing	WNL-C08	Culvert	2021	No	LP

APPENDIX III: HARVEST VOLUME PROJECTIONS

Block Volumes by Species

The 2022-2024 proposed harvest block volumes have been generated from LP's Pre-Harvest Survey (PHS) information.

Total Block Volumes

The *Hardwood Total Volume* includes trembling aspen (TA), balsam poplar (BA) and white birch (WB). Manitoba maple, green ash, white elm and bur oak volumes are not reported, since these hardwood species are not cut. The *Softwood Total Volume* includes white spruce (WS), black spruce (BS), jack pine (JP), balsam fir (BF), and tamarack (TL).

Hardwood and Softwood Allocation Volumes

The *Hardwood and Softwood Allocation* for both hardwood and softwood have been netted down to estimate the actual volume that will be harvested by each quota holder within a cut block. These net-downs include:

- i) **wildlife trees** - a 5 % reduction on the *Total Volumes* to account for 8 – 12 wildlife trees per hectare, line-of-sight buffers, understory protection, wind protection *etc.*; and
- ii) **immature white spruce** - a further reduction in the *Softwood Allocation Volume* to account for immature white spruce that has been prescribed to be left unharvested (anything less than 10 meters in height) or seed trees left as part of the renewal prescription.

Certain cut blocks are harvested over several years (multi-year blocks), in these cases, only the Quota Holders annual allocated volume is indicated in the *Allocation Volume*.

Projection Year Volumes

The volumes for projection blocks (2024, 2025, and 2026) are based on average volumes from past harvest blocks. These estimated volumes will be replaced by the actual Pre-Harvest Survey measured volumes, after the blocks are Pre-Harvest Surveyed.

Table A3.1 Operating area names and codes by Forest Management Unit, within Forest Management Licence 3.

FMU	CODE	NAME
10	ALS	Alonsa
10	BGC	Boggy Creek
10	BVD	Beaver Dam
10	CYR	Cayer
10	DPH	Dauphin
10	ETH	Ethelbert
10	GRL	Garland
10	GRP	Grand Plains
10	ING	Inglis
10	MKK	Makinak
10	NRW	The Narrows
10	RBN	Roblin
10	SRS	Ste Rose
10	TBT	Timberton
10	WDN	Weiden

11	ALP	Alpine
11	BSN	Bowsman
11	CWE	Cowan East
11	PRV	Pretty Valley
11	RWR	Renwer
11	SLT	Sclater
11	SWL	Swan Lake
11	SWV	Swan Valley

FMU	CODE	NAME
13	ARL	Arm Lake
13	CHL	Cache Lake
13	CRP	Cryderman's Pit
13	CWC	Clearwater Creek
13	CWW	Cowan West
13	DFR	Drifting River
13	EAF	East Favel
13	EBT	Ethelbert Trail
13	FRC	Four Corners
13	ISL	Island Lake
13	JFL	Jackfish Lake
13	KTC	Ketchum Creek
13	LLK	Laurie Lake
13	LNK	Line Lake
13	MGL	Madge Lake
13	MNC	Minitonas Creek
13	NTD	North Duck
13	ONL	Onion Lake
13	RTH	Route H
13	RTW	Route W
13	RVH	River Hill
13	SGL	Singush Lake
13	SLC	Silver Creek
13	SNL	Sinnott Lake
13	SRL	Sarah Lake
13	STR	Stoski Rd.
13	TEL	Tee Lakes
13	UPD	Upper Dam
13	VLR	Valley River
13	VMR	Vimy Ridge
13	WEF	West Favel
13	WJL	Watjask Lake
13	WNL	Wine Lake

Table A3.2 Timber sale holders and their associated volume quotas by species group and Forest Management Unit.

QUOTA HOLDER FMU 13	Timber Sale #	QUOTA #	QUOTA VOLUME (m3)	
			Softwood	Hardwood
Angus, Len & Bill	Permit	156	167.12	0.00
Bielek, Danny	Permit	154	0.00	191.42
Bresky, Herb & Sons	5419	185	3,915.03	10,036.38
Cords, Tom & Don	Permit	158	104.85	0.00
Dudar Forest Products	5435	281	630.10	1,000.00
Intermountain Contracting	5421	202	84.12	3,923.07
Kevin Barker Trucking	5432	267	0.00	1,000.00
Kotyk Lumber	5416	152	3,879.40	2,091.40
Lakeshore Mills	5423	271	329.77	3,355.18
Medwid, Bill	Permit	212	0.00	105.64
Mykula, Chad	5417	163	0.00	1,004.33
Pachkowski, Jerry	Permit	186	113.94	0.00
Penner Bros. Logging	5434	272	839.61	3,000.00
Perchaluk, John & Sons	5428	188	637.12	29.28
Poyser, David	5429	191	498.48	201.19
Riehl Lumber and Logging Inc.	5420	198	307.28	11,327.69
Riehl Lumber and Logging Inc.	5440	SA	0.00	5,000.00
Spruce Products Ltd.	5422	206	132,273.74	2,742.98
Spruce Products Ltd.	5463	241	15,749.29	0.00
Spruce Products Ltd.	5464	239	17,406.93	0.00
Spruce Products Ltd.	5441	SA	0.00	10,000.00
Trisum Logging (412096)	5427	164	0.00	1,299.87
TOTAL (22)			176,936.78	56,308.43

QUOTA HOLDER FMU 11	Timber Sale #	QUOTA #	QUOTA VOLUME (m3)	
			Softwood	Hardwood
Graham, Malcolm	5402	264	0.00	2,000.00
Prairie Forest Products Ltd.	5437	192	490.80	0.00
Spruce Products Ltd.	5401	206	2,899.40	0.00
Spruce Products Ltd.	5462	241	2,222.71	78.23
Zander, Stuart	Permit	217	36.12	16.82
TOTAL (5)			5,649.03	2,095.05

Table A3.3 2022 harvest volumes and allocations by FMU and cutblock.

FML 3 2022 - Harvest

FMU 10	Hectares (ha)	HW Volume	Holder	SW Volume	Holder	Total Volume
Ethelbert						
ETH-003	79.73	11,292	LP	31	SPL	11,323
		<u>11,292</u>		<u>31</u>		<u>11,323</u>
FMU 10	79.73	11,292		31		11,323
FMU 11	Hectares (ha)	HW Volume	Holder	SW Volume	Holder	Total Volume
Alpine						
ALP-025	70.77	15,967	LP/Quota Holder	1,734	SPL	17,721
ALP-028	16.24	2,872	LP/Quota Holder	39	SPL	2,911
ALP-802	41.52	55	Quota Holder/LP	36	Quota Holder	91
		<u>18,914</u>		<u>1,809</u>		<u>20,723</u>
Bowman						
BSN-L02	32.60	5,580	Quota Holder/LP	0	SPL	5,580
		<u>5,580</u>				<u>5,580</u>
FMU 11	161.13	24,494		1,809		26,303
FMU 13	Hectares (ha)	HW Volume	Holder	SW Volume	Holder	Total Volume
Arm Lake						
ARL-032	99.55	16,040	LP	6,656	SPL	22,696
ARL-033	85.81	8,225	LP	5,272	SPL	13,497
ARL-035	35.56	3,358	LP	2,493	SPL	5,851
ARL-037	42.82	5,917	LP	3,275	SPL	9,192
ARL-063	57.44	11,473	LP	3,465	SPL	14,938
ARL-064	20.06	5,038	LP	1,173	SPL	6,211
		<u>50,051</u>		<u>22,334</u>		<u>72,385</u>
Clearwater Creek						
CWC-822	44.45	0	Quota Holder/LP	8,307	SPL	8,307
CWC-864	46.11	172	Quota Holder/LP	9,481	SPL	9,653
CWC-882	34.31	0	Quota Holder/LP	7,728	SPL	7,728
		<u>172</u>		<u>25,516</u>		<u>25,688</u>
Cowan West						
CWW-853	95.48	7,041	LP	8,684	SPL	15,725
		<u>7,041</u>		<u>8,684</u>		<u>15,725</u>
East Favel						
EAF-829	40.61	7,232	Quota Holder/LP	3,906	Quota Holder/SPL	11,138
EAF-835	38.66	3,458	Quota Holder/LP	5,422	Quota Holder/SPL	8,880
		<u>10,690</u>		<u>9,328</u>		<u>20,018</u>
Ethelbert Trill						
EBT-005	171.59	23,645	LP	1,695	SPL	25,340
EBT-816	34.01	969	Quota Holder/LP	940	Quota Holder	1,909
		<u>24,614</u>		<u>2,635</u>		<u>27,249</u>

