



Spray Lake Sawmills

Detailed Forest Management Plan 2001 – 2026

Chapter 5 - Resource Management Objectives and Strategies



December 15, 2006

Chapter 5 - Resource Management Objectives and Strategies

Mission

The SLS mission is to be an industry leader and an active community member by valuing our employees, conserving our environment and managing our resources.

Goals

1. To maintain natural ecosystems, communities and native species in the FMA area in balance with social and economic needs.
2. To build knowledge of ecological relationships.
3. To manage broad ecosystem functions and patterns in order to maintain broad species diversity based on a natural disturbance history dominated by fire.

Based on the overall company philosophy and the issues identified at the Preliminary Forest Management Plan (PFMP) and Public Involvement stages, SLS has developed a set of Objectives and strategies by subject area. A matrix format was initially used to guide the development of the Objectives and strategies for each of the issues/values through the Planning/Review Team process identified in the DFMP Terms of Reference. The matrix information was then reformatted into the following. Where needed, further direction on the strategies is provided in terms of ground rules implications.

5.1 Access Management

There is a need to address aspects involving the development of new access and the management/use of existing access within the FMA. Alberta Sustainable Resource Development (SRD) is currently developing the Ghost Access Management Plan for the north portion of the FMA.

Objectives

- Minimize the impact of access development on the environment and other land uses.

Strategies

- Integrate harvest access development and reclamation with other commercial users in the area through direct communications as part of the harvest planning process. Communications could include letters, meetings and field visits.
- SLS will continue to pursue Road Use Agreements with major Energy sector companies.
- Long-term road strategy will be developed as part of the DFMP (Chapter 3). The strategy will be shared with other commercial users to facilitate coordination of access.
- SLS will continue to follow its Access Control Policy.
- Access no longer required will be promptly reclaimed as per the applicable Ground Rules and the SLS Road Maintenance and Abandonment Plan.
- Evaluate the Ghost Access Management Plan once finalized by SRD for incorporation into operational planning.

- Incorporate existing plans, zones, other resource values (e.g. fish, wildlife, recreation and other commercial interests) and authorities regarding access.
- Work with SRD to identify sensitive wildlife areas in access planning, to minimize road densities and to develop operational strategies for incorporation into the Ground Rules.
- Recognize the Grizzly Bear Recovery Plan process and develop strategies and a monitoring/measurement program based on recovery plan recommendations. The recovery plan will be evaluated in consultation with SRD once completed. Grizzly Bear Conservation Areas may become the focus of access strategies and will be given consideration in the harvest design process. Road density targets may be an outcome of the Recovery Plan.

Ground Rules Implications

Ground rules will detail road planning requirements (construction, maintenance and abandonment). Operational strategies and tactics will be defined to address sensitive wildlife areas. These strategies may include avoidance, minimize placement through sensitive areas, timing, gating and prompt reclamation.

Access management will be a standing agenda item for the annual SLS/SRD/Alberta Community Development (ACD or CD) harvest design review meeting.

5.2 Adaptive Management and Research

The ability and flexibility to change management strategies and practices in light of new research and monitoring results is recognized as a very important component of forest management. Equally important is the investment in and application of research.

Objectives

- Incorporate adaptive management philosophy into the management strategy for the DFMP.
- Continue to support research as a commitment to adaptive management and environmental protection.

Strategies

- Use an adaptive management process of plan implementation, monitoring and revision for delivery of the DFMP.
- Continue to monitor the latest in research (e.g. Foothills Model Forest) and operational delivery. Applicable information will be evaluated as part of the harvest planning process and best management incorporated.
- Continue as members of Forest Engineering Research Institute of Canada (FERIC) and the Foothills Model Forest (e.g. Managing Disturbance in Riparian Zones).
- Support other research initiatives based on SLS review.

Ground Rule Implications

Ground rules will be continually monitored within the context of the latest research and monitoring results. Should it be determined that a specific ground rule is out-dated or less effective, changes can be requested by either SLS or SRD.

5.3 Aesthetic Values

The FMA is known, in part, for its scenic and natural values. Concern has been expressed in the past over the impact of harvesting activity in areas of high visual sensitivity.

Objectives

- Mitigate the impact of our operations on visual resources.

Strategies

- A broad level Visual Sensitivity Assessment for the planning area is the starting point. A procedure to identify, assess and plan for aesthetic values at the preliminary harvest design stage will be developed for incorporation in FMA Ground Rules. Areas rated High will be the focus of more detailed analysis at the time of harvest planning. Areas rated Medium will be investigated further with stakeholder involvement at the time of harvest planning. Areas rated low will generally not be assessed further unless specifically identified by stakeholders at the time of harvest planning.
- Follow the harvest planning processes in the applicable Ground Rules. Specific attention will be on road location and cutblock boundaries. The process for areas of high visual sensitivity will include referrals to SRD and referrals to stakeholders, and may include computer modeling and the development of detailed block plans.

Ground Rule Implications:

Ground rules will focus on the operational delivery of the above strategies. The harvest planning process including referral processes will be defined as will the planning and operational tactics presently available and used. Areas may be re-classified for visual sensitivity on a site-specific basis during the harvest planning process. Computer models will be identified. Situations where detailed block plans are required will be defined.

To mitigate the impact of timber harvesting on aesthetics, specific attention will be on road location, harvest layout design, cutblock boundaries and timing of operations. Scenic values can be addressed through varied block sizes, avoidance of geometric shapes, irregular edges, retention of trees or other structure, block positions and distribution on the landscape, use of visual screens and harvest system. Visual resource concerns will be a standing agenda item for the annual SLS/SRD/CD harvest design review meeting.

5.4 Biodiversity and Wildlife Habitat Supply

In general, the following two concerns have been identified:

- Concerns over the effects of long-term timber harvesting on biological diversity and ecosystems.
- Concerns over the effects of long-term timber harvesting on wildlife habitat supply.

To deal with these, Objectives and strategies have been separated into a vegetation component and a wildlife component.

5.4.1 Vegetation

Objectives

- Gain an understanding of the vegetative diversity across the FMA.
- Maintain the natural vegetation range of variability across the landscape at key points in time.
- Protect rare ecosections and ecosites.
- Retain structural attributes within harvested areas and fire salvage areas.
- Retain tree species genetic diversity across the landscape.

Strategies

- Develop an Ecological Land Classification (ELC) inventory for the FMA. The ELC will provide a baseline description of the vegetation types (as modified by factors such as slope and aspect) across the landscape.
- Analyze the ELC and Alberta Vegetation Inventory (AVI) to document the current vegetation status and use as a baseline for the natural range of variability. (e.g. Landbase will be stratified and quantified for Seral stage/cover group analysis and age class distribution by compartment. Forest management scenarios will be run and evaluated against the baseline.)
- Evaluate the ELC to determine the occurrence of rare ecosites. The Alberta Natural Heritage Information Center (ANHIC) database will also be assessed to identify the presence of rare ecosites. ANHIC data will be updated at the time of harvest planning to determine new reported sites.
- Develop block specific structural retention strategies based on block specific Objectives. Factors include block size, topography, aesthetics, understory and dominant tree species. Strategies may include leaving dead or dying trees where safe, leaving unmerchantable trees and species and leaving islands or patches of unmerchantable and merchantable trees. Specifics will be developed in the applicable Ground rules to allow for an adaptive management approach.
- Follow the SRD Standards for Tree Improvement in Alberta as the standard for growing planting stock and promote natural regeneration from on-site seed sources.
- Work with SRD on the development of a fire salvage strategy based on existing policies.

Ground Rules Implications

Obtaining an updated version of the ANHIC data from the province will be incorporated into the harvest planning process. Although the one objective and strategy in this section is specific to fire salvage as the primary disturbance regime, it is recognized there may be salvage opportunities that should be addressed in the ground rules or under a separate salvage initiative (e.g. blowdown, insect or disease damage).

Structural retention and genetics are emerging fields of science being incorporated into forest management strategies and ground rules. As such, the following sub-sections on structural retention and genetics provide more detailed strategic direction for the timber supply analysis and ground rule development.

