



Weyerhaeuser Pembina

Timber Harvest Planning and
Operating Ground Rules

2019

Weyerhaeuser Pembina Operating Ground Rules

WEYERHAEUSER PEMBINA FMA

ALBERTA

AGRICULTURE and FORESTRY

ENDORSEMENTS

The Weyerhaeuser Pembina FMA Operating Ground Rules, having been prepared in accordance with Section 16 (2) of FMA 0900046, and hereby endorsed this 29th day of May, 2019. These ground rules will apply to Weyerhaeuser Pembina FMA. The Executive Director of Forest Management Branch has also determined these ground rules will apply to FMU R14.

HER MAJESTY THE QUEEN in right of Alberta as
represented by the Minister of Agriculture and
Forestry

Original Signed

Original Signed

Per: _____

Per: _____

David Kent

Darren Tapp

(print name)

(print name)

General Manager – Timberlands

Executive Director – Forest Management Branch

(title)

(title)

Weyerhaeuser Pembina Timber Harvest Planning and Operating Ground Rules

Revisions from 2017 to 2019

(Effective Date: June 1, 2019)

2019 Revisions

Ground Rule Number	2017 Version of the Ground Rule	2019 Version of the Ground Rule
General	Some edits were made outside of the joint review that included deletion of word(s), correction of spelling & grammar, changes to bolded text, etc. that did not change the intent, meaning or requirements of the OGRs, but rather to provide clarification. These changes are not documented in this table.	
1.0 Ground Rule Scope	Ground rules are the practices used in planning and conducting forest management operations which constitute the methods used to implement decisions made in the Forest Management Plan (FMP) or other higher level plans such as Integrated Resource Plans (IRP).	Ground rules are the practices used in planning and conducting forest management operations which constitute the methods used to implement decisions made in the Forest Management Plan (FMP) or other higher level plans such as Integrated Resource Plans (IRP) or Sub-Regional Plans approved under the <i>Alberta Land Stewardship Act</i> .
3.3.3 1. e)	a brief description of potential issues arising from the proposed harvest activities that have been identified through discussions with Alberta or other known resource users;	Moved to section 3.5.4

3.4.1	<p>An FHP shall be approved by acceptance if:</p> <p>validated by a registered forestry professional (RFP);</p> <p>variance less than 20% of the area sequenced in the SHS, by compartment per decade;</p> <p>the harvest area (ha) does not exceed 100% of the total area in the SHS by compartment per decade; and</p> <p>it adheres to all ground rules as per the FHP checklist (see Appendix 1).</p>	<p>An FHP shall be approved by acceptance if:</p> <p>validated by a registered forestry professional (RFP);</p> <p>additions less than 20% of the area sequenced in the SHS, by compartment per decade and yield strata;</p> <p>the harvest area (ha) does not exceed 100% of the total area in the SHS by compartment per decade and yield strata; and</p> <p>it adheres to all ground rules as per the FHP checklist (see Appendix 1).</p>
3.4.1	New	Note (3.4.1 b.): these are only considerations for “acceptance” of the FHP; approval can still occur through appraisal of FHP if strata has not been balanced.
3.4.7 l)	unless shown elsewhere, the wet areas mapping layer where available;	Deleted
3.4.8 k)	New	structure retention summary based on FHP average as per 7.4.2.1.
3.4.10 e)	New	listed uncommon plant communities (FMP 5.4.6) that are encountered during harvesting or road construction activities;
3.5.4	Moved from 3.3.3	If not previously submitted, a brief description or summary of potential issues arising from the proposed harvest activities that have been identified through discussions with Alberta or other known resource users.
3.5.5 c) III.	declaration of outstanding operational items including debris disposal or an agreement with Alberta on reporting of outstanding operational items;	declaration of openings with outstanding operations or an agreement with Alberta on reporting of outstanding operational items;

Table 1. AOP Amendments	d. (Minor amendment) Where an approved silviculture strategy exists for roads, the in-block roads and associated watercourse crossings may be moved as required provided there are no additional watercourse crossings are required outside of those allowed in (e).	d. (Minor amendment) Where an approved silviculture strategy exists for roads, the in-block roads and associated watercourse crossings may be moved as required.
Table 1. AOP Amendments	e. (Minor amendment) Watercourse crossing structures that have been upgraded from the approved FHP. Adding crossings to intermittent and ephemeral watercourses.	e. (Minor amendment) Any watercourse crossing structures that have been upgraded from the approved FHP. Adding crossings (as identified in 3.4.7 (f) to intermittent watercourses and ephemerals.
Table 1. AOP Amendments	New	f. (Minor amendment) Re-location of planned structure retention up to 150 m within the harvest area boundary.
Table 1. AOP Amendments	New	f. (Major amendment) Planned structure retention in a harvest area is not implemented.
4.1.1	New	For the FHP submission, the company shall submit a map to show the comparison of the 1-10 year SHS to the Laid out harvest areas. The map shall distinguish using symbology between: <ul style="list-style-type: none"> • substantial deletions • substantial deferrals • substantial additions

4.1.2	New	Variance shall be reported by Alberta Base 10 stratum for each FHP. The table shall include the minimum information as per Table 2 in order to calculate and express cumulative variance for FHP review. As-built information as per Table 2 will be shown as part of the Stewardship Report requirements. A Forest Harvest Plan will be appraised when additions exceed 20% of planned SHS 1-10 year for the particular FHP, or when substantial additions exceed the combination of substantial deletions and deferrals. Table 2 shall include cumulative information from all previously approved FHP's in the compartment.
4.1.3	New	<i>Variance</i> from the SHS shall be monitored and reported by compartment. The cumulative as-built variance for all FHPs shall be compiled by compartment and reported annually in the GDP. The table shall include information as per Table 2 for all compartments operated within the current FMP effective period.
4.1.4	New	Where stands are added for harvest, preference should be for stands in the 11-20 year period. Stands currently not part of the net landbase that are found to be productive merchantable landbase may be considered for addition with Alberta's approval. Stands shall not be added without evaluating why the stand is not within in the net landbase (e.g. Meeting wildlife VOIT)
4.1.5	New	Justification shall be provided in the FHP (block comments) in the following instances: i. entire deleted or deferred stands (AVI Polygons); ii. entire stand (AVI Polygon) additions
4.1.6	New	All substantial deletions shall be coded and tracked spatially by the operator to allow for incorporation into the subsequent Forest Management Plan net landbase development process.