FML 3 2022 - Harvest

FMU 13	Hectares (ha)	HW Volume	Holder	SW Volume	Holder	Total Volume
Island Lake						
ISL-002	64.90	5,613	LP	7,217	SPL	12,830
ISL-007	84.39	6,970	LP	8,308	SPL	15,278
ISL-008	64.86	5,832	LP	7,797	SPL	13,629
ISL-009	77.90	999	LP	754	SPL	1,753
		<u>19,414</u>		<u>24,076</u>		<u>43,490</u>
Jackfish Lake						
JFL-806	69.66	1,900	LP/Quota Holder	912	Quota Holder	2,812
		<u>1,900</u>		<u>912</u>		<u>2,812</u>
Line Lake						
LNK-811	112.23	10,748	Quota Holder/LP	14,230	Quota Holder/SPL	24,978
		<u>10,748</u>		<u>14,230</u>		<u>24,978</u>
Madge Lake						
MGL-029	92.02	8,460	LP	113	SPL	8,573
		<u>8,460</u>		<u>113</u>		<u>8,573</u>
Route H						
RTH-800	19.88	100	LP	114	Quota Holder	214
		<u>100</u>		<u>114</u>		<u>214</u>
Sarah Lake						
SRL-844	48.23	7,152	Quota Holder/LP	1,304	SPL	8,456
		<u>7,152</u>		<u>1,304</u>		<u>8,456</u>
Silver Creek						
SLC-806	20.06	2,059	LP/Quota Holder	479	Quota Holder/SPL	2,538
SLC-807	29.77	4,694	LP/Quota Holder	597	Quota Holder/SPL	5,291
		<u>6,753</u>		<u>1,076</u>		<u>7,829</u>
Sinnott Lake						
SNL-202	28.11	2,035	LP	1,452	SPL/Quota Holder	3,487
SNL-203	11.30	2,120	LP	1,611	SPL/Quota Holder	3,731
SNL-204	29.05	2,028	LP/Quota Holder	2,511	SPL/Quota Holder	4,539
		<u>6,183</u>		<u>5,574</u>		<u>11,757</u>
Stoekl Rd.						
STR-807	21.17	100	LP	105	Quota Holder	205
STR-853	87.43	7,860	LP/Quota Holder	11,167	SPL/Quota Holder	19,027
		<u>7,960</u>		<u>11,272</u>		<u>19,232</u>
Tee Lakes						
TEL-822	85.66	17,449	Quota Holder/LP	5,270	SPL	22,719
TEL-823	63.42	12,856	Quota Holder/LP	3,114	SPL	15,970
TEL-890	19.69	4,307	Quota Holder/LP	435	SPL	4,742
TEL-919	106.21	5,694	Rieh/SPLLP	13,389	SPL	19,083
TEL-923	83.06	3,330	Quota Holder/LP	16,555	SPL	19,885
TEL-931	69.04	3,102	Quota Holder/LP	11,704	SPL	14,806
		<u>46,738</u>		<u>50,467</u>		<u>97,205</u>

FML 3 2022 - Harvest

FMU 13	Hectares (ha)	HW Volume	Holder	SW Volume	Holder	Total Volume
Valley River						
VLR-037	23.33	2,482	LP	1,391	SPL	3,873
VLR-038	74.13	9,475	LP	4,367	SPL	13,842
VLR-213	6.84	564	LP	2,207	SPL	2,771
VLR-804	34.98	4,837	LP	2,820	SPL	7,657
VLR-805	9.16	904	LP	271	SPL	1,175
		18,262		11,056		29,318
Vimy Ridge						
VMR-006	32.21	500	Quota Holder/LP	100	SPL	600
VMR-831	48.37	4,053	Quota Holder/LP	5,356	SPL	9,409
VMR-832	19.81	54	Quota Holder/LP	687	SPL	741
VMR-850	69.65	581	LP/SPL	2,029	SPL	2,610
		5,188		8,172		13,360
Watjask Lake						
WJL-124	106.53	2,344	LP	1,095	SPL	3,439
WJL-125	98.89	3,463	LP	1,739	SPL	5,202
WJL-126	55.78	1,580	LP	1,292	SPL	2,872
WJL-138	69.87	16,896	LP	3,287	SPL	20,183
WJL-150	37.96	6,353	LP	3,485	SPL	9,838
WJL-151	22.12	2,865	LP	4,273	SPL	7,138
		33,501		15,171		48,672
West Favel						
WEF-042	86.53	13,077	LP	2,086	SPL	15,163
WEF-043	95.51	8,782	LP	4,908	SPL	13,690
WEF-046	29.78	4,471	LP	268	SPL	4,739
WEF-048	6.92	1,549	LP	0	SPL	1,549
		27,879		7,262		35,141
Wine Lake						
WNL-111	72.19	15,978	LP	3,285	SPL	19,263
WNL-116	34.16	4,714	LP	687	SPL	5,401
WNL-117	18.63	2,385	LP	1,297	SPL	3,682
WNL-123	3.53	268	LP	110	SPL	378
		23,345		5,379		28,724
FMU 13	3,191.38	316,151		224,675		540,826
		351,937		226,515		578,452
Report Total:		351,937		226,515		578,452

Table A3.4 2022 contingency volumes and allocations by FMU and cut block.

FML 3 2022 - Contingency

FMU 10	Hectares (ha)	HW Volume	Holder	SW Volume	Holder	Total Volume
Roblin						
RBN-003	21.45	3,731	LP	0	SPL	3,731
RBN-004	11.54	1,620	LP	0	SPL	1,620
		<u>5,351</u>				<u>5,351</u>
FMU 10	32.99	5,351		0		5,351
FMU 11	Hectares (ha)	HW Volume	Holder	SW Volume	Holder	Total Volume
Cowan East						
CWE-301	39.94	5,131	LP	318	SPL	5,449
CWE-800	8.02	240	LP	599	SPL	839
		<u>5,371</u>		<u>917</u>		<u>6,288</u>
Renwer						
RWR-008	26.66	5,384	Quota Holder/LP	0	SPL	5,384
		<u>5,384</u>				<u>5,384</u>
Sclater						
SLT-018	24.94	3,737	LP	0	SPL	3,737
SLT-052	32.19	4,051	LP	1,617	SPL	5,668
SLT-053	14.92	2,466	LP	896	SPL	3,362
SLT-069	23.69	3,518	LP	42	SPL	3,560
SLT-800	36.09	355	LP	4,126	SPL	4,481
SLT-860	41.23	1,333	LP	1,879	SPL	3,212
		<u>15,460</u>		<u>8,560</u>		<u>24,020</u>
FMU 11	247.68	26,215		9,477		35,692
FMU 13	Hectares (ha)	HW Volume	Holder	SW Volume	Holder	Total Volume
Clearwater Creek						
CWC-854	88.28	411	Quota Holder/LP	13,984	SPL	14,395
		<u>411</u>		<u>13,984</u>		<u>14,395</u>
Cowan West						
CWW-856	124.56	8,386	LP	6,554	SPL	14,940
		<u>8,386</u>		<u>6,554</u>		<u>14,940</u>
Drifting River						
DFR-013	23.90	2,608	LP	481	SPL	3,089
DFR-014	78.19	9,755	LP	2,007	SPL	11,762
DFR-015	6.36	1,439	LP	97	SPL	1,536
DFR-016	15.52	1,284	LP	904	SPL	2,188
DFR-017	29.32	5,120	LP	115	SPL	5,235
		<u>20,206</u>		<u>3,604</u>		<u>23,810</u>

FML 3 2022 - Contingency

FMU 13	Hectares (ha)	HW Volume	Holder	SW Volume	Holder	Total Volume
East Favel						
EAF-055	101.54	13,523	LP	1,766	SPL	15,289
EAF-056	64.04	8,291	LP	5,567	SPL	13,858
EAF-057	119.80	17,677	LP	5,835	SPL	23,512
EAF-834	17.31	2,075	Quota Holder/LP	1,960	Quota Holder/SPL	4,035
EAF-836	20.47	2,879	Quota Holder/LP	612	Quota Holder/SPL	3,491
EAF-839	20.87	3,980	Quota Holder/LP	201	Quota Holder/SPL	4,181
EAF-844	97.30	9,287	LP	11,524	SPL	20,811
		57,712		27,465		85,177
Ethelbert Trail						
EBT-817	31.79	3,586	Quota Holder/LP	322	Quota Holder	3,908
		3,586		322		3,908
Island Lake						
ISL-903	17.30	1,353	Quota Holder/LP	35	SPL	1,388
ISL-905	1.93	135	Quota Holder/LP	0	SPL	135
ISL-906	3.82	177	Quota Holder/LP	0	SPL	177
		1,665		35		1,700
Line Lake						
LNK-810	86.48	9,507	Quota Holder/LP	5,824	Quota Holder/SPL	15,331
LNK-813	66.67	9,049	Quota Holder/LP	4,748	Quota Holder/SPL	13,797
LNK-814	82.37	1,714	Quota Holder/LP	5,888	Quota Holder/SPL	7,602
LNK-834	24.21	1,602	Quota Holder/LP	2,698	Quota Holder/SPL	4,300
		21,872		19,158		41,030
Route H						
RTH-006	34.92	2,490	LP	2,338	SPL	4,828
RTH-007	69.19	9,546	LP	904	SPL	10,450
RTH-008	46.24	4,517	LP	667	SPL	5,184
RTH-009	106.95	16,164	LP	2,291	SPL	18,455
RTH-805	9.14	134	LP	114	Quota Holder	248
		32,851		6,314		39,165
Silver Creek						
SLC-852	51.72	3,000	LP	6,481	SPL	9,481
SLC-853	42.09	2,206	LP	6,668	SPL	8,874
SLC-855	40.31	1,681	LP	7,742	SPL	9,423
		6,887		20,891		27,778
Sinnott Lake						
SNL-802	44.33	6,102	Quota Holder/LP	1,473	Quota Holder/SPL	7,575
		6,102		1,473		7,575
Tee Lakes						
TEL-811	8.06	435	Quota Holder/LP	279	SPL	714
TEL-878	76.49	7,337	Quota Holder/LP	11,850	SPL	19,187
		7,772		12,129		19,901