5.4.1.1 Structural Retention

Identifying and maintaining structural components at the landscape and stand level is an important part of ecosystem based management. The dynamic arrangement of living and dead trees, and other vegetation has the potential to contribute the necessary habitat elements for a variety of species over space and time. Structural retention is linked to a number of the DFMP Objectives including biodiversity, aesthetic resources and integration of other values and non-commercial uses. The natural disturbance regime for the FMA is dominated by fire. SLS is conducting a Fire Regime Analysis to help us understand the role and influence of fire in shaping the forests on the FMA. This study will be completed by March 2006.

In the meantime, SLS has conducted a review of the literature from the Foothills Model Forest Natural Disturbance Program. Guidance from this research is applied based on our interpretation to determine structural retention needs both at the landscape level and the stand level. It provides guidance in terms of how much of the landscape is subjected to disturbance, in terms of block or disturbance patch design (irregular boundaries) and in terms of the level of detached, interior block retention targets. Specific references are provided. SLS will continue to monitor the research and adapt when and where possible within the constraints of the DFMP.

Landscape Retention

Retention is commonly discussed at the stand level. However, the entire landscape contributes to the objectives, including lands within the timber harvest land base, lands within the non-AAC or passive land base and lands outside the FMA in the protected land base. Important structural and seral component objectives can be met:

- on steep slopes,
- in watercourse buffers,
- in protected areas,
- in non-accessible areas,
- in areas of non-merchantable trees in terms of both size and species, and
- in retention areas within the harvest land base and harvest blocks.

In terms of the fire natural disturbance regime, the “disturbance event” encompasses the rough outer boundary of the fire and depending on size may include many of the

different landscape components. Within the disturbance event is a combination of disturbed (burnt – disturbance patches) and non-disturbed (non-burnt) areas.¹ For the purposes of the DFMP we will approximate the portion of a compartment sequenced for harvest with a “disturbance event”.

Retention areas within the broader area will include many of the above noted landscape features to meet some of the wildlife objectives including travel corridors (a route followed by animals along a belt or band of suitable cover or habitat – Thomas 1979), thermal cover (cover used by animals to ameliorate effects of weather – Thomas 1979), and hiding cover (any vegetation used by an animal for security or to escape danger – Thomas 1979). In the context of a natural disturbance regime, these areas roughly simulate matrix remnants (residual patches within the greater event area but are still physically connected to surrounding forest matrix or landscape²). “The percent of disturbance events that are actually disturbed ranges between 44-95%, and averages about 69%.”³ Matrix remnants contain a mix of mature forest, immature forest and non-forested areas. In terms of the DFMP land base, 66% is in the active or timber harvest land base and 34% is in the passive land base.

Stand Level Retention

Stand level retention usually refers to structure left as part of the harvest design and within harvest blocks. Opportunities for retention generally depend on the strata or cover group represented by the stand. All planned harvest areas will be assessed for structural retention opportunities as part of the SLS Pre-harvest Assessment. For the purpose of the DFMP, we will equate the “disturbance patch” to the harvest block.

Further to this, in the context of the natural disturbance regime, harvest blocks will be designed with irregular block boundaries to simulate edge island remnants (within patch residual material adjacent to edge of disturbance patch). This will also contribute to wildlife objectives by providing hiding cover, thermal cover and contributing to travel corridors.

The final component to be addressed at this time are detached island remnants which are areas within disturbed patches where mortality is incomplete and are not associated directly with the disturbance patch boundary. These areas provide temporary refuge, snags and live residual trees for wildlife and are generally defined at the disturbance patch scale. The literature indicates a higher percentage of mature forest burns during the fire than immature forest⁴. Harvest blocks will be assessed for structural attributes including:

- Understory trees
- Safe snags
- Unmerchantable trees and species
- Brush and other vegetation
- Dead woody material on the ground
- Windfirmness and topography

¹ Foothills Model Forest. FMF Natural Disturbance Program Research. Quicknote No. 7. March 2001

² Foothills Model Forest. FMF Natural Disturbance Program Research. Quicknote No.11. September 2001.

³ Foothills Model Forest. Alberta Foothills Disturbance Ecology Research Series Report No. 5. November 2003.

⁴ Foothills Model Forest. FMF Natural Disturbance Program Research. Quicknote No. 16. September 2002.

- Habitat Connectivity, hiding cover and thermal cover
- Structure of the original stand

Locations that present operational difficulties will also be noted as good candidates for retention. Considerations include:

- Springs, wet or depression areas,
- Steep pitches
- Treed rock outcrops
- Ravines or draws

Presently, SLS uses a stumpside processing harvesting system. Limbs and tree tops are left scattered throughout the block contributing to the pre-harvest level of down woody debris which includes the larger piece size down woody debris. It is expected that over time portions of the standing structural retention will fall due to winds or age contributing to the recruitment in the larger size classes.

SLS spends considerable resources assessing future harvest areas using a formalized Pre-harvest Assessment to determine site-specific stand characteristics and objectives. This approach is supported by the research which indicates "...the difficulty of using general-level rules to achieve natural pattern emulation goals. Solutions are more likely to be associated with local-level opportunities."⁵ Structural retention opportunities will be a part of the PHA program. The following discussion provides some guidance in this regard.

Merchantable trees and species may be left in certain circumstances dependent on site-specific objectives and the general stand strata as described below. Remnant patches or islands will be variable in size and shape generally ranging from individual trees to a few hectares in size. The distribution pattern is dependent on the site-specific conditions of each block and the patch sizes are very dependent on the harvest block size.

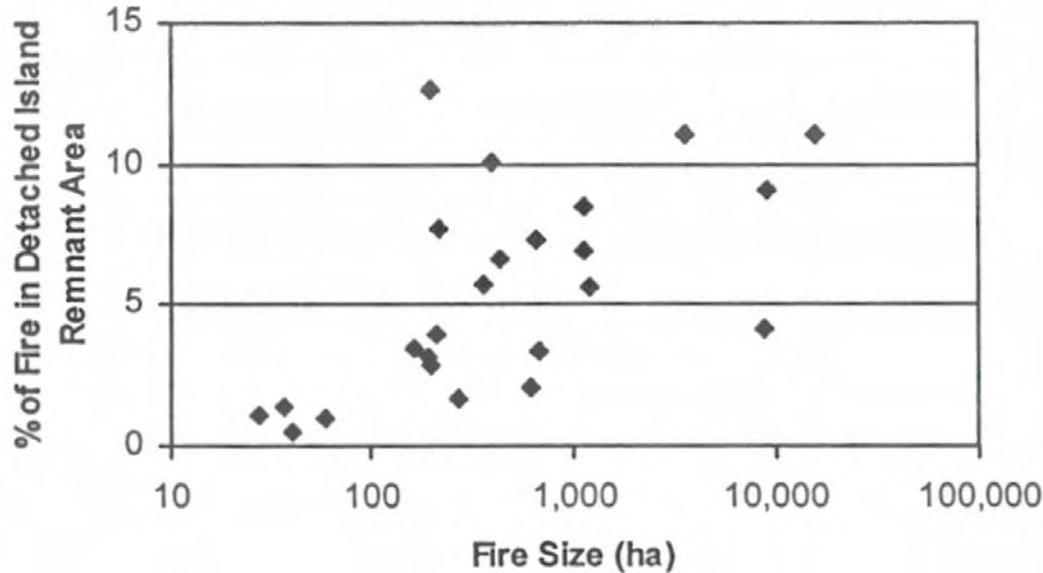
Mixedwood stands provide the most opportunity for leaving structure with the emphasis on the deciduous and understory components. Deciduous trees as well as non-merchantable and understory coniferous species will be left within harvested areas. Cutblocks within these cover groups will generally have some level of structural retention independent of block size. Table 5.1 provides guidance to harvest operations. The target is to protect all the deciduous and understory conifer recognizing there will be some operational losses.

Coniferous stands in the SLS FMA are generally even-aged and present fewer opportunities for leaving structure based on a history of stand replacing fires. In larger blocks (greater than 100 ha.), detached island remnants will be designed so they will be available for harvesting in future passes. As stated earlier, edge island remnants will be retained as part of the irregular block boundary design becoming part of the adjacent stand. How long the islands remain on the landscape will depend on the site-specific characteristics but the minimum period will be 20 years to be consistent with the adjacency constraints in the timber supply analysis. Upon final removal the target is still to retain 1% in standing live trees over the rotation. In blocks less than 100 ha., on

⁵ Foothills Model Forest Natural Disturbance Program Research. Quicknote No.11. November 2001.

average, SLS will target 1% of the harvest block to be left as a combination of individual and small patches of standing live trees.⁶

Percent of Fire Area in Detached island Remnants



Understory conifer will be protected where it exists. At this point, the spatial harvest sequence has only identified one block that is greater than 100 ha. in size.