4.2.1	The tree/piece utilization standards are stated in the <u>applicable timber disposition</u> and shall normally be one of the following standards.	The tree utilization standards are stated in the <u>applicable timber disposition</u> and shall normally be one of the following standards.
4.2.6	Company processing practices cannot make an unmerchantable piece from a merchantable tree or merchantable piece.	Company processing practices cannot make an unmerchantable piece from a merchantable tree.
5.1.1	All operators with timber dispositions potentially affected by an FHP or GDP must agree to the FHP and GDP before approval is granted.	All operators with timber dispositions potentially affected by an FHP or GDP must agree (i.e. reviews should focus on potentially integrated operational items, including adherence to operator-assigned SHS, access management, and timing restrictions, as examples) to the FHP and GDP before approval is granted.
5.6.3.1	New	Historical cabins identified during operations will have a minimum buffer of 25 metres applied.
Table 3. Watercourse Classification	Class “A” and Class “B” classifications.	Deleted
Table 4. Standards and Guidelines for Operating Beside Watercourses	Class “A” and “B” protection areas.	Deleted
Table 3. Watercourse Classification (Water Source Areas)	Areas with saturated soils, surface flow or seepages.	Areas with saturated soils, surface flow or seepages contributing directly to stream flow.
Table 3. Watercourse Classification (Lakes)	Large water collection areas permanently filled with water.	Large water collection areas (> 1ha) permanently filled with water.
Table 3. Watercourse Classification (Lakes)	Lakes (with recreational, waterfowl or sport fish potential)	Lakes

Table 4. Standards and Guidelines for Operating Beside Watercourses (Lakes)	For shorelines not located within reserved areas, no disturbances shall be permitted within 200 m of the high water mark unless specifically approved in the AOP.	For shorelines not located within reserved areas, no disturbances shall be permitted within 100 m of the high water mark unless specifically approved in the AOP.
Table 4. Standards and Guidelines for Operating Beside Watercourses (Lakes)	On lakes exceeding 4 ha in area, no disturbance or removal of timber within 100 m of the high-water mark. Alberta in the FHP may require additional protection.	On lakes exceeding 4 ha in area, no disturbance or removal of timber within 100 m of the high-water mark unless approved. Alberta may require additional protection in the FHP.
Table 4. Standards and Guidelines for Operating Beside Watercourses (Lakes)	Consideration must be given to aesthetics when harvesting adjacent to lakes with recreational potential.	If timber removal is approved, no machinery to operate within 40 m of the high water mark.
7.3 DISCUSSION	New	Acceptable methods of reducing slash hazards are defined in Directive AF-FDP-2017-07, Debris Management Standards for Timber Harvest Operations.
7.3.3	<p>Burning operations shall :</p> <p>a) not be conducted during the fire season, unless otherwise approved under a fire permit;</p> <p>b) require a post burning survey (scan and/or cold trailing) to ensure all holdover fires are extinguished; and</p> <p>c) Burning shall reduce the individual pre burn pile area by 80%.</p>	<p>Burning operations shall :</p> <p>a) not be conducted during the fire season, unless otherwise approved in the Fire Control Plan;</p> <p>b) require a post burning survey to ensure all holdover fires are extinguished; and</p> <p>c) have 80% of each pile consumed with an attempt to burn all piles.</p>
7.3.4	New	<p>A Fire Control Plan, consistent with "Schedule A" of a company's Fire Control Agreement shall be submitted as part of the AOP.</p> <p>In the absence of a Fire Control Agreement, the company shall fill out and submit the TM118C Fire Control Supplement form.</p>

7.3.5	<p>For ecological benefits within the constraints of the Debris Disposal Policy and safety requirements, debris should be retained as follows:</p> <p>a) large logs presently on the ground or unmerchantable trees knocked down during harvest, should be left in place;</p> <p>b) spreading of debris is encouraged;</p> <p>c) where debris is piled, piles chosen for retention, as a priority should contain larger logs as opposed to fines and branches.</p>	Deleted
7.4.1	New	Residual structure shall be retained in harvest areas during harvest and silviculture operations (including salvage operations) according to the FMP. The merchantable retention target will be applied to each forest operator, across all harvest areas, reported as described in VOIT 10 (objective 1.1.2.1).
7.4.2	New	Merchantable residual structure can be defined as live, commercially viable trees retained post-harvest to create old forest characteristics in young and mid-aged regenerating stands. Target of 4% of the harvested area, representative of pre-harvest stand conditions.
7.4.2.1	New	Harvest areas less than 5 ha may have less than 4% merchantable retention, including zero. With Alberta's approval, there may be zero patches of residual structure in any harvest area if there is compensation in other harvest areas to meet the FHP average with justification provided by Disposition Holder.
7.4.2.2	New	All identified retention will be excluded from harvest for one rotation (based on minimum harvest ages as indicated in the TSA).

7.4.2.3	New	<p>Retention shall be left as islands (undisturbed patches) or as dispersed (single trees / clumps), distinctly inside block, and representative of the original stand harvested.</p> <p>a) Retention islands that are surrounded by disturbed area not by design, but by default due to its location on a harvest block edge that borders a previously harvested area (equal to or less than 14 years old) or a constructed permanent disposition can contribute to the target in 7.4.2. Retention left in this manner can only be attributed to the harvest area in which it is planned and must still adhere to the criteria identified in 7.4.2, 7.4.2.1, and 7.4.3.</p>
7.4.3	New	<p>Non-merchantable retention includes residual structure that does not meet the utilizations standard(s) as defined in 4.2. Forest operators shall retain non-merchantable structure in the following manner:</p>
7.4.3.1	New	<p>Leave individual stems of residual structure throughout harvested areas where operationally and silviculturally feasible. Other considerations:</p> <p>a) leaning snags or trees of non-merchantable species that are greater than 6 m in height that create a safety hazard should be felled to create safe working conditions;</p> <p>b) snags within 40 m of roads, camps, landings, fence lines, power lines and machine maintenance areas should be felled to create safe working conditions.</p>

7.4.4	New	<p>The following are guidelines for the spatial distribution of residual structure:</p> <p>a) retain residual structure near the harvest area boundary to create a gradual ecotone between the harvest area and un-harvested forest;</p> <p>b) retain residual structure in patterns and locations that minimize the potential for blowdown;</p> <p>c) retain residual structure near ephemeral draws and intermittent streams;</p> <p>d) retain residual structure adjacent to inoperable areas whenever possible.</p>
7.6.3	New	<p>As per VOIT 14 (FMP) there are additional considerations in watersheds where cold water fish species (Athabasca Rainbow Trout, Bull Trout and Arctic Grayling) have been identified and the ECA (Equivalent Clearcut Area) exceeds 30 to 35% (as identified in Fig 6-31 FMP). Harvesting has been deferred in the vast majority of these identified watersheds. Where harvesting is proposed in one of these higher risk watersheds, the following mitigation strategies may be considered at the operational level:</p> <p>a) careful consideration given when balancing additions with deletions and deferrals (SHS);</p> <p>b) incorporate watershed values when locating structure retention (as per 7.4);</p> <p>c) consider leaving above average retention requirements, especially in proximity to ephemerals, intermittents, or other water source or collection areas; and</p> <p>d) utilizing LIDAR and wet area mapping.</p>
7.7.4	GROUND RULES	BEST MANAGEMENT PRACTICES
7.7.4.7	Unless otherwise agreed to by Alberta, timber operations should be conducted outside of the period January 15 to April 30.	Unless otherwise agreed to by Alberta, timber operations should be conducted outside of the period January 15 to April 30. Operations that are approved in an AOP are not subject to this timing restriction.