FML 3 2022 - Contingency

FMU 13	Hectares (ha)	HW Volume	Holder	SW Volume	Holder	Total Volume
Valley River						
VLR-022	46.18	4,669	LP	3,036	SPL	7,705
VLR-023	54.76	6,247	LP	2,069	SPL	8,316
VLR-024	32.09	5,325	LP	1,726	SPL	7,051
VLR-026	55.29	5,846	LP	3,445	SPL	9,291
VLR-030	32.09	6,919	LP	297	SPL	7,216
		<u>29,006</u>		<u>10,573</u>		<u>39,579</u>
Watjaak Lake						
WJL-139	210.00	18,120	LP	26,241	SPL	44,361
WJL-152	59.79	8,781	LP	6,052	SPL	14,833
		<u>26,901</u>		<u>32,293</u>		<u>59,194</u>
FMU 13	2,141.67	223,357		154,795		378,152
		<u>254,923</u>		<u>164,272</u>		<u>419,195</u>
Report Total:		254,923		164,272		419,195

Table A3.5 2023 harvest volumes and allocations by FMU and cutblock.

FML 3 2023 - Harvest

FMU 10	Hectares (ha)	HW Volume	Holder	SW Volume	Holder	Total Volume
Boggy Creek						
BGC-008	21.99	4,495	LP	609	SPL	5,104
BGC-009	32.33	4,490	LP	210	SPL	4,700
		<u>8,985</u>		<u>819</u>		<u>9,804</u>
Welden						
WDN-L10	6.42	724	LP	0	SPL	724
WDN-L11	15.34	2,387	LP	0	SPL	2,387
WDN-L13	2.08	265	LP	0	SPL	265
WDN-L14	15.02	1,991	LP	0	SPL	1,991
WDN-L16	20.38	1,205	LP	0	SPL	1,205
WDN-L17	5.19	783	LP	0	SPL	783
WDN-L18	11.76	1,113	LP	0	SPL	1,113
WDN-L19	16.16	1,046	LP	0	SPL	1,046
WDN-L20	11.21	504	LP	0	SPL	504
WDN-L22	7.96	654	LP	0	SPL	654
		<u>10,672</u>				<u>10,672</u>
FMU 10	165.84	19,657		819		20,476
FMU 11						
FMU 11	Hectares (ha)	HW Volume	Holder	SW Volume	Holder	Total Volume
Alpine						
ALP-005	35.30	2,520	LP	236	SPL	2,756
ALP-006	29.13	3,341	LP	1,017	SPL	4,358
		<u>5,861</u>		<u>1,253</u>		<u>7,114</u>
Cowan East						
CWE-210	12.32	1,240	LP	0	SPL	1,240
CWE-212	48.67	6,749	LP	825	SPL	7,574
CWE-214	3.41	349	LP	0	SPL	349
		<u>8,338</u>		<u>825</u>		<u>9,163</u>
Pretty Valley						
PRV-011	39.63	5,143	LP	1,929	SPL	7,072
PRV-012	60.22	7,850	LP	170	SPL	8,020
PRV-031	20.43	3,516	LP	0	SPL	3,516
		<u>16,509</u>		<u>2,099</u>		<u>18,608</u>
Sclater						
SLT-065	7.57	850	LP	371	SPL	1,221
		<u>850</u>		<u>371</u>		<u>1,221</u>
FMU 11	258.68	31,558		4,548		36,106
FMU 13						
FMU 13	Hectares (ha)	HW Volume	Holder	SW Volume	Holder	Total Volume
Arm Lake						
ARL-034	33.50	6,330	LP	2,162	SPL	8,492
ARL-055	86.76	13,954	LP	4,236	SPL	18,190
		<u>20,284</u>		<u>6,398</u>		<u>26,682</u>

FMU 13	Hectares (ha)	HW Volume	Holder	SW Volume	Holder	Total Volume
Clearwater Creek						
CWC-004	11.82	2,233	LP	0	SPL	2,233
CWC-005	74.32	9,216	LP	4,005	SPL	13,221
CWC-006	73.30	7,821	LP	2,848	SPL	10,669
CWC-007	82.62	9,290	LP	7,306	SPL	16,596
CWC-115	86.78	5,852	LP	7,608	SPL	13,460
CWC-116	10.91	1,123	LP	934	SPL	2,057
CWC-808	79.15	475	LP/Quota Holder	14,131	SPL	14,606
CWC-810	47.43	0	LP/Quota Holder	7,301	SPL	7,301
CWC-815	87.21	747	LP/Quota Holder	18,824	SPL	19,571
CWC-836	52.01	763	Quota Holder/LP	9,066	SPL	9,829
CWC-860	21.15	397	Quota Holder/LP	3,353	SPL	3,750
CWC-862	32.17	2,297	LP/Quota Holder	3,756	SPL	6,053
		40,214		79,132		119,346
Cowan West						
CWW-003	59.62	6,821	LP/Quota Holder	21	SPL	6,842
CWW-004	25.03	4,390	LP/Quota Holder	77	SPL	4,467
CWW-852	105.36	4,128	LP	5,600	SPL	9,728
		15,339		5,698		21,037
Crydermans Pit						
CRP-035	9.78	1,018	LP	82	SPL	1,100
CRP-038	10.87	2,232	LP	90	SPL	2,322
		3,250		172		3,422
Drifting River						
DFR-023	16.50	2,833	LP	13	SPL	2,846
DFR-024	9.07	1,300	LP	478	SPL	1,778
DFR-025	36.97	4,279	LP	572	SPL	4,851
		8,412		1,063		9,475
East Favel						
EAF-005	51.57	9,637	LP	1,147	SPL	10,784
EAF-006	32.82	4,268	LP	2,719	SPL	6,987
EAF-008	48.94	8,060	LP	911	SPL	8,971
EAF-009	28.61	6,759	LP	1,895	SPL	8,654
EAF-010	9.14	1,053	LP	950	SPL	2,003
EAF-016	54.75	8,009	LP	3,506	SPL	11,515
		37,786		11,128		48,914
Ethelbert Trail						
EBT-818	44.73	4,753	Quota Holder/LP	3,099	Quota Holder	7,852
EBT-819	6.29	733	Quota Holder/LP	153	Quota Holder	886
		5,486		3,252		8,738
Jackfish Lake						
JFL-012	51.71	5,061	LP	2,049	SPL	7,110
JFL-013	60.96	6,264	LP	2,169	SPL	8,433
		11,325		4,218		15,543