Table 5.1

Yield Strata	AVI Leading Species	Structural Retention Strategy	
		Block Size < 100ha.	Block Size > 100ha.
1, 3	Conifer Pine	Individual tree and small patch. (1% by volume)	Large patch (>4ha.)
2, 4	Conifer Spruce	Individual tree and small patch. (1% by volume)	Large patch (>4ha.)
5	Mixed wood	Deciduous trees and understory conifer.	Deciduous trees and understory conifer.
6	Deciduous	Deciduous trees and understory conifer.	Deciduous trees and understory conifer.

Operating procedures for identifying and protecting structural retention characteristics to achieve structural objectives will be defined in the ground rules as previously described in the Landscape Retention and Stand Level Retention discussions. Emphasis will be placed on the Pre-Harvest Assessment process.

Monitoring

SLS will monitor the volume of merchantable trees left as part of the structural retention strategy. The volume will be tracked and reconciled against the annual harvest level on

⁶ Foothills Model Forest Natural Disturbance Program Quicknote #23. November 2003.

a quadrant basis (i.e. every five years). The volume will be reported in the 5-year Stewardship Report.

Monitoring Procedure

A consistent approach to assess both individual stem and patch retention was required. A combined process utilizing aerial photography interpretation and linear transects presented the most practical option.

1. Method for Retention Patches

Retention patches will be assessed utilizing aerial photography to determine the total area of patches retained. Although the approach is currently based on aerial photography, SLS will also investigate the use of GPS technology to record and quantify the total area. This method will be applied to all blocks where patches can be easily identified on the aerial photography.

1.1 Determining Percent Area and Percent Merchantable Volume in Retention Patches

Percent Area

The total area of eligible retention patches within the block determined through aerial photography interpretation will be recorded. Total block area inclusive of retentions will then be divided into the total area of the retention patches to show retention as a percentage of block area.

Percent Volume

To determine the percentage of merchantable volume represented by the retention patches, multiply the average cubic meters per hectare for the block by the total hectares of remnant patches. Divide this number by the block volume for percent volume retained.

Block Area (ha)	Retention Patches (ha)	% Area Retained	Block Volume (M ³)	Block Volume (m ³ /ha)	Retention Volume (m ³)	% Volume Retained
100	7	7	22,000	220	1540	7



2. Method for Individual Merchantable Stems and Small Patches

In some cases, retention is left as a combination of individual stems and small patches throughout the block, the amount of which cannot be readily determined with aerial photos. Method 2 will be used in these situations.

A linear transect sample strip will be utilized to survey both individual merchantable trees and merchantable trees within smaller patches. A single straight line linear transect, two meters wide, will be plotted along the long axis of the block. All merchantable trees within the two meter wide linear transect will be tallied. The line location will be recorded on GPS.

2.1 Determining the Percent Area of Small Patches and Percent Merchantable Volume represented by Small Patches and Individual Stems

Percent Area (Small Patches)

Determine the total linear transect area in hectares; square meters of linear transect/10000.

Record the total area of linear transect within patches and determine as a percentage of the total linear transect area. This percentage should be representative of the small patch area per block.

Percent Volume (Small Patches and Stems)

Divide the total merchantable stems tallied by the average trees per cubic meter for the block to determine cubic meters per linear transect. Divide the cubic meters per linear transect by the area per linear transect in hectares to determine the retained cubic meters per hectare. Multiply the retained cubic meters per hectare by the final block area divided by the harvested block volume to determine the percentage of merchantable volume retained.



Block area = 28ha.
 Total Transect length = 900m
 Transect area = .180ha.
 Volume/transect = 1.65m³
 Volume/ha retained = 9.16m³/ha
 Volume % retained = 3.3%

Block volume = 7700
 trees/m³ = 3.64
 Trees tallied = 6

If the distribution of retention trees is not uniform or different strategies were applied to different portions of a block (e.g. single tree vs. patch retention) the block may be stratified and separate assessments performed. The area figures derived from aerial photo interpretation of remnant island patches and from the linear transect are additive for blocks where both procedures were employed.

The above methodologies will be outlined in the Ground Rules. The focus at this point is on the use of air photos or GPS technology or a combination thereof.

5.4.1.2 Genetics

The SRD manual for Standards for Tree Improvement in Alberta (May 1, 2003) will be used by Spray Lake Sawmills as the standard for all seed collection and deployment on the FMA.

SLS conifer seed collection and reforestation program will use Stream 1 adapted seed material for deployment on the FMA. The Standards for Tree Improvement in Alberta defines Stream 1 material as follows: "Adapted seed or vegetative material collected from wild or artificially regenerated stands of native species within a given seed zone, having restricted or unrestricted registration for deployment in that seed zone. Adaptedness of Stream 1 material is assumed on the basis of limited geographic transfer from source location. Diversity and documentation standards apply." This means that SLS will collect conifer seed for all harvested species for which artificial regeneration will be performed. Seed collected will be from wild stands in amounts that will provide for reforestation of the harvested area. SLS will collect conifer seed and track specific seedlots to seed zones as identified in the Standards for Tree Improvement manual.

SLS currently collects conifer seed using woodlands staff or by directly supervised contract. All conifer seed is collected from specific or designated areas. Cones are only accepted from designated areas and specific seed zones. No cones are accepted without verification by woodlands staff. Conifer seed is collected in sufficient quantities to ensure adequate amounts are available to reforest all harvest areas and provide for contingencies if required. All conifer seed is registered and stored at the Alberta Tree Improvement and Seed Center (ATISC).

SLS currently uses stumpside processing which promotes reforestation of harvested areas with natural seed on site. Reforestation prescriptions will continue to take advantage of the seed existing on site to maintain population diversity.

Spray Lake Sawmills will coordinate with SRD in the development of genetic in situ conservation seed area reserves within the FMA as part of the overall Provincial system and Provincial Conservation Plan. There are existing areas on the landscape that can be used for the conservation areas. The focus of the Provincial Conservation Plan will be on genetic representation with a priority given to natural areas, protected areas, inoperable areas, and areas not within the productive forest land base when these are suitable.

SLS does not anticipate developing a forest genetics program to use stream 2 materials within the ten year time frame of this DFMP. Stream 2 material is defined as “Adapted seed or vegetative material produced in a production facility, having restricted or unrestricted registration for deployment within the deployment zone of the associated controlled parentage program...Adaptedness of Stream 2 material is assumed on the basis of limited geographic transfer from source location, or may be confirmed through long-term testing and/or monitoring, concurrent with use.”

Three tree species have been identified as being of special concern by SRD. The first is White bark pine (Pa) which has been placed on the provincial “watch list” as a species experiencing serious population decline. SRD requires White bark pine not be harvested. The Forest Inventory for the FMA (AVI) identifies one stand (16 hectares) in the extreme south that has a minor component of White bark pine (C17La6Fa2Se1Pa1). This stand is outside the net productive forest land base. SLS will not harvest small patches of Whitebark Pine. Staff and contractors will be trained in its identification and trees will be flagged for protection where identified. SLS will notify the SRD Genetics Unit when White bark pine is found.

Also identified as a species of concern is Limber pine. Similar to White bark pine, SRD requires that Limber pine not be harvested. There are no stands containing Limber pine identified in the Forest Inventory. However, staff and contractors will be trained in its identification and trees will be flagged for protection should any Limber pine be identified. SLS will notify the SRD Genetics Unit when Limber pine is found.

The final species is Douglas Fir. Douglas fir (Fd) is more prevalent in the Montane regions of the Province and as such there is only one stand (10 hectares) containing this species identified in the Forest Inventory (B18Se6Fd4). Eighty percent of this stand is outside the net productive forest land base. Should SLS come across meaningful volumes of Douglas Fir within harvest blocks, we will take steps to either protect the trees or plan for their reforestation. A detailed block plan will be developed. SLS will

meet with SRD to discuss whether site-specific silvicultural strategies are required to minimize the risks to successful regeneration prior to the block being harvested. The draft document “Porcupine Hills Harvesting and Silviculture Strategies: Minimizing the risks to successful regeneration of cutovers” prepared by SRD, will be referenced as a guide.