7.7.4.8	Known willow areas shall be maintained in harvest areas during timber operations.	Deleted
8.2.3 b) III.	New	Deployment of stream 1 seed
8.2.3 b)	<p>Should the proposed reforestation activities for a harvest area change after Reforestation Schedule approval, the following items require an amendment:</p> <ul style="list-style-type: none"> changing to a treatment not approved in the silviculture strategy table for the specific stratum; additional harvest areas to be treated by any means of treatment. <p>The remaining changes require notification to Alberta through Alberta Regeneration Information System (ARIS) reporting.</p>	<p>Should the proposed reforestation activities for a harvest area change after Reforestation Schedule (AOP) approval, the following items require a minor amendment (as defined in 3.5.6.1):</p> <ul style="list-style-type: none"> completing establishment or non-legislated surveys in openings not listed in the approved AOP; <p>Should the proposed reforestation activities for a harvest area change after AOP approval, the following requires a major amendment to the AOP:</p> <ul style="list-style-type: none"> changing to a treatment not approved in the silviculture strategy table for the specific strata. <p>All approved changes require notification to Alberta through Alberta Regeneration Information System (ARIS) reporting.</p>
8.3.4	Planting boxes shall be removed to an appropriate disposal facility if ground access exists or the block does not contain any debris piles. If ground access does not exist, boxes may be securely placed within existing debris piles for disposal by burning. All plastic shall be removed from boxes and disposed of at an approved waste disposal site prior to burning. Based on past operator compliance to this rule, Alberta may place a condition in the AOP for removal of all planting boxes.	Planting boxes shall be removed to an appropriate disposal facility if ground access exists or the block does not contain any debris piles. If ground access does not exist, boxes may be securely placed within existing debris piles for disposal by burning. All plastic shall be removed from boxes and disposed of at an approved waste disposal site prior to burning.

9.4	New	Note: Areas with single ruts or a limited number of short ruts can be indicative of an operator becoming aware of unfavorable conditions and making the decision to cease operations.
11.3.4.2	Certified weed free seed shall be used when seeding is used for reclamation.	Certified weed free seed (native) shall be used when seeding is used for reclamation.
Table 6. Acceptable Crossing Structures	New	Temporary Machine Crossings
Table 6.	Logfills will only be installed when no flow is present in the channel.	Logfills, modified logfills and temporary machine crossings will only be installed when no flow is present in the channel.
Table 6.	<ul style="list-style-type: none"> Modified logfill can be used on streams less than 1.5 m wide. It consists of a pipe supported by logs and constructed as defined in 11.4.21. 	<ul style="list-style-type: none"> Modified logfill can be used on streams less than 1.5 m wide. It consists of an appropriately sized pipe supported by logs and constructed as defined in 11.4.21. "Bridge" includes native timber bridges, engineered bridges and ice bridges.
11.4.4	<p>Unless otherwise approved, watercourse crossings shall:</p> <ul style="list-style-type: none"> a) minimize erosion and sedimentation; b) have stable approaches; c) be at right angles to the watercourse; d) be at locations where the channels are well defined, unobstructed and straight; e) be at a narrow point along the watercourse; f) allow room for direct gentle approaches; g) have no direct ditch drainage; h) shall have erosion control structures during construction; i) shall maintain fish passage where fish are present. 	<p>Unless otherwise approved, watercourse crossings shall:</p> <ul style="list-style-type: none"> a) prevent erosion and sedimentation; b) have stable approaches; c) be at right angles to the watercourse; d) be at locations where the channels are well defined, unobstructed and straight; e) be at a narrow point along the watercourse; f) allow room for direct gentle approaches; g) have no direct ditch drainage; h) shall have erosion control structures during construction; i) shall maintain fish passage if applicable. .

11.4.5 b)	temporary roads (Class IV) – shall be constructed such that the crossing is at or above the high water mark, will allow water flow and meet the minimum requirements of an adequately designed crossing as per section 11.4.	temporary roads (Class IV) – shall be constructed such that the crossing will allow water flow (where applicable) and meet the minimum requirements of an adequately designed crossing as per section 11.4.
11.4.20	Crossing intermittent or ephemeral watercourses within harvest areas shall be avoided when possible. When the crossings are necessary, they shall be constructed at specified locations using appropriate watercourse crossing structures.	Crossing intermittent or ephemeral watercourses within harvest areas shall be avoided when possible. When the crossings are necessary, they shall be constructed at specified locations using appropriate watercourse crossing structures. If temporary machine crossings are used, they are done in accordance with 11.4.20.1.
11.4.20.1	New	<p>A properly constructed temporary machine crossing avoids disturbance to watercourse channels, minimizes bank disturbance, does not impede natural water flow, prevents deposition of debris, soil and slash and includes the following:</p> <p>a) Crossing is not associated with or on a road;</p> <p>b) Tree stems or logs are placed parallel to the channel no closer than the thickness of the stem used;</p> <p>c) Width of crossing does not exceed 1.5 times the width of the machine using the crossing; and</p> <p>d) Provisions for removal are in place that do not disturb the banks or introduce sediment to the watercourse.</p>
11.4.22	In fish-bearing watercourses, any negative impacts on the stability and fish habitat values of stream banks must be minimized.	In fish-bearing watercourses, any negative impacts on the stability and fish habitat values of stream banks must be prevented.
Glossary – Historical cabins	New	Cabin(s) that are no longer active and may or may not be intact. Historical cabins do not include existing or active RFMA (trapper) holder cabins.
Glossary – Temporary Machine Crossing	New	Crossing structure not connected to an existing road but used for equipment crossing of ephemeral and intermittent watercourses.

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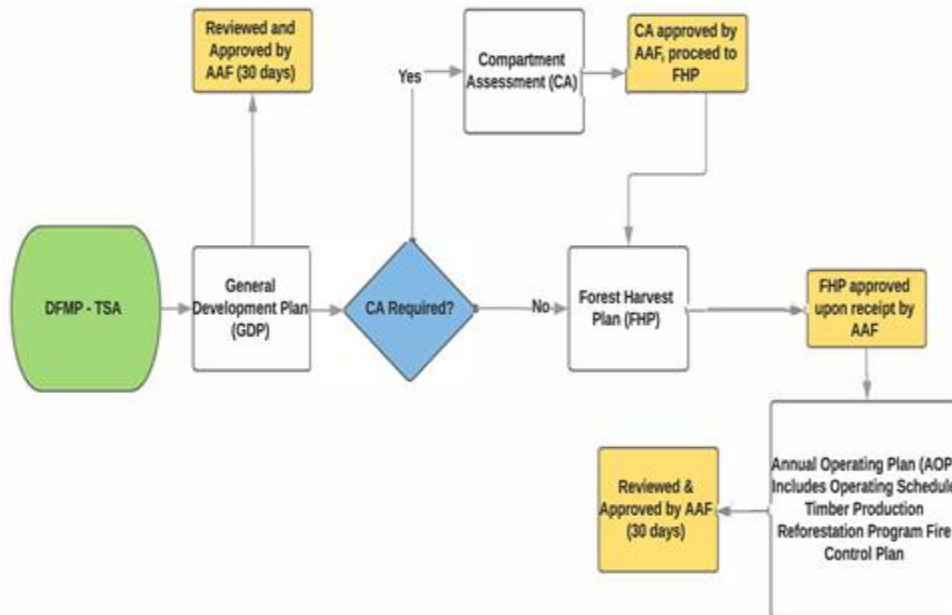


Figure 1.Planning Flowchart

1.0 GROUND RULE SCOPE

The following ground rules apply to the Forest Management Agreement (FMA) holder and all other timber disposition holders authorized under the *Forests Act* and *Timber Management Regulation* (TMR) operating within the FMA area. Ground rules are the practices used in planning and conducting forest management operations which constitute the methods used to implement decisions made in the Forest Management Plan (FMP) or other higher level plans such as Integrated Resource Plans (IRP) or Sub-Regional Plans approved under the *Alberta Land Stewardship Act*. In the event that these strategic plans do not exist, the ground rules shall establish practices that minimize the chance of negative impacts from forest management operations.