FML 3 2023 - Harvest

FMU 13	Hectares (ha)	HW Volume	Holder	SW Volume	Holder	Total Volume
Route H						
RTH-804	10.56	15	LP	114	Quota Holder	129
RTH-806	2.11	5	LP	114	Quota Holder	119
		<u>20</u>		<u>228</u>		<u>248</u>
Silver Creek						
SLC-123	5.89	1,244	LP	0	SPL	1,244
SLC-125	11.65	1,635	LP	0	SPL	1,635
		<u>2,879</u>				<u>2,879</u>
Sinnott Lake						
SNL-804	35.94	6,153	Quota Holder/LP	2,182	Quota Holder/SPL	8,335
		<u>6,153</u>		<u>2,182</u>		<u>8,335</u>
Stoekl Rd.						
STR-012	74.96	10,442	LP	1,193	SPL	11,635
STR-013	61.80	8,253	LP	1,427	SPL	9,680
STR-014	45.75	9,470	LP	843	SPL	10,313
STR-015	72.25	12,227	LP	2,218	SPL	14,445
STR-016	47.71	6,136	LP	871	SPL	7,007
STR-017	91.12	8,072	LP	3,639	SPL	11,711
STR-018	48.02	5,002	LP	584	SPL	5,586
STR-802	37.99	3,000	LP	500	SPL	3,500
		<u>62,602</u>		<u>11,275</u>		<u>73,877</u>
Tee Lakes						
TEL-882	19.18	2,004	Quota Holder/LP	2,034	SPL/Riehl	4,038
TEL-883	70.70	8,233	Quota Holder/LP	2,646	SPL/Riehl	10,879
		<u>10,237</u>		<u>4,680</u>		<u>14,917</u>
Valley River						
VLR-235	41.28	8,192	LP	488	SPL	8,680
		<u>8,192</u>		<u>488</u>		<u>8,680</u>
Vimy Ridge						
VMR-801	59.37	0	LP	10,204	SPL	10,204
VMR-801	59.37	0	LP	10,204	SPL	10,204
VMR-802	44.38	0	LP	7,126	SPL	7,126
VMR-802	44.38	0	LP	7,126	SPL	7,126
VMR-803	72.08	0	LP	6,900	SPL	6,900
				<u>41,560</u>		
Watjaak Lake						
WUL-133	55.01	10,656	LP	4,948	SPL	15,604
WUL-134	203.61	28,730	LP	14,322	SPL	43,052
		<u>39,386</u>		<u>19,270</u>		<u>58,656</u>

FML 3 2023 - Harvest

FMU 13	Hectares (ha)	HW Volume	Holder	SW Volume	Holder	Total Volume
Wine Lake						
WNL-019	32.36	6,373	LP	246	SPL	6,619
WNL-021	17.06	2,895	LP	114	SPL	3,009
WNL-032	86.62	11,397	LP	8,179	SPL	19,576
WNL-033	44.85	9,002	LP	5,935	SPL	14,937
WNL-034	46.18	4,799	LP	9,185	SPL	13,984
WNL-124	39.90	6,492	LP	2,020	SPL	8,512
		<u>40,958</u>		<u>25,679</u>		<u>66,637</u>
FMU 13	2,923.93	312,523		216,423		528,946
		363,738		221,790		585,528
Report Total:		363,738		221,790		585,528

Table A3.5 2023 contingency volumes and allocations by FMU and cutblock.

FML 3 2023 - Contingency

FMU 11	Hectares (ha)	HW Volume	Holder	SW Volume	Holder	Total Volume
Renwer						
RWR-015	16.87	2,531	LP	0	SPL	2,531
		<u>2,531</u>				<u>2,531</u>
FMU 11	16.87	2,531		0		2,531
FMU 13						
FMU 13	Hectares (ha)	HW Volume	Holder	SW Volume	Holder	Total Volume
Arm Lake						
ARL-046	77.62	13,731	LP	7,673	SPL	21,404
		<u>13,731</u>		<u>7,673</u>		<u>21,404</u>
Silver Creek						
SLC-851	15.09	448	LP	2,641	SPL	3,089
SLC-856	29.07	2,821	LP	2,354	Quota Holder	5,175
SLC-857	78.94	5,576	LP	11,301	Quota Holder	16,877
		<u>8,845</u>		<u>16,296</u>		<u>25,141</u>
Sinnott Lake						
SNL-010	70.53	11,009	LP	2,061	SPL	13,070
SNL-011	14.77	2,756	LP	1,295	SPL	4,051
SNL-012	35.34	4,993	LP	1,247	SPL	6,240
SNL-015	52.05	7,450	LP	805	SPL	8,255
SNL-016	22.36	2,670	LP	1,765	SPL	4,435
SNL-017	40.91	6,385	LP	866	SPL	7,251
SNL-056	11.49	2,270	Quota Holder/LP	0	Quota Holder/SPL	2,270
		<u>37,533</u>		<u>8,039</u>		<u>45,572</u>
Watjaak Lake						
WJL-200	89.81	12,927	LP	5,777	SPL	18,704
WJL-201	111.97	16,175	LP	8,750	SPL	24,925
WJL-202	99.49	15,929	LP	8,561	SPL	24,490
WJL-203	75.01	12,504	LP	5,237	SPL	17,741
WJL-204	100.08	13,779	LP	9,859	SPL	23,638
		<u>71,314</u>		<u>38,184</u>		<u>109,498</u>
FMU 13	924.53	131,423		70,192		201,615
		<u>133,954</u>		<u>70,192</u>		<u>204,146</u>
Report Total:		133,954		70,192		204,146

Table A3.6 Three-year projection of Open Crown Land harvest volumes by FMU.

	FMU 10		FMU 11		FMU 13	
	HWD	SWD	HWD	SWD	HWD	SWD
2024 (year 3 projection blocks – green cutblocks on maps)	7,000	0	50,000	5,000	311,000	185,000
2025 (year 4 projection blocks– green cutblocks on maps)	7,000	0	50,000	5,000	311,000	185,000
2026 (year 5 projection blocks– green cutblocks on maps)	7,000	0	50,000	5,000	311,000	185,000

Note 1: Most of these projected cutblocks have not yet been cruised. Instead, a historical average volume per is used until the Pre-Harvest Survey is completed.

Note 2: In cases where the projected volumes exceed AAC by FMU, actual cruised volumes for each block will be calculated. If the actual volumes still exceed the AAC, then blocks will be dropped to ensure the AAC by FMU is not exceeded.

APPENDIX IV: RENEWAL PLAN DETAILS

This section is an estimate of renewal activities. Renewal is dependent upon softwood blocks getting cut. If the softwood block is not cut, then it is not planted until after the block is cut.

Table A4.1 2022 and 2023 site preparation estimates.

Operating Year*	Operating Area	Block Number	Cutblock Area (ha)	Scarification Treatment Area (ha)
2022	ISL	ISL-850	84.1	84
	ISL	ISL-853	59.6	59
	ISL	ISL-854	98.3	98
		Total	242.0	241.0

* 2023 site preparation blocks not available, but will be renewed as required

Table A4.2 2022 and 2023 tree plant estimates.

Operating Area	Block Number	White Spruce (# trees)	Black Spruce (# trees)	Jack Pine (# trees)	Total
Arm Lake	ARL-039	11,160			11,160
Drifting River	DFR-018	7,920	3,240		11,160
Island Lake	ISL-009		28,800		28,800
Island Lake	ISL-850		119,880		119,880
Island Lake	ISL-853		79,920		79,920
Island Lake	ISL-854	14,400	33,480		47,880
Jackfish Lake	JFL-806	33,840	3,840		37,680
Jackfish Lake	JFL-807	14,040			14,040
Tee Lakes	TEL-863	6,480	5,760		12,240
Tee Lakes	TEL-921	10,080	69,840		79,920
Upperdam	UPD-137	16,200			16,200
Valley River	VLR-033	11,160			11,160
Valley River	VLR-215	3,240			3,240
Valley River	VLR-216	9,360			9,360
Valley River	VLR-218	18,000			18,000
Vimy Ridge	VMR-845		135,000		135,000
Vimy Ridge	VMR-861		87,840		87,840
West Favel	WEF-100	6,840			6,840
West Favel	WEF-105	6,840			6,840
Watjask	WJL-126	31,680			31,680
Watjask	WJL-127	9,720			9,720
Wine Lake	WNL-115	32,400			32,400
Wine Lake	WNL-123	2,880			2,880
2022 Totals		246,240	567,600	0	813,840

*2023 Tree plant estimates are not available. Blocks harvested in 2023 will be renewed as required.

Table A4.3 2022 and 2023 forest renewal assessment survey block estimates.