There are 14 seed zones that cover the FMA. These are:

A 1.3	Alpine
A 1.4	Alpine
DM 2.3	Dry Mixedwood
LF 2.3	Lower Foothills
M 4.3	Montane
M 4.4	Montane
M 5.3	Montane
M 5.4	Montane
SA 3.1	Subalpine
SA 3.2	Subalpine
SA 4.1	Subalpine
SA 4.2	Subalpine
UF 1.5	Upper Foothills
UF 2.5	Upper Foothills

5.4.2 Wildlife

Objectives

- Develop a landscape level understanding of wildlife habitat needs both spatially and temporally.
- Maintain habitat for key species over time at the landscape level.
- Incorporate wildlife habitat needs in operational planning.
- Minimize the impacts of SLS activities on riparian areas.
- Evaluate riparian management opportunities.

Strategies

- Work with SRD to identify sensitive wildlife sites and key wildlife species. The use of BSOD data and information from other sources on specific wildlife features will be incorporated into the harvest planning process.
- A reporting process will be developed whereby sensitive sites and observations noted by SLS during field operations are reported to the BSOD Administrators.
- Explore opportunities for wildlife research, assessment and monitoring partnerships. Habitat suitability modeling may provide some guidance.
- Follow the applicable Ground Rules. Examples in consideration of wildlife needs include leaving coarse woody debris, riparian buffers, inner block tree retention using a variety of patch sizes and spatial arrangements, modification to block size and shape, travel corridors and single entry strategies.

- Develop a species list. Model habitat suitability and project over time. Monitor changes to available habitat across the FMA.
- Wildlife habitat for selected species will be modeled as part of the DFMP to establish a baseline and to evaluate forest management scenarios developed for the Timber Supply Assessment.
- Address riparian management including timber harvesting as a vegetation management tool in the development of Ground Rules to achieve other resource Objectives where economically viable.

Ground Rules Implications

The current Provincial ground rules have major sections devoted to standards and guidelines for dealing with wildlife values. The FMA ground rules will need to deal with many of the same aspects in terms of harvest planning and operational wildlife considerations. A process for dealing with sensitive sites will be detailed in the FMA Ground Rules.

The Foothills Model Forest Natural Disturbance Program Quick Note #12 includes the following statements:

- Any given riparian site on the FMF burns almost as often as their upland counterparts.
- No evidence was found to suggest that riparian zones serve as fire refugia.
- The ubiquitous nature of fire in riparian zones suggests that disturbance is a necessary element of the terrestrial part of riparian ecosystems.

The above reference represents research findings and not provincial standards. At this time, standard watercourse buffers will be encapsulated in the ground rules as well as timber harvest options for managing the buffers to ensure they continue to provide the intended site-specific values.

Wildlife values will be a standing agenda item for the annual SLS/SRD/CD harvest design review meeting.

5.5 Community Timber Program

The Forest Management Agreement outlines the volume commitments and sequencing requirements of the fixed volume allocations for the Community Timber Program. The Community Timber Program includes 5 small quota holders (converted from commercial timber permit holders since 2004 DFMP submission), 1 commercial timber permit holder and the "Open" category administered by SR.D

Objectives

- Recognize and honor the fixed volume commitments contained in the FMA.

Strategies

- Work with the Local Advisory Committee and SRD in meeting the commitments outlined in the FMA. This will include joint meetings.

- Develop a harvest sequence that includes the Community Timber Program. Volume sequenced will reflect the average wood profile for the FMA/Quota area. Focus initially will be on the Ghost area and the Dogpound area.
- Provide historical resource predictive model results to SRD for areas sequenced for the Program.

Ground Rules Implications

It is expected the timber harvest operations in the Community Timber Program areas will follow the same ground rules as SLS.

5.6 Soil Conservation

There are concerns over the impacts of industrial activity on soil productivity.

Objectives

- Minimize the impact of our activities on soil productivity.
- Minimize soil erosion from our operations.

Strategies

- Continue to follow the applicable Ground Rules and the Soil Conservation Guidelines. Section 5.17 deals with the water quality and fisheries aspects.
- SLS will assess soils as part of determining silviculture treatments.

Ground Rules Implications

Key elements for incorporation into the ground rules come from the Soil Conservation Guidelines and include rutting, compaction, operability, timing and soil stability.

5.7 Forest Health (forest pest management)

There is potential for timber losses from insects and diseases on the FMA primarily related to the large area of mature lodgepole pine forest on the landscape. Dwarf Mistletoe and Mountain Pine Beetle are the two primary issues. Non-native invasive plants are also an issue.

Objectives

- Assist Sustainable Resource Development (SRD) in assessing the status and control of insect and disease concerns. As examples, concerns identified are Dwarf Mistletoe and Mountain Pine Beetle (MPB).
- Increase forest health awareness among staff and contractors.
- Reduce the spread of insect species that can kill trees within 1 year of infestation.
- Reduce the impact of insects and diseases that cause reduced growth, tree deformities or mortality.
- Assist in the prevention, detection and control of restricted and noxious invasive plants.

Strategies

- Continue to participate in the Integrated Pest Management Committee to obtain updates on the Insect and Disease status within the region.
- Continue to review forest health concerns and status updates with logging contractors and woodlands staff including training in identification of important insects and diseases.
- Address forest health issues through the harvest/silviculture planning process. Specific operational strategies (eg. Sanitation, detection system, rating system) will be addressed in the FMA Ground Rules. Dwarf Mistletoe infected stands within the areas sequenced in the GDP will be targeted and managed to reduce additional spread and damage. Specific Dwarf Mistletoe strategies in 5.7.1.
- Participate on the MPB Strategic Directions Council. Work with SRD to detect and control MPB infestations within 1 year of detection. MPB considerations will be linked to the long-term road strategy. Prioritize high-risk stands for assessment/harvest and develop an emergency access management strategy for MPB sanitation in the event populations build up in the FMA. In the event of an infestation, SLS will develop control plans including tactics, timelines and performance monitoring in cooperation with SRD. Specific strategies and tactics for detecting and controlling MPB infestations will be developed as part of the FMA Ground Rules.
- Participate in the development of the Mountain Pine Beetle Action Plan for Alberta and work with SRD in implementing the recommendations when completed to expedite the control of MPB under outbreak conditions.
- Spruce Beetle is not an issue at this time in the FMA. Should Spruce Beetle become a concern, strategies will be developed to control the beetle in consultation with the SRD Forest Health Officer.
- Participate in cooperative invasive plant management with SRD and other disposition holders. Train staff and contractors in identification. Identify areas of concern and report to SRD who will coordinate control efforts. SLS focus will be along LOCs and in cutblocks. A variety of vegetation management tools will be assessed as part of the control effort.
- Use only certified weed-free seed for reclamation projects.
- Continue to communicate forest health issues to the public.
- The document “Alberta Forest Health Strategy and Shared Roles and Responsibilities Between SRD and the Forest Industry” will guide management planning and activities.

Ground Rules Implications

The SRD Mountain Pine Beetle Management Guide will provide procedural guidance for operational strategies and for conducting operational ground surveys. There are a suite of control tactics for MPB including single and multiple tree treatments. SRD has also come out with the “Interpretive Bulletin – Planning Mountain Pine Beetle Response Operations” and the “Ground Rules Addendum – MPB Operations” which will guide operational planning and operations. Refer to 5.7.2 for further direction.

SRD Directive 2001-06 “Weed Management in Forestry Operations” provides guidelines for weed prevention and control including the practice of cleaning equipment before moving into an area.

SRD provided a Forest Health Matrix to SLS during the development of the DFMP. Tactics identified will be referenced when developing the ground rules.

SLS has developed a Mistletoe Management policy that has been referred to SRD that will provide operational/tool level guidance to the development of ground rules. Current Mistletoe tactics include use of the Hawksworth rating system, removal of infested pine and using spruce as part of the reforestation prescription. Hawksworth rating survey results and maps will accompany large sanitation cut proposals.