Authorizations by Alberta do not imply authorization under federal legislation and requirements, notably the federal *Fisheries Act* and *Migratory Birds Convention Act*. The proponent must seek advice and approvals of the federal agencies (Department of Fisheries and Oceans, Environment Canada) regarding federal legislation requirements.

Authorization of the Annual Operating Plan (AOP) does not constitute waiver or exemption from the ground rules, nor is authorization of the AOP verification of compliance with the ground rules.

The Delegated Authority has the authority to approve Annual Operating Plans and may also waive or amend the application of specific ground rules in unusual or special circumstances. However, waivers be completed in writing and must conform to departmental policy, the *Forests Act*, the *Timber Management Regulation*, the *Public Lands Act* and all other applicable provincial legislation or statutes.

1.1 REGULAR REVIEWS

The intent is to have an annual review of ground rules if requested by either forest disposition holders or Alberta. This is not meant to be a complete redevelopment but rather an opportunity to fine-tune the ground rules. It is expected that regular reviews will allow participants to plan revisions more systematically and to correct any inconsistencies or problems. It will also create the ability to regularly consider modifications that reflect the best and most current knowledge and tools available. Changes made to the ground rules during the review will require the updated document to be signed by Alberta and the company.

2.0 THE TOPICS

This template provides a list of topics that must be addressed in all ground rules. Each topic includes a purpose, discussion, and ground rule heading. All ground rules shall be written following this format. Bolded text is mandatory and would only be changed if, in Alberta's opinion, the result is a higher standard of practice. Non-bolded text may be modified where in Alberta's opinion it doesn't apply to an area, or the issue is handled differently to meet local needs while still meeting Alberta's expectations.

PURPOSE: A statement of what the topic is designed to accomplish.

DISCUSSION

Include background information, research knowledge, and reasons for the concern. The discussion shall focus on why a ground rule is needed. Alternative actions or solutions could also be discussed here.

GROUND RULES

These are definitive statements of the desired results to be achieved and a clear indication of what is expected. **The ground rules shall be relevant, measurable, understandable and achievable.**

3.0 OPERATIONAL PLANNING

3.1 PLANNING PROCESS

PURPOSE

The operational planning process is designed to expedite the implementation of the FMP. Where management direction has not been established through an approved FMP, then required decisions shall be made during this operational planning process.

DISCUSSION

The planning process includes five main components:

1. Approved Forest Management Plan (FMP)
 - Spatial Harvest Sequence (SHS) for first two 10-year periods;

2. Compartment Assessment (CA) – A CA shall be required when information or major issues are identified that in Alberta’s opinion, have not been addressed in the FMP. In the event that the SHS is deemed by Alberta to be inappropriate due to a significant change in circumstances since the approval of the FMP, a compartment assessment describing current issues, shall be required. (See section 3.2)
3. General Development Plan (GDP) - The GDP gives a comprehensive description of a forest operator's proposed harvest strategy, road building plans, and reclamation operations for a five-year period, and includes all licenses and permits. The GDP is used to guide integration of activities. (See section 3.3)
4. Forest Harvest Plan (FHP) – The FHP is a map and associated report describing the laid out harvest plan. (See section 3.4)
5. Annual Operating Plan (AOP) – The AOP describes operations in detail through a series of components that shall be submitted together at the same time, or as individual submissions on a schedule approved by Alberta (see section 3.5):
 - a) Operating Schedule and Timber Production;
 - b) Applicable Forest Harvest Plans;
 - c) General Development Plan;
 - d) Compartment Assessments as required;
 - e) Reforestation Program;
 - f) Fire Control Plan;
 - g) Road Plan.

3.2 COMPARTMENT ASSESSMENT

PURPOSE

To address significant issues that have arisen since the approval of the FMP.

DISCUSSION

It is recognized that circumstances change over time and it is possible that the SHS approved in the FMP may prove to be inappropriate. Where Alberta deems it necessary, a CA shall be completed to adjust the operational plan for the area. CAs are necessary when major new issues or information that have been identified since FMP approval make the SHS inappropriate. (e.g. forest fire, insect or disease, species of special management concern, a major change in land use direction or an unacceptable variance of >20% of the SHS/compartments/decade as determined by the Forestry Area Manager. The CA shall describe how the new issues will be incorporated into the FHP. In completing the CA, operators must consult in a meaningful way with stakeholders and strive to reach general agreement on issues. The CA provides an opportunity to reconsider management strategies at the time of operational planning if warranted.

GROUND RULES

- 3.2.1 Alberta shall decide on the boundaries of the area on which a CA is required and the requirements of the CA after consultation with the forest disposition holder.**
- 3.2.2 If a CA is required, the operator must receive Alberta's approval of the CA prior to the approval of a FHP.**
- 3.2.3 A CA is considered current if it has been approved by Alberta and the FHP is submitted to Alberta within three years of approval. The approval of the CA will include a timeline that the CA will remain valid and a timeframe for submission of Forest Harvest Plans.**
- 3.2.4 The CA shall include any maps, analyses, and reports deemed necessary by Alberta to adequately address the issues (e.g. watershed flow analysis).**

3.3 GENERAL DEVELOPMENT PLAN (GDP)

PURPOSE

To provide a projection of activities for the next five years to:

- Guide the integration of activities;
- Schedule timber disposition administration activities;
- Forecast cut control status;
- Co-ordinate the development and reclamation of roads.

DISCUSSION

The primary components of the GDP include a forecast of the areas scheduled for harvest for a five-year period and a summary of variance from the SHS for existing FHPs or long-term road plans outlined in the FMP. The GDP must also include the current status and forecast of the respective annual allowable cuts (AACs) and cut control period for each of the operators within the planning area. This could be either a joint submission by all operators or separate submissions containing consistent information between operators.

In addition to outlining the projected wood supply forecast, the GDP shall also include details regarding road requirements, and fish and wildlife issues within the planning area. Consultation of the GDP with First Nations is a requirement of Alberta's First Nations Consultation Guidelines on Land Management and Resource Development. Alberta will provide a list of relevant First Nations to the companies by Feb 1st of each year. It is expected that there will be substantial discussion on significant issues with Alberta before the FHP is submitted (i.e. timing constraints).