Survey Year	FMU	Block Number	Harvest Year	Surveyor	Area (ha)
2022	11	ALP-005	2018	LP	9.2
2022	11	ALP-008	2018	LP	34.5
2022	11	ALP-030	2019	MFSRC	7.3
2022	11	ALP-031	2019	MFSRC	15.5
2022	11	ALP-032	2018	LP	13.2
2022	11	ALP-L22	2018	LP	17.2
2022	11	CWE-006	2018	LP	56.1
2022	11	CWE-107	2019	MFSRC	17.8
2022	11	CWE-108	2018	LP	11.1
2022	11	PRV-800	2013	MFSRC	52.2
2022	11	RWR-026	2018	LP	38.8
2022	12	NLM-134	2017	LP	2.4
2022	13	ARL-016	2018	LP	65.9
2022	13	ARL-017	2018	LP	14.0
2022	13	ARL-018	2018	LP	69.0
2022	13	ARL-808	2019	MFSRC	4.7
2022	13	ARL-809	2018	LP	7.3
2022	13	ARL-813	2019	MFSRC	55.9
2022	13	CWC-872	2013	MFSRC	82.6
2022	13	CWW-051	2018	MFSRC	5.3
2022	13	EBT-007	2018	LP	15.7
2022	13	EBT-008	2018	LP	20.5
2022	13	EBT-816	2015, 2016	LP	14.4
2022	13	EBT-825	2019	MFSRC	22.7
2022	13	EBT-826	2019	MFSRC	7.8
2022	13	FRC-025	2018	LP	20.2
2022	13	ISL-011	2019	MFSRC	69.5
2022	13	ISL-012	2019	MFSRC	152.0
2022	13	ISL-013	2019	MFSRC	39.8
2022	13	JFL-101	2018	LP	54.2
2022	13	JFL-103	2017	LP	40.6
2022	13	JFL-813	2010	MFSRC	27.2
2022	13	LLK-804	2013	MFSRC	70.5
2022	13	LLK-805	2013	MFSRC	1.6
2022	13	LLK-806	2013	MFSRC	25.9
2022	13	MGL-048	2018	LP	20.4
2022	13	MGL-049	2018	LP	10.5
2022	13	MGL-127	2018	LP	99.1
2022	13	ONL-808	2012	MFSRC	65.0
2022	13	RTW-046	2017	MFSRC	13.6
2022	13	SLC-804	2013	MFSRC	19.8
2022	13	SNL-123	2018	LP	28.4
2022	13	SNL-125	2018	LP	47.4
2022	13	SNL-126	2018	LP	88.3
2022	13	SNL-800	2017	MFSRC	16.9
2022	13	SNL-801	2012	MFSRC	14.2
2022	13	SRL-860	2018	LP	30.8
2022	13	TEL-820	2017	MFSRC	154.7
2022	13	TEL-837	2017	MFSRC	24.0

Survey Year	FMU	Block Number	Harvest Year	Surveyor	Area (ha)
2022	13	TEL-854	2017	MFSRC	38.2
2022	13	TEL-867	2018	MFSRC	85.6
2022	13	TEL-877	2018	MFSRC	66.7
2022	13	UPD-047	2013	MFSRC	20.3
2022	13	UPD-067	2018	LP	76.2
2022	13	UPD-068	2018	LP	63.9
2022	13	UPD-070	2015	MFSRC	28.4
2022	13	UPD-074	2015	MFSRC	24.8
2022	13	VMR-003	2018	LP	20.1
2022	13	VMR-841	2013	MFSRC	41.1
2022	13	VMR-842	2013	MFSRC	16.8
2022	13	VMR-846	2013	MFSRC	37.0
2022	13	VMR-847	2013	MFSRC	40.7
2022	13	WJL-122	2017	LP	52.5
2022	13	WJL-124	2018	LP	21.5
2022	13	WJL-147	2018	LP	82.4
2022	13	WJL-148	2018	LP	38.0
2022	13	WJL-803	2019	MFSRC	22.2
2022	14	SRR-310	2017	LP	35.6
2022 total area					2,607.5
2023	11	SLT-027	2019	LP	18.9
2023	13	ARL-017	2019	LP	14.8
2023	13	ARL-019	2019	LP	39.7
2023	13	ARL-036	2020	MFSRC	36.5
2023	13	ARL-809	2019	MFSRC	7.3
2023	13	CRP-056	2014	MFSRC	47.9
2023	13	CWC-872	2013	MFSRC	82.6
2023	13	FRC-002	2019	LP	3.0
2023	13	ISL-010	2020	MFSRC	97.5
2023	13	ISL-011	2020	MFSRC	39.6
2023	13	LLK-807	2014	MFSRC	38.7
2023	13	LLK-808	2014	MFSRC	16.8
2023	13	RTW-042	2019	LP	35.9
2023	13	RTW-043	2019	LP	20.7
2023	13	RTW-044	2019	LP	6.2
2023	13	RTW-045	2019	LP	31.9
2023	13	RTW-047	2019	LP	16.3
2023	13	RTW-100	2019	LP	56.9
2023	13	RTW-101	2019	LP	5.6
2023	13	RTW-102	2019	LP	4.1
2023	13	RTW-103	2019	LP	45.8
2023	13	SGL-803	2014	MFSRC	43.1
2023	13	SGL-804	2014	MFSRC	35.0
2023	13	SGL-812	2014	MFSRC	27.1
2023	13	SLC-805	2014	MFSRC	8.7
2023	13	SNL-208	2019	LP	28.5
2023	13	SNL-210	2019	LP	26.2
2023	13	TEL-832	2014	MFSRC	38.8
2023	13	TEL-857	2019	LP	97.9

Survey Year	FMU	Block Number	Harvest Year	Surveyor	Area (ha)
2023	13	TEL-862	2020	MFSRC	51.8
2023	13	TEL-866	2020	MFSRC	33.6
2023	13	TEL-914	2020	MFSRC	11.2
2023	13	UPD-140	2019	LP	72.9
2023	13	UPD-216	2019	LP	34.5
2023	13	VLR-219	2019	MFSRC	12.2
2023	13	VLR-220	2019	MFSRC	5.7
2023	13	VLR-222	2019	MFSRC	29.0
2023	13	VLR-224	2019	MFSRC	17.4
2023	13	VLR-230	2020	MFSRC	5.9
2023	13	VLR-236	2019	MFSRC	3.8
2023	13	VMR-838	2014	MFSRC	53.3
2023	13	VMR-848	2014	MFSRC	40.9
2023	13	WJL-500	2019	LP	90.0

2023 total area 1,434.1

Table A4.4 2022 and 2023 ground stand tending estimates by block.

Block	Operating Area	Area (ha)	Priority	Pre-Harvest	Harvest Year	New Standard	potential % of block sprayed
CHL-809A	CHL	12.9	2	S	2018	NA	70
CHL-810	CHL	45.2	2	S	2018	NA	70
CHL-812	CHL	7.2	2	S	2018	NA	70
CWC-858	CWC	42.2	1	M	2015	NA	50
CWC-861	CWC	53.3	3	S	2019	NA	70
CWC-863	CWC	32.1	3	S	2019	NA	70
CWC-867	CWC	33.9	3	S	2019	NA	70
CWC-868	CWC	44.1	1	S	2016	NA	70
CWC-868	CWC	3.0	2	S	2017	NA	70
CWC-869	CWC	41.1	2	S	2018	NA	70
CWC-869	CWC	52.6	3	S	2019	NA	70
CWC-871	CWC	55.3	3	S	2019	NA	70
CWC-874	CWC	10.4	1	S	2015	NA	70
CWC-876	CWC	33.7	2	S	2017	NA	70
CWC-879	CWC	26.8	2	S	2017	NA	70
CWC-892	CWC	12.3	3	S	2019	NA	70
CWC-893	CWC	18.6	3	M	2019	NA	50
ISL-831	ISL	30.4	3	M	2019	NA	40
ISL-856	ISL	60.5	3	M	2019	NA	40
LNK-800	LNK	29.3	3	M	2019	NA	50
LNK-812	LNK	63.5	3	M	2019	NA	50
LNK-814	LNK	34.8	2	S	2018	NA	50
LNK-815	LNK	82.3	2	M	2018	NA	50
SGL-800	SGL	14.0	2	S	2017	NA	70
SGL-810	SGL	49.2	1	S	2015	NA	70
SGL-811	SGL	43.7	1	M	2015	NA	50
SGL-923	SGL	80.0	1	S	2016	NA	70
TEL-831	TEL	50.7	1	M	2015	NA	50
TEL-833	TEL	54.0	2	M	2017	NA	50
TEL-876	TEL	15.7	2	M	2018	NA	50
TEL-910	TEL	11.3	2	S	2018	NA	70
TEL-913	TEL	50.1	3	M	2019	NA	50
TEL-917	TEL	62.6	3	M	2019	NA	50
VMR-803	VMR	20.1	2	S	2018	NA	70
VMR-805	VMR	18.8	2	S	2018	NA	70
VMR-806	VMR	80.6	2	S	2017	NA	70
VMR-808	VMR	11.3	2	S	2017	NA	70
VMR-808	VMR	29.3	2	S	2017	NA	70
VMR-814	VMR	64.6	2	S	2018	NA	70
VMR-815	VMR	66.2	2	S	2017	NA	70
VMR-817	VMR	19.7	1	S	2016	NA	70
VMR-832	VMR	12.4	1	S	2015	NA	70
VMR-833	VMR	81.0	1	S	2015	NA	70
VMR-835	VMR	34.4	1	S	2015	NA	70
VMR-843	VMR	49.9	3	S	2019	NA	70
VMR-850	VMR	53.2	3	S	2019	NA	70
VMR-852	VMR	60.2	3	S	2019	NA	70
VMR-853	VMR	29.1	2	S	2018	NA	70
area total		1,887.5	ha				

Table A4.5 2022 and 2023 aerial stand tending estimates by block.