5.7.1 Dwarf Mistletoe Management Strategy

5.7.1.1 Introduction

There are areas of the forest with high incidence of dwarf mistletoe on Spray Lake Sawmills FMA and quota areas. In the past, ground rules and the typical two-pass harvest system did not allow for the management of large dwarf mistletoe infestation problems particularly where the infested area exceeded permitted cutblock sizes. To try to deal with this SLS developed its own dwarf mistletoe management policy. Now within the context of the DFMP, SLS will be harvesting based on a Spatial Harvest Sequence (SHS). This strategy document will outline how dwarf mistletoe will be dealt with in this context.

The lodgepole pine dwarf mistletoe is a naturally occurring parasitic plant affecting lodgepole pine. Dwarf mistletoe can have detrimental effects on the health, function and productivity of forests with cone and seed size also being adversely affected. Effects of dwarf mistletoe include reduced growth rates and decreased strength and quality of infested wood. Individual small trees can be killed, and, in time, growth of infested, living trees can become completely stagnated. Severely infested trees are also more susceptible to other damaging agents.

Dwarf mistletoe survival depends on the continuous presence of host trees from one forest generation to the next. It is significantly affected by stand age, density, vertical and horizontal height structure, and species composition.

Forest harvesting, regeneration, and stand management activities can either limit or enhance the spread and intensification of dwarf mistletoe. Removing live host trees can effectively control dwarf mistletoe. Spread and intensification are enhanced when dwarf mistletoe infestation sources remain in and around openings or within thinned or partial cut harvested stands. It is more efficient to prevent mistletoe establishment in non-infested stands than to remove it from infested stands or to replace severely infested stands.

5.7.1.2 Objective

The objective of dwarf mistletoe control is to reduce losses through economically and environmentally sound forest management practices.

5.7.1.3 Background

Lodgepole pine trees of all ages can be parasitized and affected by dwarf mistletoe. Dwarf mistletoe grows in tree bark and wood, absorbing water and nutrients from the host that otherwise is used for tree growth. The parasite induces a localized swelling of bark and wood. Often, nearby buds and branches are stimulated to grow excessively resulting in abnormal clumps of branches called “brooms” or “witches’ brooms.”

Dwarf mistletoe is readily identified in ground surveys during the data collection phase of forest development plans or any prescriptions. Symptoms of infestation such as brooming and stem or branch swellings should be verified by identifying the dwarf mistletoe shoots on affected bark. Low-level aerial observations, although useful to indicate general areas of severe occurrence, must be verified by ground-level detection.

Tree species composition and succession influence the impact of dwarf mistletoe in natural stands. Species-diverse stands are less affected than pure lodgepole pine stands. Wildfires have maintained single-species stands of lodgepole pine allowing survival of dwarf mistletoe.

Dwarf mistletoe plants are parasites that survive only on live branches or stems of living trees. They die as soon as a branch or stem dies. In forests disturbed by logging or fire, dwarf mistletoe survives on residual overstory trees, and eventually spreads to nearby young regeneration. Birds or squirrels occasionally carry dwarf mistletoe seeds, but they are not considered important sources of spread.

Dwarf mistletoe seeds are explosively ejected from plants to horizontal distances of up to 20 m, and land on tree branches or stems with needles to cause a new infestation. Initial spread of dwarf mistletoe from infested residual trees to susceptible regenerating trees depends on several factors. The age and size of young target trees, amount of dwarf mistletoe seed spreading to the target trees and the stand density and distribution of both residual and target trees effects susceptibility. Trees can be infested at any age but generally must be 2 to 3 m in height (7 years or older) before appreciable new infestations are visible. Lodgepole pine regeneration as small as 30 cm tall can be visibly infested. Mistletoe seeds can be cast directly onto small trees within 20 m of infested residuals.

In lodgepole pine stands, spread of dwarf mistletoe into young trees is more extensive from single, isolated residual trees than from relatively uniform, dense, even-aged stands of residual trees. Spread appears to be accelerated when dense infested residual stands are partially disturbed by cutting or wildfire. Within even-aged stands, dwarf mistletoes spread slowly (approximately 1 m to 1.5 m per year), with faster spread in less dense stands.

The dwarf mistletoe has a life cycle of about 5 years.

1. First year the seeds of the mistletoe that have overwintered on the host needles and twigs germinate early summer and penetrate the host by late summer.
2. Second year the mistletoe causes visible swelling of the twigs and brooming of the branches.
3. Third year aerial shoots develop on broomed branches.
4. Fourth year the aerial shoots then produce flowers, and pollination and fertilization usually occur at this time.

5. Fifth year the mistletoe flowers in late spring and by mid-August to mid-September the fruits mature and seeds are actively discharged, settling onto host needles and twigs.

5.7.1.4 Assessment

Dwarf mistletoe significantly affects the health of forests and the success of silvicultural systems and treatments. Information is required in forest management plans for managing dwarf mistletoe at the landscape level, including occurrence and general levels of incidence. Dwarf Mistletoe infested stands within the areas sequenced in the Spatial Harvest Sequence (SHS) or the General Development Plan (GDP) will be targeted and managed to reduce additional spread and damage. SLS completes a risk assessment at the preliminary harvest design stage (operational assessment of the SHS) and appropriate treatments documented for stands infested by dwarf mistletoe.

Where dwarf mistletoe has been noted, the following information is recorded:

- Stand size relative to block size constraints,
- Percentage of trees infested and severity of infestation in the current stand,
- Incidence and severity of infestation adjacent to planned harvest stand, and
- Proportion of any non-host tree species.

For the purpose of describing the severity of dwarf mistletoe infestation on a tree, SLS uses the Hawksworth six-class dwarf mistletoe rating system.

Instructions		Example
<p>Step 1 Divide live crown into thirds.</p>	<p>—</p>	<p>If this third has no visible infections, its rating is (0).</p>
<p>Step 2 Rate each third separately. Each third should be given a rating of 0, 1, or 2 as described below:</p> <p>(0) no visible infections</p> <p>(1) light infection (1/2 or less of total number of branches in the third infected)</p> <p>(2) heavy infection (more than 1/2 total number of branches in the third infected).</p>	<p>—</p> <p>—</p>	<p>If this third is lightly infected, its rating is (1).</p> <p>If this third is heavily infected, its rating is (2).</p>
<p>Step 3 Add ratings of thirds to obtain rating for total tree.</p>		<p>The tree in this example gets a rating of: 0 + 1 + 2 = 3.</p>

N = minor stem swelling (25% of the stem circumference affected)

M = major stem swelling (>25% of the stem circumference affected).

Only a major stem swelling is recorded if there are both major and minor swellings.

On a tree or stand basis, light infestation is a rating of 1 to 2; moderate is 3 to 4; and severe is 5 to 6.

Stands contained within the SHS that contain dwarf mistletoe will be subjectively assessed and generally be harvested independent of the rating. The extent of the dwarf mistletoe infestation adjacent to the scheduled stands will be assessed. In these adjacent stands, a grid will be used to select the sample trees for use in determining the stand average infestation level. Grid size will depend on the stand or infestation size and a subjective judgment of infestation variability throughout the stand. At each grid point, the four nearest trees will be assessed. For a stand, the rating is calculated as the average rating of all infested trees. Incidence is the percentage of susceptible trees infested by dwarf mistletoe.

5.7.1.5 Management Strategies

Strategies for management or treatment to reduce impacts of dwarf mistletoe are identified in the following sections.

5.7.1.5.1 Preharvest

- Complete an inventory of infested stands within the Spatial Harvest Sequence and in adjacent stands.
- Prevent reintroduction into young regenerating stands by planning the harvest of all lodgepole pine trees in infested stands within 20 meters of young pine stands or plantations.
- Plan the harvest of all infested trees such that none are retained as residuals or seed sources.
- Plan the treatment of adjacent stands based on the dwarf mistletoe assessment. This may include complete removal or the establishment of a 20m buffer free of lodgepole pine.
- Weak stands with mistletoe will be prioritized for control over infested but vigorous stands within the context of the SHS.

5.7.1.5.2 Harvest Design

In general, the Spatial Harvest Sequence and the ground rules will be followed. However, some deviation may be required, primarily where the infestation has spread beyond the stands scheduled for harvest. Deviations will be identified in the harvest design and addressed on a block-by-block basis.