- 3.3.1 The GDP submission date is on or before May 1 of each year unless otherwise approved by Alberta. Alberta shall respond within 15 days identifying any deficiencies in the GDP. The GDP shall be approved subject to an appraisal by Alberta. Approval will be within 30 days if the plan is complete and accurate.**
- 3.3.2 Prior to approval, other forest operators affected by the GDP must agree in writing (e-mail is acceptable) to the upcoming years' production described in the GDP (see section 5.1.1). It is the responsibility of the operator to ensure that they do not exceed the allowable cut level as specified in their tenure document.**
- 3.3.3 The GDP consists of the following:**

- 1. Schedules with the following information:**

- a) the volumes to be harvested each year by compartments by management unit by species group for the next five-year period;
- b) quadrant/cut control period production summary table for all dispositions;
- c) class I, II and III road developments showing planning and timelines;
- d) all roads that are to be monitored, and all outstanding and anticipated reclamation work related to Department License of Occupation (DLO) road and stream crossings (see 11.2.1.1);
- e) status of all non-DLO roads over two years old;
- f) the sum of all variance from FHPs within a compartment (as per 4.1.2); and
- g) where a significant change to the approved GDP is proposed, an amendment may be requested by Alberta.

2. A map (of appropriate scale) that shows the following:

- a) existing roads and roads to be constructed (excluding in-block roads);
- b) compartments, or an operating area defined (at a company's discretion) and/or timber dispositions to be operated;
- c) other important forest resource areas or facilities (i.e., Trumpeter Swan lakes, provincial parks etc. that could be directly affected by harvesting).

3.4 FOREST HARVEST PLAN (FHP)

PURPOSE

To describe the laid out harvest and road design.

DISCUSSION

The primary components of an FHP are a map and report that clearly show and document the harvest area boundaries, roads and water crossings for the harvesting area. The design shall be valid for five years from the time of approval, unless issues deemed significant by Alberta arise during this period.

GROUND RULES

- 3.4.1 An FHP shall be approved by acceptance if:**
- a) validated by a registered forestry professional (RFP);**
 - b) additions less than 20% of the area sequenced in the SHS, by compartment per decade and yield strata;**
 - c) the harvest area (ha) does not exceed 100% of the total area in the SHS by compartment per decade and yield strata; and**
 - d) it adheres to all ground rules as per the FHP checklist (see Appendix 1).**

Note (3.4.1 b.): these are only considerations for “acceptance” of the FHP; approval can still occur through appraisal of FHP if strata has not been balanced.

Note: Where the FHP does not meet standards a), b), or c), the FHP shall undergo a full review by Alberta. Where standard d) above is not met, the review shall be focused on the list in 3.4.2. Variances from the SHS shall be reported in the FHP in a format acceptable to Alberta (see section 4.1.1).

- 3.4.2 Any deviations from the ground rules shall be listed and justification provided for Alberta review.**
- 3.4.3 If a CA was completed, the FHP shall undergo an appraisal by Alberta to ensure the direction in the CA has been implemented.**
- 3.4.4 All FHPs submitted by operators who harvest more than 30,000 m³ each year from Crown land, must be validated by an RFP.**
- 3.4.5 Other forest operators affected by the FHP must agree, in writing (e-mail is acceptable), with the FHP before it will be approved (see section 5.1.1).**

3.4.6 The FHP shall consider direction provided in Community FireSmart Plans.

3.4.7 Maps shall accurately show the following information:

- a) the approved forest inventory at an appropriate scale;
- b) laid-out harvest areas overlying the original SHS polygons and the proposed variance to the SHS;
- c) compartment boundary;
- d) all existing roads used to access forest operations;
- e) all applicable laid out class I, II and III roads and corresponding watercourse crossings and structures;
- f) all class IV exterior roads and proposed watercourse crossings shall be laid out and shown (crossings on ephemeral watercourses don't need to be shown);
- g) class IV in-block roads may be shown on the map but do not require approval;
- h) planned crossing locations on small or large permanent watercourses for class IV in-block roads;
- i) locations of access control measures where required (existing and proposed);
- j) current dispositions and reserves (e.g., registered trapline boundaries, permanent sample plot (PSP) locations);
- k) watercourses, their classifications and protective buffers;
- l) springs, water source and seepage areas;
- m) current information on previously harvested areas, existing trails, seismic lines, power lines, pipelines; and
- n) sensitive wildlife sites as per section 7.7.5.2.

3.4.8 In addition to the FHP map, the following information is required:

- a) area (ha), and coniferous and deciduous volume for each proposed harvest area;
- b) summary table of variances from the SHS by compartment for each FHP submitted (see section 4.1);
- c) reforestation strata designation for each harvest area;
- d) information required in 3.4.7 (h) may be shown in tabular format instead of on the map;
- e) description of how the CA is addressed in the FHP, if applicable;
- f) list of watercourse crossing location as per 3.4.7 (e, f, and h);
- g) access control methods employed; and
- h) description of integration with other forest operators (see section 5.1.1);
- i) a grazing timber agreement (GTA) where applicable (see section 5.4.2);
- j) shape files of laid out blocks, roads, and crossings as per Directive 2015-02 (Spatial Data Directive(s)); and
- k) structure retention summary based on FHP average as per 7.4.2.1.

3.4.9 The company shall follow existing ILM or access development strategies when developing DLO roads. Alberta may approve deviations from these strategies after discussions with the company.

3.4.10 The following information shall be submitted if applicable:

- a) layout bordering restricted areas (e.g., PSPs, private land, etc.);
- b) tactics to address forest health issues;
- c) if required, protection of roadside vegetation and how to be done;
- d) adjacent to permanent roads, strategies to address sight distance concerns with an attempt to maintain sight distance of 400 m or less;
- e) listed uncommon plant communities (FMP 5.4.6) that are encountered during harvesting or road construction activities; and
- f) need for a detailed harvest area plan (see section 3.4.11).

3.4.11 Detailed harvest area plans (DHAP) are required when there is higher than average potential for environmental damage if operations are not carefully planned. Circumstances that merit DHAPs are:

- a) areas of steep topography requiring specific road location and construction or specialized harvesting equipment on slopes >45%;**
- b) unstable slopes are generally to be avoided but if this is not possible it is necessary to plan operations carefully to minimize impacts;**
- c) harvest areas with numerous water source areas, seepages, or drainages;**
- d) harvest areas requiring understorey protection using planned protection techniques (see section 7.5);**
- e) harvest areas located near high-value recreation areas or identified as highly sensitive in the FMP (e.g. provincial park, campground);**
- f) partial harvests, excluding commercial thinning (CT) and pre-commercial thinning (PCT);**
- g) layout bordering or encompassing riparian management zones when different than the standards in section 6.0.**
- h) important wildlife sites as defined in section 7.7.5.2**

3.4.12 The DHAP shall include a map of appropriate scale to the issue(s) and describe how the concern will be addressed in operations. DHAPs are submitted to Alberta but do not require approval.