Block Number	Operating Area	Area (ha)	Priority	Pre-Harvest	Harvest Year	Regen Standard	potential % of block sprayed
ARL-066	ARL	1.5	3	S	2019	NA	50
ARL-811	ARL	16.1	2	M	2017	NA	70
ARL-812	ARL	8.1	3	M	2019	NA	60
CWE-107	CWE	17.8	3	M	2018	NA	60
EAF-822	EAF	10.9	2	M	2018	NA	50
EAF-823	EAF	3.6	2	S	2018	NA	70
EAF-831	EAF	41.9	2	M	2017	NA	50
EBT-820	EBT	82.2	2	M	2017	NA	70
EBT-821	EBT	12.0	2	M	2017	NA	50
EBT-822	EBT	11.5	2	S	2017	NA	70
EBT-823	EBT	8.7	2	M	2017	NA	60
EBT-824	EBT	33.0	2	M	2017	NA	60
EBT-856	EBT	9.3	2	S	2017	NA	70
EBT-857	EBT	18.9	2	S	2017	NA	70
EBT-858	EBT	79.7	2	S	2017	NA	70
JFL-814	JFL	32.1	2	M	2017	NA	50
RTH-810	RTH	32.4	2	M	2017	NA	50
RTH-811	RTH	54.8	1	S	2015	NA	70
RTH-812	RTH	27.2	1	S	2015	NA	70
RTH-813	RTH	32.7	1	S	2016	NA	70
RTH-814	RTH	19.4	1	M	2016	NA	50
RTH-814	RTH	34.6	2	M	2017	NA	50
RTH-815	RTH	17.5	2	M	2017	NA	50
RTH-816	RTH	8.3	2	S	2017	NA	70
RTW-043	RTW	20.7	3	M	2019	NA	50
RTW-044	RTW	6.2	3	M	2019	NA	50
SGL-813	SGL	65.1	2	M	2017	NA	50
SGL-815	SGL	96.0	1	M	2015	NA	60
SGL-816	SGL	86.0	1	M	2015	NA	60
SGL-820	SGL	61.7	1	M	2016	NA	60
SGL-821	SGL	105.0	1	M	2016	NA	60
SGL-822	SGL	79.1	1	M	2016	NA	60
SLC-805	SLC	3.7	1	M	2015	NA	60
SLC-805	SLC	4.4	3	M	2019	NA	60
SLC-850	SLC	45.8	2	M	2018	NA	60
SLC-854	SLC	30.5	2	S	2018	NA	70
STR-809	STR	33.5	2	M	2017	NA	50
STR-852	STR	47.6	3	M	2019	NA	50
TEL-842	TEL	4.2	1	M	2016	NA	50
TEL-855	TEL	47.1	2	M	2017	NA	50
TEL-861	TEL	53.0	3	M	2019	NA	50
TEL-865	TEL	28.6	2	M	2017	NA	50
UPD-039	UPD	32.7	2	M	2017	NA	50
VLR-219	VLR	12.2	3	M	2019	NA	50
VLR-220	VLR	5.7	3	M	2019	NA	50
VLR-222	VLR	29.0	3	M	2019	NA	50
VLR-224	VLR	17.4	3	M	2019	NA	50
VLR-236	VLR	3.8	3	M	2019	NA	50
WJL-144	WJL	69.2	2	M	2017	NA	50
WJL-803	WJL	22.2	2	S	2018	NA	70
total area		1,624.6	ha				

APPENDIX V: FIRE PLAN

FIRE PROTECTION/SUPPRESSION PLAN FOR THE 2022 FIRE SEASON

APRIL 1st TO NOVEMBER 15th



**LP CANADA LTD.
SWAN VALLEY - FOREST RESOURCES DIVISION**

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INTRODUCTION

This Fire Protection/Suppression Plan is submitted as a requirement of Section 23 (B) of the Forest Management License (FML 3) Agreement between the Province of Manitoba and LP. LP provides a Fire Protection/Suppression plan as part of the Operating Plan submitted to the Province of Manitoba.

The Fire Protection/Suppression Plan includes details regarding equipment, manpower, and transportation facilities available for the prevention, detection and suppression of forest fires. The area covered includes FML 3 as well as Forest Management Units 12 and 14. The Company has timber harvesting activities in all Forest Management Units within the Mountain Forest Section.

The Mountain Forest Section is highly valued for its richness in all-natural resources and as such the forests and all associated values must be protected against wildfires.

LP will cooperate fully with the Manitoba government in the prevention, detection, and suppression of forest fires within the Mountain Forest Section.

POLICY

- The Province of Manitoba has the full responsibility for forest protection services, including fire control, under the Forest Act and Regulations, and The Wildfires and Consequential Amendment Act.
- If fires are detected in FML 3, Manitoba will deal with them under the terms of the Forest Management License Agreement.
- LP and Manitoba must cooperate in developing strategies for dealing with fires.
- LP's Operating Plan and the Province's fire plan for the region must clearly state the division of responsibilities.
- If Manitoba must take action to suppress fires and requires equipment or workers from the Company, the Company will provide those workers and equipment. Manitoba will pay the Company for the workers and equipment under such conditions.
- Should LP need more protection from fire hazards than the Province provides, any expenses incurred for such extra fire protection will be borne by LP.

GOALS

LP will provide fire suppression training for its employees if the Province requires it.

LP will work with Manitoba to develop guidelines, practices and standards for fire prevention within the FML 3 area.

LP will comply with established regulations, standards and guidelines and will train employees how to apply them.

All LP Forest Resources employees will strive to cooperate with MC regarding the prevention of forest fires with the following priorities:

- No loss of lives or injuries
- Prevent loss of property or equipment
- Prevent the loss of the forest resource

FOREST FIRE PREVENTION

PROCEDURES

LP Canada Ltd. will support Manitoba in its' fire prevention efforts. The Company will develop rules and procedures regarding forest fire prevention for its employees and independent logging contractors in their work environment. These procedures are required to promote forest fire prevention and for the safety of all those involved in forest operations.

PERSONAL AWARENESS

The fire season is in effect from April 1 to November 15.

The cost of fire suppression may be charged against a person or Company if proven that person or Company was responsible for starting a forest fire.

No fires of any type are allowed.

Avoid smoking while working or walking in the bush.

No clear glass water jugs.

Know the location of fire equipment in your area.

Do not use fire equipment for any other purpose than to fight fires.

Forest workers are required by law to fight forest fires when called upon and are paid at the rates set by Manitoba Conservation.

SMOKING

Extreme caution is required by all people who smoke on Company operations.

The following policies if followed will reduce the risk of forest fires occurring by smokers and more strict smoking rules being implemented:

Sit down before smoking.

Remain seated until smoking material is extinguished.

Be sure smoking material is completely out before standing up.

All equipment operators with open cabs or windows must stop their machine when lighting up and during smoking.

LUNCH FIRES

Open lunch fires are not permitted from April 1 to November 15.

Lunch shack stoves should be removed during the fire season.

POWER SAWS

Power saws are one of the greatest fire hazards in the woods. The following procedures are to be followed to reduce the risk of fire when using power saws:

All power saws must have operable mufflers and baffle plates.

All power saws must be kept clean and in good operating condition.

Hot power saws are to be set down on mineral soil or a stump, never on dry forest litter.

Power saws are to be allowed to cool for five (5) minutes before refueling.

Power saws are to be refueled on mineral soil.

No smoking while refueling.

Move power saws away from the refuel site before starting.

Power saw operators must have a dry chemical fire extinguisher at the fueling site during the fire season.

Power saw operators are to comply with the Company smoking policy.

Power saws must be shut off for at least five (5) minutes before leaving the work area.

MECHANICAL EQUIPMENT

Equipment operators are to clean all forest debris from their machines at least once per shift.

Regular inspections must be performed on in-machine automatic fire control systems.

All equipment must have the engine and winch areas washed on a regular basis.

All emergency brake systems must be functioning properly and not dragging.

It is the duty of all equipment operators to check at the beginning of each shift and ensure the required fire equipment is on their machines and in good condition (i.e. fire extinguishers, shovel, axe, etc.).

Any fuel or hydraulic leaks are to be repaired as soon as possible.

Short circuits in the electrical system are to be repaired immediately.

Equipment is to be parked on mineral soil if possible and at least 20 ft. from other machines or buildings.

All machines must be checked for smoldering debris after they are shut down.

Equipment operators must comply with the Company smoking policy.

All master and cut-off switches are to be turned off at the end of each shift.

FIRE EXTINGUISHERS

Each person must know the location of the fire extinguisher nearest your place of work. Fire extinguishers must be inspected on a regular basis by a qualified person.

Any fire extinguisher which has been used must be replaced immediately and the discharged one turned into the supervisor or employer for recharging.

Playing with fire extinguishers is prohibited. A partially discharged fire extinguisher will lose its charge quickly and become useless.

If you are not aware of the proper use of an extinguisher - have someone who knows how show you.

In the event of a fire take the following steps to extinguish the fire but take no action that could endanger your life:

Break the wire seal.