- Proposed block sizes will depend on the extent of the infestation as determined by the assessment.
- For the purpose of designing cut blocks that will reduce infestation of regeneration, note the distribution of infested trees and any natural barriers to spread such as rock outcrops, roads, patches of non-host tree species, or any other similar features, which might be incorporated.
- All cut blocks will be designed to minimize spread of dwarf mistletoe into the young stand by leaving residual non-host species as border trees, and incorporating natural barriers wherever possible. Non-host tree species should be planned for or used for natural regeneration as much as possible.

- More than 90 percent of dwarf mistletoe seed is dispersed within 20 meters of infested trees. Cutting boundaries should be located in bottoms rather than on ridges, and should pass through into non-infested stands, non-susceptible types, and natural or man-made openings where possible. Even where stands are properly clearcut, some infestation could develop in the regeneration bordering infested areas. Plan the harvest of all lodgepole pine in a 20m buffer surrounding the block. Where harvesting is not permitted in the buffer or adjacent stand, damage to the young stand will be relatively light if the residual blocks are cut within 10 years after regeneration is established.
- Where there are other important values to consider, SLS will work with SRD and other stakeholders to arrive at an acceptable harvest design and operational strategy.'

5.7.1.5.3 Harvest/Reforestation Methods

- SLS will remove all infested pine trees within the approved harvest block.
- Control the spread of the parasite through harvesting methods.
- Clearcut harvesting, ensuring the eradication of all host-tree residual stems, successfully eradicates dwarf mistletoe from a stand. Areas within the block containing infested lodgepole pine are unacceptable. After harvest dwarf mistletoe may spread from adjacent infested trees along cutblock boundaries to infest newly regenerated trees. Any infested or susceptible pine tree within 20 meters of the cutover should be harvested to establish a buffer between the regeneration and any remaining infested trees.

Cut blocks in infested stands should have as large an area/perimeter ratio as possible to prevent rapid re-invasion from infestation sources on the edges. The edge should be regular in shape (straight lines); narrow strips should be avoided.

Infested trees on edges of openings should be removed during harvest before planting or natural regeneration if reforestation with lodgepole pine is planned. If infested edge trees cannot be removed prior to planting or natural regeneration, removal is recommended before susceptible seedlings are 2 to 3 meters tall or 10 years old. If infested edge trees are required to be retained longer than 10 years, a strip extending about 20 meters from them into the reforestation area should be planted with non-susceptible tree species (e.g. Spruce).

- Dwarf mistletoe for lodgepole pine is host specific. White spruce, which is not susceptible, should be retained during timber stand improvement operations. This will include situations where:
 - Residual stands containing dwarf mistletoe adjacent to cut blocks should be scheduled for harvest as soon as possible with all the infested pine being removed. White spruce and deciduous retention areas could be used where deemed to be windfirm.
 - Buffers (e.g. streamside buffers and wildlife corridors) adjacent to cut blocks that contain infested pine should be managed by removing all infested pine and leaving all white spruce
- Reforestation areas should be examined closely for infested residuals before they are planted or naturally regenerated. All Infested residuals should be cut.
- Reforested cutblocks will be assessed for Dwarf Mistletoe during the 8 year establishment survey and the 14 year performance survey.

5.7.1.5.4 Management Strategies to Avoid

- Shelterwood and selection systems are not recommended.
- Partial cut harvesting in stands infested with dwarf mistletoe can greatly enhance the impact of dwarf mistletoe because latent infestations are activated by increased light in tree crowns. It is virtually impossible to ensure that all remaining overstory trees are free of dwarf mistletoe unless all host species are cut. Scattered infested overstory trees produce a barrage of dwarf mistletoe seed that can rapidly infest regeneration.
- Single-tree or group selection systems that include pine will likely result in intensified spread and damage by dwarf mistletoe.
- Both pre-commercial and commercial thinning increase the light available in stands and, therefore, can increase the activity of dwarf mistletoe. However, in commercial thinning, trees are of merchantable size and the time to final harvest usually does not allow substantial further impact.
- Fully stocked stands have lower rates of spread and intensification of dwarf mistletoes. Dense stands suppress seed production of dwarf mistletoes, and shade out lower branches that are often the most heavily infested. Structural retention containing pine in infested stands should be avoided, as it is virtually impossible to ensure that leave trees are free of dwarf mistletoe due to the three- to five-year life cycle of the parasite. Apparently disease-free trees may be infested, and quickly produce new aerial shoots and seed.

5.7.2 Mountain Pine Beetle

Since the DFMP Forest Health strategies were developed, much has changed respecting the movement of Mountain Pine Beetle into Alberta. The DFMP Decision Document (Condition 9.5.1.v) stated:

(v). SLS shall review and update as necessary the Mountain Pine Beetle hazard assessment for the FMA and complete an analysis of feasible management options to mitigate extreme outcomes of MPB infestations for inclusion in the revised DFMP.

Further direction was provided by SRD at a meeting April 20, 2005. SLS was to work with the Forest Health Officer to define management options. Timber supply analysis scenarios were to be available but not necessarily part of the DFMP. In a follow-up phone call with SRD on January 20, 2006 SRD indicated it wanted some text referencing preparation activities relative to the MPB Emergency Response Plan.

A number of Provincial initiatives have since been launched to deal with the seriousness surrounding the MPB. SRD completed a MPB hazard susceptibility rating map for portions of the Eastern Slopes of Alberta. This was made available to SLS on March 15, 2006. This information was then updated and made available to SLS July 24, 2006. A further, revised version of the Mountain Pine Beetle Stand Susceptibility Index application was made available on September 18, 2006.

SRD has also produced the following documents:

- *Mountain Pine Beetle Action Plan for Alberta*

- *Interpretive Bulletin – Planning Mountain Pine Beetle Response Operations*
- *Ground Rules Addendum – Mountain Pine Beetle Operations*

From a management perspective, the following strategy is cited in the Mountain Pine Beetle Action Plan for Alberta:

Prevention (Pine) Strategy – Working Forest (Active Landbase)

The primary tactic is to evaluate the feasibility and effectiveness of harvesting to reduce the risk of MPB spread. The target is to do whatever is practical and feasible to reduce the area of susceptible pine stands to 25% of that currently projected in twenty years.

This is further defined in the Interpretative Bulletin:

Prevention (Pine) Strategy

- New or amended Pine Strategy FMPs must be completed by May 1, 2009.*
- The goal is to reduce the area of susceptible pine stands in the Rank 1 and Rank 2 categories in the Sustained Yield Unit (SYU) to 25% of that projected in the currently approved FMP at a point twenty years into the future.*

A letter from SRD indicated it would like to have the re-sequencing analysis completed by July 1, 2006 and the re-planning activities initiated “as soon as is practical and feasible.”

Mountain pine beetle priority areas, as identified by SRD, were assigned compartment ratings of “high” and therefore given the highest harvest priority in the timber supply analysis. Pine stands will also be targeted across the FMA in the Preferred Forest Management Strategy within the constraints of the approved AAC focusing on Pine leading Rank 1 and Rank 2 areas as defined in the Interpretative Bulletin. In terms of the Prevention (Pine) Strategy, SLS is working with SRD to interpret the MPB Stand Susceptibility Ranking results to set priority criteria for re-planning relative to the 25% in twenty years target. SLS will model more aggressive removal strategies outside this DFMP to assess against the target. In the short-term, SLS has initiated a re-sequencing exercise. SLS has prepared Preliminary Harvest Designs for the MPB priority areas using the July 24, 2006 version of the MPB SSI as the guide (ASRD/Industry Mountain Pine Beetle Committee Meeting August 30, 2006 Minutes) and targeting stands within the net land base ≥ 50 for removal. SRD and SLS will re-evaluate the compartment risk annually based on beetle activity as part of the General Development Plan review. For more information on the timber supply analysis and the re-sequencing refer to Chapter 6 (inclusion of MPB Ranking in the net land base file) and Chapter 8 (incorporation of MPB ranking in the TSA).

5.8 Forest Land Base

Security of the forest land base available for timber harvesting is critical to SLSs operations. Given the wide variety of interests there is always the potential for land base losses.

Objectives

- Identify opportunities for offsetting the impact of other industrial users on the productive forest land base within the FMA.