3.5 ANNUAL OPERATING PLAN (AOP)

PURPOSE

To annually authorize all road, harvest and forest management activities for the operator.

DISCUSSION

The AOP articulates in detail the activities proposed for the current year and must be approved by Alberta before timber operations shall commence. The AOP components can be submitted under separate cover and approved independently and include:

- a) Operating Schedule and Timber Production
- b) Applicable Forest Harvest Plans
- c) Compartment Assessments (if applicable)
- d) Reforestation Program
- e) Fire Control Plan
- f) Road Plan
- g) General Development Plan

For timber permit operators and small quota holders who harvest less than 30,000 m³ annually, Alberta has alternate AOP submission requirements.

GROUND RULES

- 3.5.1 The AOP submission date is on or before May 1 of each year unless otherwise approved by Alberta. Alberta shall respond within 30 days. The AOP shall be reviewed by Alberta with approval subject to the outcome of the review.**
- 3.5.2 The Operating Schedule and Timber Production, Reforestation Program, Fire Control Plan, and Road Plan, are submitted as in 3.5.1 above, unless otherwise agreed to by Alberta.**
- 3.5.3 Only harvest areas and roads with FHP approval shall be scheduled for operations in the AOP submission.**

3.5.4 If not previously submitted, a brief description or summary of potential issues arising from the proposed harvest activities that have been identified through discussions with Alberta or other known resource users.

3.5.5 The AOP shall contain the following components:

a) The map(s) referred to in 3.4.7 above including shape files of approved FHP harvest areas if not previously submitted.

b) Administrative and timber production information:

- I. name of disposition holder(s);
- II. number of the disposition(s);
- III. date of submission and effective period;
- IV. location of mill where timber will be manufactured or processed, or other reporting options;
- V. where all volumes (deciduous and coniferous) will be charged (quota, deciduous timber allocation, deciduous timber permit (DTP), FMA, commercial timber permit (CTP), community timber permit program);
- VI. proposed volume to be harvested by timber disposition;
- VII. community timber program operators shall include all road use agreements;
- VIII. scaling methodology (e.g., weigh scale, other arrangements), (not necessary if otherwise submitted);
- IX. utilization standards, including declaration of underutilization production (product 99);
- X. declaration or list of key stakeholder notifications (see section 5.0).

c) Operating Schedule – a table which outlines:

- I. list of harvest areas proposed for harvest (including opening number, area and volume by species or species group, with totals);
- II. lists of roads proposed for construction, maintenance and reclamation for non-DLO roads, except in-harvest area roads and access into blocks < 100 m in length (these are shown on the map). It includes watercourse crossings structures to be built or installed or removed/maintained;

- III. declaration of openings with outstanding operations or an agreement with Alberta on reporting of outstanding operational items;
- IV. annual reforestation program (see section 8.2).

d) Fire Control Plan which covers suppression equipment (see section 7.3); and

e) GDP and if applicable CA.

3.5.6 All amendments to harvest plans must be justified and submitted to Alberta in writing. RFP validation of all amendments is required. Any changes must be incorporated into the as-built plan.

3.5.6.1 Changes listed in the “Minor Amendments” column require only notification to Alberta. Minor amendments don’t require Alberta’s approval, provided all appropriate background checks have been made and rationale for the change will be provided (changes can be implemented prior to notification but must be reported after implementation or on the next block status report).

Changes listed in the “Major Amendments” column require the approval of the delegated authority (Alberta) prior to implementation. Alberta will provide the company with feedback and/or approval of the AOP amendment within 10 working days of submission. Any changes that could adversely affect buffers established for the protection of riparian areas, wildlife sites, historic resources, or aesthetic values or any changes not listed will be considered a major amendment.

Table 1.AOP Amendments

	Minor Amendments (Reportable/Notification Required)	Major Amendments (Delegated Authority Approval)
a.	Additions to the approved AOP harvest area boundary where the final gross area does not vary from the area in the approved FHP by more than 5% for blocks greater than 10 ha, or more than .5 ha for blocks less than or equal to 10 ha.	For blocks >10 ha, final gross area varies $\geq 5\%$ from FHP; for blocks ≤ 10 ha, final gross area varies >0.5ha from FHP.
b.	Operational deletions that exceed 2 ha to the approved FHP harvest area boundary.	N/A
c.	Exterior block roads moved to existing access or conventional seismic lines where re-growth averages less than 3m and within 150 m of the approved AOP access; or exterior block roads requiring the development of new Right-of-Way clearing within 150 m of the approved AOP access.	Exterior block roads moved to existing access or conventional seismic lines where re-growth averages more than 3m or is more than 150m from the approved AOP access; or exterior block roads that require development of new right-of-way (ROW) greater than 150 m of the approved AOP access.
d.	Where an approved silviculture strategy exists for roads, the in-block roads and associated watercourse crossings may be moved as required.	In-block roads and/or watercourse crossings are moved and there is no approved silviculture strategy for roads.
e.	Any watercourse crossing structures that have been upgraded from the approved FHP. Adding crossings (as identified in 3.4.7 (f) to intermittent watercourses and ephemerals.	Adding crossings (as identified in 3.4.7 (f) and (h)) to small permanent and higher class watercourses. Added crossings not approved as per Table 6.
f.	Re-location of planned structure retention up to 150 m within the harvest area boundary.	Planned structure retention in a harvest area is not implemented.

3.5.6.2. Notwithstanding the above table, all changes to harvest operations within a timber permit (CTP, DTP or CCTP) are considered major amendments, and require Alberta's approval.

3.5.6.3 Any change to harvest area that results in a variance from the approved SHS must be categorized and reported as per 4.1.2.

3.6 SALVAGE PLANNING

PURPOSE

Salvage planning shall be implemented when necessary to reduce the potential for loss of fibre.

DISCUSSION

Under certain circumstances, planning shall be expedited to reduce the loss of fibre from fire; disease or insect infestation; blowdown, industrial activity or other such unforeseen disturbances. Other requirements for Mountain Pine Beetle can be found in the Action Plan for Mountain Pine Beetle, the Interpretive Bulletin: Planning Mountain Pine Beetle Response Operations and the MPB Operating Ground Rules Addendum.

Salvage planning shall not be used when:

- a) the disturbance regime is slow moving and can be accommodated under conventional planning timeframes and protocols;
- b) the regime is not an imminent threat to green fibre;
- c) fibre loss is deemed to be within an acceptable range.

Salvage planning does not confer rights to the planner to ignore other values, or the inherent value of a natural disturbance. It does allow for consideration of all values and for prompt, qualified, professional opinion to drive the process.