Remove the locking pin.

On cartridge type extinguishers, break the cartridge seal.

Get in as close to the fire as is safe and possible.

Hold the extinguisher upright.

Aim the extinguisher at the base of the flame.

Release the charge.

Be sure to notify your supervisor or employer so that the extinguisher can immediately be replaced and the used one recharged.

WELDING OR ACETYLENE BURNING

No welding or cutting is to be done unless the machine or part is situated on mineral soil.

All flammable fluids are to be cleaned off before welding or cutting.

Use welding blankets where necessary.

A fire watch person must be used during welding.

Sufficient fire extinguishers must be on hand while welding or cutting is taking place.

Mechanics and welders must be trained in the proper use of fire extinguishers.

PROVINCE OF MANITOBA - FIRE EQUIPMENT REQUIREMENTS FOR THE FIRE SEASON

APRIL 1 TO NOVEMBER 15

Power Saw Operator Or One-Man Crew	1 - 2 lb. Chemical extinguisher (Operational)
Three – Five Man Crew	1 - Pack pump (full). 1 – Shovel.
Five – Ten Man Crew	2 - Pack pumps (full). 1 – Shovel. 1 – Axe.
Ten Person Crew Plus	1 pumping unit (min 50 p.s.i.) c/w 600 feet of forestry hose and accessories. 1 – 500 gallon tank wagon (where there is no readily available water source 3 pack pumps. 3 – shovels 2 – axes
Logging/Scarification Operations (Skidders, Feller Buncher, slasher, delimber etc.)	1 - 20 lb. ABC type fire extinguisher or 2 – 10 lb. ABC type fire extinguishers. 1 – pack pump (available) 1 – shovel
Haul Trucks	1 – 5lb. ABC type fire extinguisher. 1 shovel
Road Construction: Bulldozer, Grader, Excavator	1 - 20 lb. ABC type fire extinguisher or 2 – 10 lb. ABC type fire extinguishers. 1 – shovel
Service/Utility Vehicles (Pick-up, fuel truck etc.)	1 – 5 lb. ABC type fire extinguisher.
ATV	1 – 2.5 lb. ABC type fire extinguisher
Spark Arrestors	Required by law on all internal combustion engines
Communications	Where possible, all forest operations should have a means of reporting a forest fire or other work-related emergency. At the discretion of the Natural Resource Officer in charge, permit restrictions may be imposed during periods of high wildfire danger, where field communications do not exist.

All dry chemical extinguishers must be ABC type, C.S.A. approved, and properly maintained.

FOREST FIRE HAZARD REDUCTION

Important to the cause of forest fire prevention is the careful planning of forest management activities.

Buffer management is an important aspect of fire hazard reduction. Buffers along roads and water bodies can provide a path for forest fires to follow when other sources of fuel have been removed by harvest. The buffers may create the only fire corridor from one adjacent stand to another. For this reason, buffers must be managed to reduce the risk of fire spread where possible. Buffers with unhealthy or over mature timber and heavy fuel load should be considered for removal to reduce or eliminate the fire hazard they may cause.

Stands of timber which have been killed or damaged by insects or disease will be given priority for harvest in order to salvage the timber and eliminate the risk of fire hazard.

Where initially approved by work permit conditions, slash and top debris that is to be piled at the landing for disposal will be burned in late fall or winter to minimize the fire hazard.

All company and/or contract personnel involved in forest renewal activities during the fire season will be required to follow the established guidelines and procedures for fire prevention.

FOREST CLOSURE DURING FIRE SEASON

When weather and forest fire danger ratings warrant, Manitoba may impose travel and/or activity restrictions within the forested areas of the province. These restrictions are put in place for the safety and protection of those people involved and to reduce the risk of fires within the restricted areas. Forest restrictions may affect the movement of vehicles and people within certain areas or for specific forest operations, depending on the extremity of the situation.

Company employees and independent contractors will cooperate with Manitoba Conservation when such restrictions are issued.

LP's Forest Resources Division management staff will consult with Manitoba to assist in the implementation of restriction procedures which may include:

- Close down all or part of the Company's forest operations until the restrictions have been removed.
- Assist MC in providing roadblocks to notify and instruct people as to restriction requirements.
- Restrict the use of Company roads to Company operations only.

- Direct Company employees and independent contractors to start daily shifts earlier than normally scheduled in order to finish earlier in the day.
- Inform all independent contractors of the fire hazard situation and any restrictions that may occur.

FOREST FIRE DETECTION AND REPORTING

All Company Forest Resources staff engaged in field operations will be instructed to be aware of the conditions on their operating areas and keep a close watch for potential fire hazards or actual fires.

When reporting a forest fire, the witness should provide as much information as possible to assist Manitoba in determining what personnel and equipment is needed to respond to the fire.

The following information should be provided:

- Your name and phone number.
- Time the fire is discovered.
- Location of fire - road, lake, block number, operating area name
- Approximate size of fire.
- Fire spread - ground, crowning, etc.
- Fuel type - muskeg, swamp, cutover, plantation, standing timber, etc.
- Identify any property values in the area if possible - cabins, camps, etc.
- Location, name and size of nearest lake and distance to fire.
- Is there room on the lake for a float plane or is a helicopter required?
- Wind direction and strength.
- Access to fight the fire - roads, water.
- People already available to fight the fire.
- Experience level of those people present and available.
- Equipment present and operational.

FOREST FIRE REPORTING PROCEDURE

It is important to report all fires.

The first call must be to Manitoba Fire Duty Officer **204-627-8332**.

The second call must be to the Operations Supervisor
(KEITH PROCTOR) 204-734-0646

Designated responsible for the fire reporting procedure.

If the Natural Resource Officer cannot be contacted at the first call, the Area Forest Manager becomes responsible to contact Manitoba Conservation.

Contact persons and phone numbers for Manitoba and LP are provided at the end of this section.

INITIAL ATTACK

Where a fire is detected in the vicinity of one of the Company's harvest blocks, fire suppression activities will commence only if the size of the fire is such that there is no threat to the safety of any forest workers.

SAFETY OF WORKERS

First consideration must be given to the safety of all workers during fire suppression.

No one is to be placed in a position where his or her life is in danger.

During initial fire suppression activities, the following must be kept in mind:

- Keep all workers together
- Maintain visible distance between workers
- Know what the fire is doing
- Cross through unburned portion of the fire
- Travel at an angle to the fire edge
- Watch hand holds and footing
- Avoid hazardous short cuts
- Beware of causes of accidents
- Keep calm
- Treat all injuries

Maintain fire suppression activities only if the fire is controllable and until Manitoba initial attack crew arrives.

If the fire is put out, maintain a close watch on the fire area until Manitoba initial attack crew arrives.

FIRE OUT OF CONTROL

If the fire is out of control when detected or becomes uncontrollable with existing equipment, evacuation procedures must be implemented.

Gather all information possible for a report to Manitoba.

EVACUATION OF WORKERS

Evacuation of all workers is the first priority.

If the Area Forest Manager is not available, the contractor or foreman will be responsible for the shutdown of operations and evacuation of workers.

All workers need to be assembled at a central location within the operating area.

All workers must be accounted for as they are escorted or directed to leave the operating area by the safest route possible.

EVACUATION OF EQUIPMENT

If there is enough time to move equipment, the following lists the order in which equipment shall be moved:

- Bulldozers
- Feller-Bunchers
- Delimbers
- Loaders
- Slashers
- Skidders
- Graders
- Lowbeds
- Haul trucks
- Buses and pickups

If the equipment cannot be moved from the immediate area and time permits, it should be moved to a protected area (landing, roadside, borrow pit, swamp).

When equipment can be moved out of the area, lowbeds shall move the equipment as per the above priority list. Wheeled equipment will be moved by the operators to a safe location. The person responsible for the evacuation will ensure all equipment and personnel are accounted for.

MANITOBA ARRIVAL TO FIRE

Upon arrival of Manitoba to the fire, the Company representative or contractor coordinating the initial attack effort will provide the following information to the Manitoba fire boss:

- Fire location
- Condition of fire i.e. fuel present, access to fire, distance and location of water, values to be protected, spread potential
- Discovery time
- Cause of fire (if known)

- Manpower and equipment on fire
- Manpower and equipment available
- Hours worked by men and equipment
- Time and method of initial attack
- The effect of the initial attack on the fire

Manitoba will take over fire suppression responsibilities on the fire.

The Company representative or contractor will offer full cooperation to the Manitoba fire boss for further fire suppression assistance if required.

The Manitoba fire boss will release Company or independent contractor personnel from fire suppression activities as soon as possible.

CONTACTS AND RESOURCES

This section of the Fire Protection/Suppression Plan will provide contact information for LP Forest Resources Division personnel, independent logging contractors, third party operators and Manitoba Conservation. Information is also provided on manpower and equipment availability.