- Minimize the loss of productive forest land base.

Strategies

- Identify non-forested land for afforestation opportunities from the Alberta Vegetation Inventory.
- Encourage prompt reclamation of disturbed land through the disposition consent process.
- Identify joint use of road corridors with other commercial users through referrals and the disposition consent process.
- Research opportunities to reforest reclaimed dispositions.

Ground Rules Implications

Afforestation opportunities will be a part of the Grazing/Timber integration process to ensure rangeland is not impacted. The ground rules will identify operational planning and referral processes to ensure communication with other commercial users. The ground rules will also identify reclamation standards recommended by SLS for use by other commercial users. Developing and maintaining a spatial, digital land use disposition layer is a priority.

5.9 Forest Protection (fire):

The forests of the southeast slopes of Alberta historically were shaped by natural disturbances, primarily fire. As such, there is always the potential for timber losses from fire.

Objectives

- Support the Government of Alberta's forest fire protection activities.

Strategies

- Follow the Forest and Prairie Protection Act.
- Continue to review fire protection requirements with logging contractors and woodlands staff.
- Continue to provide contractor and staff training.
- Continue discussions with the Forest Protection Division toward establishing a Fire Control Agreement.
- Work with SRD in the implementation of Fire Smart initiatives in the FMA. Key staff will be trained in Wildfire Threat Assessment. SLS will work with SRD to refine the data for the WTA specific to the FMA. Sequencing of timber harvest volumes will consider SRD Fire Smart Community Zone Planning.
- Work with SRD in the development of fire salvage plans in accordance with Provincial policy.

Ground Rules Implications

Fire Smart initiatives may require unique solutions to meet site-specific Objectives. Silviculture and harvesting operations may deviate from traditional operational practices and therefore may deviate from the ground rules. SLS will work closely with SRD in the

planning and operational delivery of SRD's program. Where SLS is involved in the timber harvesting phase, detailed block plans will be developed.

5.10 Historical Resources and Unique Areas

There is the potential for loss of historical resources and unique sites as a result of SLS forest management activities.

Objectives

- Protect historical resources across the FMA.
- Identify and protect unique areas.
- Identify and protect rare ecosites within the FMA.

Strategies

- Implement the Historical Resource Predictive Model results for the FMA.
- Work with our qualified archaeological consultants and Alberta Community Development to develop an implementation process that includes annual field work and model updating. (completed)
- Incorporate known historical sites and unique areas into the GIS system. A reporting process will be developed whereby new sites discovered by SLS will be reported to Alberta Community Development.
- Continue to request public input to identify unique areas.
- Identified sites will be dealt with through the harvest planning process. The ANHIC data will be assessed to identify rare ecosites. ANHIC data will be updated at the time of harvest planning.
- A reporting process will be developed whereby sensitive sites and observations noted by SLS during field operations are reported to the ANHIC Administrators.

Ground Rules Implications

The processes referenced in the above strategies will be defined in the ground rules. This includes the reporting, public input, and harvest planning processes. Archaeological assessment field work is required on an annual basis based on the location of upcoming harvesting, road building and silviculture activities. The ground rules will also define some operational tactics that can be used to protect known resources as they are encountered.

5.11 Integration of Other Values and Non-Commercial Uses

There are opportunities for the integration of other values and non-commercial uses with timber harvest planning and operations.

Objectives

- Minimize the impact of our activities on other values and users.
- Recognize existing designated recreation facilities and mapped trails in our operational planning.

- Recognize other designated non-commercial sites and non-commercial disposition holders.
- Recognize future tourism opportunities.

Strategies

- Follow the applicable Ground Rules and existing referral process.
- Work with known stakeholders through a referral process at the preliminary harvest design stage. Consideration will be given through harvest design and timing of operations as examples.
- Maintain linkages in existing trail systems where possible through the harvest planning process and subsequent company activities. Trails in harvest areas will be reviewed for season of use and level of use. The trail inventory will be kept current by working with ACD.
- Work together with ACD in partnership to explore opportunities through coordination of activities and sharing of information. Part of the process will be an annual meeting to share plans coordinated through SRD.
- The East Kananaskis Country Region Tourism Assessment will be referenced and considered in the harvest design process. Alberta Economic Development will be included in the referral process, as coordinated through SRD, for areas adjacent to known potential development sites.

Ground Rules Implications

The ground rules will define the stakeholder referral process. Integration of other values and uses will be a standing agenda item for the annual SLS/SRD/CD harvest design review meeting.

The ground rules will identify examples of operational strategies available to SLS for integration of other values and uses such as harvest design and timing of operations.

5.12 Integration with Other Commercial Users

There are opportunities for the integration of other industrial activity with timber harvest planning and operations.

Objectives

- Minimize our impact on the environment to reduce the collective footprint.
- Work with other commercial users to minimize the impact of activities on each other's interests.

Strategies

- Establish contacts with representatives of other commercial interests.
- Coordinate our planning and operations with other commercial users through the applicable Ground Rules referral processes and disposition consent process.
- Develop a communication process to deal with grazing interests as part of the Ground Rules.
- Coordinate scheduling with other commercial users where possible.

Ground Rules Implications

The ground rules will define the referral processes for other commercial users by industry category. Integration with the grazing community will follow the Provincial Grazing and Timber Integration Manual adopted by the Provincial government. Developing and maintaining a spatial, digital land use disposition layer is a priority.

5.13 Public Involvement

The public has an expectation of public participation in the management of crown resources.

Objectives

- Continue to provide for public involvement in the development of company plans.

Strategies

- Follow the public involvement requirements described under the terms of the FMA.
- Follow the company policy that provides for opportunities for public review and comment on harvest designs. Opportunities will vary from compartment to compartment depending on existing issues and stakeholder interest.
- Explore options for sharing SLS monitoring results and stewardship reporting.

5.14 Public Safety

There is the potential for interaction between the public and SLS operations.

Objectives

- Manage our log haul, timber harvesting and other woodlands activities with due consideration for public safety.

Strategies

- Follow company policies with regards to public safety (e.g. Signage, Public notification).
- Continue to provide staff, contractor and operator training.

5.15 Reforestation

There is public concern over the regeneration success in harvested areas.

Objectives

- Meet our obligations in reforesting all harvested areas.
- Identify areas where alternate reforestation strategies may be necessary and where alternate reforestation standards need to be developed.

Strategies

- Follow the appropriate standards as per the Timber Management Regulation based on the year of harvest.
- Follow the applicable Ground Rules and Silviculture Reporting requirements.
- Monitor the establishment and growth of seedlings.
- Assess reforestation strategies at the preliminary harvest design stage.

TABLE 5.2

Silviculture Strategy Options Table										
Preharvest Condition		Reforestation Transitions		Harvest		Post Harvest Treatments				
Yield Stratum	AVI Species Group	Transition Assumptions (% transition to stratum XX)	Area (ha) ^o	Understory Protection		Site Preparation	Establishment Type (Finalized Based on PHS)			Competition Control*
				Yes / No	Area (ha)		Natural Seed (yes/no)	Seed* (kg/ha)	Plant* (range +/- 200 stems/ha)	
1	B9B-C-PL	100% to stratum 1	76,778	Based on PHA	0	*Mechanical or None (PHS)	*Yes	0.3	1600	*None Mechanical Manual Chemical
2	B9B-C-SW	100% to stratum 2	17,743	Based on PHA	0	*Mechanical or None (PHS)	Yes	0.3	*1600	*None Mechanical Manual Chemical
3	B10B-C-PL	100% to stratum 3	63,537	Based on PHA	0	*Mechanical or None (PHS)	*Yes	0.3	1600	*None Mechanical Manual Chemical
4	B10B-C-SW	100% to stratum 4	21,757	Based on PHA	0	*Mechanical or None (PHS)	Yes	0.3	*1600	*None Mechanical Manual Chemical
5	FMA-MX-n/a	100% to stratum 5 (Maintain conifer/deciduous % as per regeneration standards)	15,913	Based on PHA	0	*Mechanical or None (PHS)	Yes	0.3	*1600	*None Mechanical Manual Chemical
6	FMA-D-n/a	100% to stratum 6 (Maintain conifer/deciduous % as per regeneration standards)	17,937	Based on PHA	0	*Mechanical or None (PHS)	Yes	0.3	*1600	*None Mechanical Manual Chemical
99	FMA-comp ^Ω	100% to stratum 7	8,909	Based on PHA	0	Mechanical or *None (PHS)	Yes	0.3	*1600	*None Mechanical Manual Chemical

* Indicates the primary treatment strategy for the strata.