GROUND RULES

- 3.6.1 Salvage planning is initiated on the natural disturbance when deemed appropriate by Alberta.**
- 3.6.2 FHPs for the salvage area must be developed, and shall form part of the AOP. Modified timelines and content for the FHP shall be considered by Alberta. Detailed requirements may be published from time to time by Alberta. It is expected that there will be substantial discussion to resolve significant issues with Alberta before the FHP is submitted.**

4.0 UTILIZATION

4.1 STAND UTILIZATION

PURPOSE

Track variance from the approved Forest Management Plan (FMP) SHS as well as total area harvested in order to:

- Ensure a sustainable harvest level and future forest objectives are maintained through operations adhering to the FMP;
- Improve information for the next FMP, (e.g. landbase);
- Make decisions around Forest Harvest Plan Acceptance

DISCUSSION

The *Alberta Forest Management Planning Standard, Annex 1, Section 6.0 Harvest Planning Standards* indicates scheduling of stands through the FMP - SHS is dependent upon the timber merchantability criteria allocated in the disposition holder's tenure document (e.g., FMA, quota certificate) and the management assumptions used in the timber supply analysis (TSA). Pertinent assumptions are comprised of deletions from the net landbase (e.g., subjective deletions, stream buffers, protected areas) and parameters that determine a stand's eligibility for harvest (e.g. earliest age of harvest). The SHS results from the analysis of these TSA inputs coupled with basic field reconnaissance. The SHS identifies spatially (subunit and location) and temporally (period) the queue of stands that will produce the sustainable timber harvest level (AAC) and desired future forest condition.

Adhering to the SHS is imperative to achieving the timber supply forecasts and the forest conditions expected. With increased levels of variance from the SHS, there is greater risk that the operational harvesting will not allow the FMP to realize its objectives and forecasted outcomes. Operational variance is unavoidable but must be effectively managed.

During the FHP planning process, an operator will select an area over which to plan a series of harvest areas (blocks) for a period of up to 5 years. This could be considered the FHP planning unit and is typically smaller than a FMA defined compartment or subunit. Within the FHP planning unit, the operator can address all the 1-10 year SHS assigned to that operator, deciding on either a harvest prescription, or a decision to not harvest at all (deletion) or to delay harvest outside the first 10 year period (deferral). Where deletions or deferrals consist of entire AVI polygons, specific justification is required.

Variance shall be monitored and reported where:

- 1) **Merchantable Stands** scheduled in the first decade of the SHS are not harvested in that decade; and
- 2) **Special Features** not identified in the FMP net landbase are encountered during layout or harvesting and are deleted from the SHS.

Timber Harvest Planning and Operating Ground Rules require timber operators to protect special features through detailed harvest planning and careful operations. (e.g. riparian buffers, steep slopes, sensitive sites, cultural/heritage sites, areas with high aesthetic value shall be removed from the SHS.)

Disposition holders shall complete Table 2 as they monitor the operational implementation of their plans against the SHS.

Definitions:

Additions – Any area planned for harvest, or which has been harvested that is not part of the 10 year SHS in the approved FMP. Additions will be divided into two categories: substantial and slivers.

Actual Harvested Area is the as-built harvested area from the FHP.

Approved FMP 10 Year SHS – Is the total SHS area within the compartment for the first 10 years of the approved Spatial Harvest Sequence.

Deferral – any area included in the 10-year SHS that will not be harvested during the current FMP. Deferrals are not removed from the contributing landbase as there is an expectation they will be harvested later in a future FMP. Deferrals will be divided into two categories: Substantial or Slivers. Deferrals are those stands or portions of which are operable, not isolated, and should be available under current technological and economic constraints for future harvest.

Deletion - Any area included in the 10-Year SHS that will never be harvested under current planning assumptions and technical constraints. This area shall be tracked spatially and removed from the contributing landbase in the subsequent FMP. Deletions are divided into two categories: Substantial or slivers.

Subunit or Compartment - Operational subunits of an FMU delineated by environmental, operational or watershed characteristics.

FHP Planning Unit: Defined operational subunit of an FMU, delineated by environmental, operational, or watershed characteristics. An FHP is the operational plan for a planning unit, and may be a compartment, sub-unit or an area of a smaller scale. FHP Planning units are discrete, and FHPs for the same operator cannot overlap spatially with the exception of access routes.

Planned Area For Harvest - Is the total area of the SHS laid out in the FHP, and includes the information for all previously approved FHPs (planned but not harvested) information for the same compartment.

Provincial Base 10 Yield Stratum- One of ten Alberta yield stratum defined in the yield projection Interpretive Bulletin in the Alberta Forest Management Planning Standard (AFMPS)

Slivers- any polygon component of variance (addition, deferral or deletion) less than 2ha in size. Generally these are long, narrow features along the edge of a block. Slivers exclude stand-alone features (blocks not bordering of or not being adjacent to SHS polygons). Slivers do not contribute to variance calculations but shall be tracked and reported separately. Sliver deletions and sliver deferrals can be aggregated together (e.g. Sliver Deletions & Deferrals)

Substantial- any polygon component of variance (addition, deferral or deletion) other than Slivers

Variance – any deviation from the 10-year Spatial Harvest Sequence (SHS) in the approved Detailed Forest Management Plan (DFMP). Variance is classified into one of these three categories: Additions, Deletions or Deferrals.

GROUND RULES

- 4.1.1 For the FHP submission, the company shall submit a map to show the comparison of the 1-10 year SHS to the laid out harvest areas. The map shall distinguish using symbology between:**
- **substantial deletions;**
 - **substantial deferrals; and**
 - **substantial additions.**
- 4.1.2 Variance shall be reported by Alberta Base 10 stratum for each FHP. The table shall include the minimum information as per Table 1 in order to calculate and express cumulative variance for FHP review. As-built information as per Table 2 will be shown as part of the Stewardship Report requirements. A Forest Harvest Plan will be appraised when additions exceed 20% of planned SHS 1-10 year for the particular FHP, or when substantial additions exceed the combination of substantial deletions and deferrals. Table 2 shall include cumulative information from all previously approved FHP's in the compartment.**
- 4.1.3 Variance from the SHS shall be monitored and reported by compartment. The cumulative as-built variance for all FHPs shall be compiled by compartment and reported annually in the GDP. The table shall include**

information as per Table 2 for all compartments operated within the current FMP effective period.

Total FHP/GDP variance shall be calculated using the following:

$$SHS \text{ Variance (Additions \%)} = \frac{\text{Area of Substantial Additions}}{\text{Area of Approved 10 yr SHS}} \times 100$$

- 4.1.4 Where stands are added for harvest, preference should be for stands in the 11-20 year period. Stands currently not part of the net landbase that are found to be productive merchantable landbase may be considered for addition with Alberta's approval. Stands shall not be added without evaluating why the stand is not within in the net landbase (e.g. Meeting wildlife VOIT).
- 4.1.5 Justification shall be provided in the FHP (block comments) in the following instances:
 - i. entire deleted or deferred stands (AVI Polygons);
 - ii. entire stand (AVI Polygon) additions
- 4.1.6 All substantial deletions shall be coded and tracked spatially by the operator to allow for incorporation into the subsequent Forest Management Plan net landbase development process.