This information is specific to the LP Forest Management License area and the LP operating areas within Forest Management Units 12 and 14.

Section II will be amended annually to provide updated information.

LP CANADA LTD. CONTACTS

LP Forest Resources personnel contacts are provided and categorized by area. The list also includes telephone and mobile radio numbers.

MANITOBA CONTACTS

Manitoba personnel contacts are provided and the numbers prioritized with the Fire Control Officer (F.C.O. **204-627-8332**) being the first contact that should be made with the other MC positions following.

INDEPENDENT LOGGING CONTRACTORS AND THIRD-PARTY OPERATORS

Information is provided for LP contractors that will be working in various areas of the Mountain Forest Section.

Information is provided for third party operators who traditionally operate during the fire season. The smaller quota holder operators traditionally operate during the winter season only.

LP CANADA LTD. SWAN VALLEY FOREST RESOURCES - CONTACTS

LP Forest Resources Office

558 3rd Avenue South
P.O. Box 998
Swan River, MB.
ROL IZO

Receptionist – Val Reich

Phone:	734-4102
Fax:	734-3646

Contacts	Office	Home	Cell
Area Forest Manager			
Todd Yakielashek	734-4102		204-281-2549
District Forester			
Paul LeBlanc	734-4102	734-4013	734-0421
Planning			
Operations Planner			
Vern Bauman	734-4102		734-0161
Planning Technician			
Brian Nickel	734-4102	539-2428	734-0816
Operations			
Operations Supervisor			
Keith Proctor	734-4102	238-4308	734-0646
Operations Technicians			
Paul Frank	734-4102		281-1687
Trevor Kotyk	734-4102		734-0366
Dave Lund	734-4102		734-0083

MANITOBA CONTACTS

		<u>Office</u>	<u>Home</u>	<u>Cell</u>
Fire Control Officer				
The Pas	Lawrence Huculak	627-8332	623-7633	623-0712
<u>District Offices:</u>				
<u>Swan River</u>				
District				
RFS	Grant White	734-3429	937-7566	937-7566
South	Jeff Vermette	734-3429	734-7090	734-0079
South	Jessica Avery	734-3429	431-281-3740	431-281-3740
South	Guye Fiel	734-3429	734-6189	281-1469
North	Blake Patterson	734-3429	734-5938	281-5300
North	Geoff Avery	734-3429	281-3961	281-3961
North	Rodney Redhead	734-3429	734-2920	734-2920
Radio Room		734-4404		
<u>Roblin</u>	Clint Wiebe	937-6452		937-7551
	Elliott Hrychuk	937-6452		247-0361
	Nathan McMillen	937-6452		937-7295
	Joey Foxon			431-271-0211
<u>Winnipegosis</u>	Mike Tyschinski	656-7036		648-4251
<u>Dauphin</u>				
Regional Field Supervisor				
District Supervisor	Chad Ducheck	622-2106		648-4547
	Linden Clark	204-7684428		
<u>24 Hour Toll-Free Forest Fire Line</u>		<u>1-800-782-0076</u>		
Winnipeg Emergency Measures		945-5555		

INDEPENDENT LOGGING CONTRACTORS
FML 3 – SUMMER & FALL 2022

CONTRACTOR	LOCATION	EQUIPMENT/PEOPLE
Bresky, Herb and Sons Herb Bresky 204-734-2530 C 204-734-8246 Rick Bresky C 204-734-8941	Unknown	3 648 GIII and 748 GIII JD skidder, 665 JD cable skidder w/300 gal. Water tank/pump, D6H Series II Cat w/ripper and long undercarriage, D6M LGP Cat w/winch, D8N Cat, 618 Timberjack feller buncher, 2 853G JD feller buncher, Hydro-Axe rubber tired feller buncher, scraper, JD 772BH grader, JD 2054 Log Loader w Bucket, 200 LC JD Logger log loader, 240 LC JD Logger log loader, JD 200LC excavator w/thumb, 200 Hyundai log loader, Cat 950 wheel loader, 35 and 40 ton low beds, 6 trucks, picker trailer, tandem gravel truck, 2-5000 gal. Water tanks/pumps, and 15 men
Intermountain Contracting Ltd Office 204-734-4222 Matt Atkinson 204-281-0669	Unknown	2 Deere 748GIII skidders, 850 Timberjack feller buncher, 2 822 Tigercat feller bunchers, 2 fuel trailers, 40 ton low bed, 140G Cat grader, 143H Cat grader, 892E JD log loader, 270 Hitachi log loader, 200 LC JD track hoe, D7H Cat w/ripper, 450G LGP JD dozer w/winch, 7 trucks, D6H LGP Cat w/winch, D6H Cat, JD 270LC track hoe, Volvo 240LC excavator, 20 men
Trisum Logging Dienel Laliberte 204-937-3334 C 204-937-7507	UPD	2 748 GIII, 1 748E, and 1 648 GIII JD skidders, 2 2200B Madill feller bunchers, 790 JD log loader, 220 LinkBelt log loader, 690D-LC JD excavator, 270 Hitachi excavator, JD 790D excavator, 450 Komatsu wheel loader, D7G Cat, D7H Cat with ripper, 2 740 Champion graders, 9 trucks, 35 and 40 ton low beds, 20 men
McCullough Logging Inc. Byron McCullough 204-734-2447 C 204-734-8347 Cory McCullough C 204-734-8602	Unknown	1 535 and 2 525 Cat skidders, 618 Timberjack feller buncher, 235 Cat track loader, 3 trucks, 12 men, D9H Cat w/ripper, Cat No. 12 grader
West Favel Logging Ian McKay 204-525-4693 C 204-734-8324	Unknown.	648 G John Deere Skidder, 560 Timberjack skidder, Tigercat 870 feller buncher, 200 ELLE LC5 Hitachi log loader, 270LC Hitachi log loader, 3 trucks, 600 Champion grader, D65 Komatsu dozer, D85 Komatsu dozer 6 men

**FMU'S 12 & 14
SUMMER & FALL 2022**

CONTRACTOR	LOCATION	EQUIPMENT/PEOPLE
Prairie Mountain Loggers Laurie Parker 204-734-2101 C 204-734-0644	Unknown	2 648 GIII Deere, 628 Timberjack feller buncher, D6H Cat w/winch, 740 Champion grader, 4 trucks, 200 Komatsu log loader, JD 200LC excavator, 2054 JD excavator, 40 ton low bed, 6 men
Ferland Logging Darrell Ferland 204-545-2157 C 204-281-1051	Unknown	540 JD skidder, 3 men
Cober Contracting Daren Cober 204-734-4739 C 204-734-0356	Unknown	903G JD feller buncher, 748G111 JD skidder, 210 BLC Volvo, 2 Trucks, 5 men
Timberline Transport Darcy Laliberte C 204-937-7417	Unknown	822 Tigercat feller buncher, 545C CAT skidder, 748 JD skidder, D6R Cat, Link Belt Hoe, Trucks, Lowbed, 140 G/H CAT Grader
Kulish Logging Dwight Dudar C 204-648-5378 Shawn Dudar C 204-648-6491	East Side Duck Mtn.	853 M & 753 J John Deere feller bunchers, 845 Tigercat feller buncher, 648G, 748H, and 848G John Deere Skidders, 480 Timberjack skidder, 220 Daewoo, 200 John Deere and 595 John Deere log loaders, D7R and D6H Dozers, 210 Hyundai and 200 Hitachi Excavators, 40 ton low bed, 8 trucks and 15 men, 740D Grader

**THIRD-PARTY OPERATORS
FML 3**

CONTRACTOR	LOCATION	EQUIPMENT/PEOPLE
<u>Spruce Products Limited</u> Rick Bobby 734-3089		
Garth Riehl 539-2406 Lonny Riehl 204-734-8843	SRL	4 648 JD skidders, 2 D8 Cat, D7 Cat, case dozer, 2 Prentice 630B feller bunchers, 490A Prentice skidder, 40 ton low bed, CAT 330B log loader, Prentice log loader, 2 Honda fire pumps, 1000 gal. Water tank, Cat 140 grader, 5 trucks, 14 men.

APPENDIX VI: PUBLIC OPPORTUNITIES

Advertisement in the local newspapers for Roblin and Swan River.

LP Forest Management Open House

**LP would like to hear your opinion on the two-year
Operating Plan 2022-2024 for the Duck Mountain
Provincial Forest and surrounding area**

All plans for both LP and Quota Holders in Forest Management Licence #3 will be available for review and public input.

Mon. Feb. 7th 6 to 8 pm; or

Wed. Feb. 9th 6 to 8 pm

Join us on Zoom at: <https://lpcorp.zoom.us/j/8157705136> Meeting ID: **815 770 5136**

email paul.leblanc@lpcorp.com and he will email you back the links

For further information call Val at 1-204-734-4102