† Efforts directed towards maintaining the conifer component in all strata.

* SLS is committed to maintaining a Stream 1 seed supply through periodic collections where seeding or planting is prescribed.

^Ω Non-forested (AVI designation), regenerating cut blocks.

^o Refer to Chapter 7 (Growth and Yield) for description of strata areas.

The objective of Spray Lake Sawmills' silviculture program is to reforest harvested areas to ensure a fully stocked stand at rotation age that will ensure sustainability of the forest resource. The Silviculture Strategy Options Table represents the starting point in silviculture planning and shows the general options available for each yield strata as well as indicating the primary option based on SLS experience.

SLS uses a staged approach and finalizes its strategies based on field assessment. Field assessments are key to determining the best, site-specific, silviculture strategy based on site characteristics and limiting factors. Limiting factors to successful reforestation on the FMA include winter desiccation from Chinook winds, seasonal moisture variability through the growing season and browsing by wildlife, cattle and feral horses. Dwarf mistletoe is also present on the FMA and comes with its own set of reforestation challenges. SLS is currently working with SRD to define a Dwarf Mistletoe Management Policy for the FMA that includes silviculture strategies.

The primary silviculture system across the different strata is clearcut with various degrees of structural retention. SLS employs a stumpside processing harvest system to achieve its various block specific objectives including the reforestation objectives. Initial silviculture prescriptions are based on the Pre-harvest Assessment and incorporated into the operational planning process. These prescriptions may differ from the primary option identified in Table 5.2. In fact, throughout the process, site-specific prescriptions may change. The final decision on post harvest treatments is left to the Post Harvest Survey and incorporated into the Annual Silviculture Schedule.

5.15.1 Standard Operating Procedures

5.15.1.1 Pre-harvest Assessment (PHA)

A pre harvest assessment is completed to identify features, classify the ecosite(s), collect and record detailed information necessary to the development of a comprehensive harvest design. Field assessments are conducted and data collected in areas representative of both average and unique field conditions. The pre harvest assessment considers reforestation potential, wildlife, watershed, soils, insects & disease, unique features, historic resources, scenic values, trails, grazing, other users, existing assets, EFM and conversion opportunities.

Appropriate silvicultural treatments are recommended based on the assessed site characteristics.

5.15.1.2 Annual Operating Plan

The silviculture component of the AOP is submitted with the preliminary AOP. The reforestation tactics are approved as part of the final AOP. This component is a plan that will provide a link between the harvest strategy (silviculture system) and the reforestation tactics that will be employed to ensure the successful reforestation of cut blocks and achieving the goal of Free-to-Grow. The silviculture component of the AOP states the silvicultural system (strategy) to be used in the disposition, and the reforestation tactics for each cut block to be harvested during the operating period.

5.15.1.3 Post Harvest Survey (PHS)

The post harvest survey is completed as a final assessment to verify the reforestation strategies for all blocks harvested. A post-harvest survey is an assessment of a site's biophysical factors. This assessment is used to finalize the silvicultural prescription for the site.

5.15.1.4 The Annual Silviculture Schedule

The Silviculture Schedule is a list of all timber dispositions and cut blocks where reforestation operations will be conducted during the next operating year. It includes all cut blocks to be treated, the reforestation activities for each cut block and the schedule (by month) for the activities that will be completed. This plan is submitted annually each spring, separately from the AOP, by March 31 of the year the work is to be done. Where SLS proposes a change of tactics from those in the silviculture component of the AOP, Public Lands and Forests Division must approve such tactics before reforestation operations begin. This schedule allows for an opportunity to review (and revise if necessary) the reforestation prescription for each cut block based on the Post Harvest Survey.

Ground Rules Implications

The ground rules will define the silviculture planning requirements. Operational site or species-specific silviculture strategies and tactics will also be defined in the ground rules.

5.16 Sustainable Timber Supply

There is a strong interest in providing a sustainable supply of logs to the mill. Associated with this there are issues and obligations in establishing and sustaining our level of timber harvesting based on ecological, economic and social needs.

Objectives

- Provide a continuous supply of timber to our mill site.
- Manage the forest land base within the FMA and the B9 Quota area on a sustained yield basis based on a balance of ecological, economic and social values.

Strategies

- Follow the harvest sequence defined by the DFMP. Areas with preliminary harvest designs in timber licences established prior to the FMA will be incorporated into the harvest sequence.
- Develop an Annual Allowable Cut (AAC) based on sustained yield principles.
- Recognize other values in determining the net land base (e.g. IRP zones, streamside buffers, recreation sites) and through the timber supply analysis in the DFMP (e.g. Green-up constraints).
- Follow the applicable Ground Rules.
- Update the FMA area and B09 quota area AVI to the standard current at the time of the update in time for use in the next DFMP. Update the forest inventory for harvesting and land use activities for the next DFMP to the Provincial standards.
- Establish a growth and yield program.

Ground Rules Implications

The ground rules will define the stakeholder referral process for the operational harvest planning process. Integration of other values and uses will be a standing agenda item for the annual SLS/SRD/CD harvest design review meeting. SLS will continue to comply with Timber Management Regulation 105 by submitting aerial photography of the previous years harvest areas.

5.17 Water Quality/Quantity and Fisheries Resources

There is potential for negative impacts on the water and fish habitat resources from timber harvesting and road construction/reclamation activities.

Objectives

- Maintain water quality and quantity by minimizing the effects of SLS activities on watercourses.
- Protect fish and fish habitat.

Strategies

- Follow the applicable Ground Rules and associated guidelines (e.g. Resource Road Planning Guidelines and the Stream Crossing Guidelines). Watercourse buffers will be assessed for management needs.
- Continually look for opportunities for improvement and apply management practices that meet or exceed the standards of the day.
- Explore opportunities for water quality and quantity assessment and monitoring partnerships.
- Review/investigate research and opportunities to assess water quantity.
- Work with the Department of Fisheries and Oceans (Fisheries Act) and Alberta Environment (Codes for Watercourse Crossings).
- Observe the restricted activity periods for watercourse crossings, as identified by Alberta Environment, in the planning of operations.
- Monitor ongoing development of water quality initiatives and policies (eg. Water for Life Strategy) for guidance and participation opportunities.
- Use the Equivalent Clearcut Area (ECA) model (Chapter 2.18) as a guideline to assess forest management options.

Ground Rules Implications

The current Provincial ground rules have major sections devoted to standards and guidelines for dealing with water and fisheries values. The FMA ground rules will need to deal with many of the same aspects in terms of harvest planning and operational considerations. A process for dealing with sensitive sites will be detailed in the FMA Ground Rules. Standard watercourse buffers will be encapsulated in the ground rules as well as timber harvest options for managing the buffers to meet site-specific resource Objectives.

Water and fisheries values will be a standing agenda item for the annual SLS/SRD/CD harvest design review meeting.

5.18 Trans-boundary Issues

There is the potential for management issues between FMA and non-FMA lands.

Objectives

- Manage trans-boundary issues between designated protected areas, designated recreation areas, private lands and the FMA.

Strategies

- Work with ACD in managing issues in the boundary area between the FMA and Protected Areas/Recreation areas. (eg. Visual impacts, changes in human access to protected areas, wildlife movements) SLS plans for lands adjacent to Protected Areas/Recreation areas will be referred to ACD. This referral will be through SRD as the one window or some other agreed to mechanism. ACD plans in Protected areas/Recreation areas will be referred to SLS.
- Work with SRD in managing lands adjacent to private lands.
- Work with SRD and ACD in the implementation of Fire Smart initiatives on adjacent lands. (e.g. campgrounds)

Ground Rules Implications

Trans-boundary management will be a standing agenda item for the annual SLS/SRD/CD harvest design review meeting.

5.19 Carbon Sequestration

This is a new, evolving issue relating to climate change.

Objectives

- To stay informed on the emerging information and regulatory requirements.

Strategies

- Monitor and develop a process to meet any reporting requirements that may materialize.