Table 2. SHS Assessment

SR SHS Tracking between 2015 and 2025 (timber year)

PD 1, Year 1-10

Harvest Profile			Planned for Harvest (ha)						Asbuilts			Combined As-Built & Planned																		
			Harvested Area		Variance			Harvested (ha)		SHS Assessment (Excluding Slivers)	Variance		SHS Assessment (Excluding Slivers)																	
					Substantial	Slivers					Substantial																			
Compartment			Operator Approved FMP 10 Year SHS	SHS 1-10yr	SHS 11-20yr	Contributing Landbase Outside SHS	Non-Contributing Landbase	Total	Additions (included in harvested area)	Deletions	Deferrals	Total	Additions	Deletions & Deferrals	Total	SHS 1-10yr	SHS 11-20yr	Contributing Landbase Outside SHS	Non-Contributing Landbase	Total	SHS Variance (Additions %)	Difference in Area (Subst. Add. - D&D)	Difference in Area Total Harvested - 10Yr FMP SHS	Additions	Deletions	Deferrals	SHS Variance (Additions %)	Difference in Area (Subst. Add. - D&D)	Remaining Available Area (SHS & Non-SHS)	
All	All	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00%	-	-	-	-	-	-	0.00%	-	-
Aw/AwU	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AwS	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Saw	4/6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PjMx	2/5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sw	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pj	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sb	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SbFM	9A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
**NP_c	XC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
**NP_d	XD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note: * Deletions and Deferrals to be provided in shapefile format for next FMP

**NP_c and NP_d refer to Non-Productive Conifer and Deciduous Landbase respectively. Through a "pre-blocking" exercise, some landbase that was historically classified as non-productive, was selected as part of the SHS. In many cases additions also fall under the non-productive classification.

4.2 TREE UTILIZATION

PURPOSE

To utilize all merchantable trees and pieces in a merchantable stand as defined by the timber disposition and the FMP.

DISCUSSION

Tree utilization assumptions in the FMP must be followed so that sustainability is not affected.

GROUND RULES

- 4.2.1 The tree utilization standards are stated in the applicable timber disposition and shall normally be one of the following standards.**

Coniferous Utilization Standards

15/10 Utilization

- Merchantable Tree: one that has a minimum diameter of 15 cm outside bark at stump height (15 cm) and a usable length of 3.66 m to a 10 cm diameter (inside bark).

15/11 Utilization

- Merchantable Tree: one that has a minimum diameter of 15 cm outside bark at stump height (15 cm) and a usable length of 3.66 m to an 11 cm top diameter (inside bark).

Deciduous Utilization Standards

15/10 Utilization

- Merchantable Tree: one that has a minimum stump diameter of 15 cm outside bark and a merchantable length of 3.66 m or greater to a 10 cm top diameter (inside bark), or to the point where the stem is unusable or there is no central stem due to heavy branching.

- 4.2.2 Coniferous and deciduous log butts or large ends exhibiting advanced decay greater than 50% in area of the cut surface (basal area) may be bucked at 1.2 m intervals or less until the decay begins to diminish. At that**

point the bucking shall revert to 0.61 m intervals or less to 50% sound wood.

- 4.2.3 Maximum stump height when measured from ground level shall be no more than 15 cm, unless otherwise approved by Alberta. Exceptions may be approved in the FHP (e.g., to delineate harvest areas, create rub posts for understorey protection, large diameter stems with significant butt flare, areas of steep slopes). Where stumps are left to delineate areas (e.g. harvest areas, create rub posts for understorey protection, or to delineate poorly defined watercourses) they shall be on average 30m apart and no higher than 2m.
- 4.2.4 As per the Debris Management and Structure Retention ground rules, forest operators are permitted to leave merchantable volume in harvest areas if the approved FMP identifies specific stand structure retention strategies.
- 4.2.5 All trees/pieces used in the construction of crossing structures may be scattered (or piled when being reused or burned) along the ROW or in the harvest area. Trees should be utilized wherever possible.
- 4.2.6 Company processing practices cannot make an unmerchantable piece from a merchantable tree.

5.0 INTEGRATION WITH OTHER USERS

5.1 DECIDUOUS/CONIFEROUS INTEGRATION

PURPOSE

To ensure that planning, harvesting and reforestation in overlapping dispositions are carried out efficiently and with a minimum of environmental impact.

DISCUSSION

Due to overlapping tenures, integration of activities between the various operators is essential. Alberta monitors the integration of roads and harvesting, but the responsibility for co-ordinating plans and operations lies with the operators.

Integration of activities is necessary to:

- a) reduce the amount of time roads are open;
- b) reduce disturbance of wildlife; and
- c) enable prompt reforestation .

GROUND RULES

- 5.1.1 All operators with timber dispositions potentially affected by an FHP or GDP must agree (i.e. reviews should focus on potentially integrated operational items, including adherence to operator-assigned SHS, access management, and timing restrictions, as examples) to the FHP and GDP before approval is granted. If agreement cannot be reached after all meaningful consultation has taken place, the following dispute resolution process can be implemented. Areas of disagreement will be documented and forwarded to Alberta for review. Depending on the exact nature of the disagreement, Alberta will either: 1) facilitate a dispute resolution process, or 2) direct the operators on areas of disagreement through conditions of approval.**

- 5.1.2 All roading, harvesting and silviculture operations shall be completed at a time and in a manner that enables effective reforestation and minimizes road access.**

5.2 FOREST RECREATION AND TOURISM

PURPOSE

To manage the implications of forest management activities on forest recreation.

DISCUSSION

Forest management activities can impact recreational opportunities. Potential exists for increased public awareness and for increased recreational opportunities through co-ordination with forest management practices. The FMP may have addressed recreational issues through a variety of tactics.

GROUND RULES

- 5.2.1 Operational tactics to mitigate impacts on recreation and tourism shall be described in the GDP, FHP, or CA where required.**
- 5.2.2 The forest operator shall work with stakeholders that have raised concerns with the operator or have been identified by Alberta.**
- 5.2.3 Roads should be planned to avoid recreation sites. Roads shall be designed to minimize their impact on the recreation values of the area.**
- 5.2.4 FHPs affected by recreational sites should provide opportunities for the enhancement of endorsed recreational trails whenever possible.**

5.3 TRAPPING

PURPOSE

To avoid damage to the infrastructure associated with Registered Fur Management Areas (RFMA) and to reduce the impact on trapping opportunities.

DISCUSSION

Communication with the owner and/or operator of a trapline is a key element in minimizing the impact of timber operations. Discussions held early in the planning process allow both the

trapper and the forest operator to work co-operatively, with the least amount of disruption to their individual operations. To facilitate communication between forest operators and trappers, Fish and Wildlife shall annually update the list of RFMA's and owners. Upon request the local Fish and Wildlife office shall provide the relevant list of trappers to the forest operators.

GROUND RULES

- 5.3.1 A representative of the forest operator shall personally contact, or send a registered letter to the senior partners of an RFMA during the preparation of the FHP. Information provided by the trapper such as cabin locations, trails and other improvements, or concerns shall be noted at this stage. During the development of the FHP information and concerns shall be addressed. The forest operator shall provide the trapper with a copy of the approved FHP map.**
- 5.3.2 Prior to submission of the AOP, the trapper shall be notified via letter of the forest operator's intent to conduct harvesting, silviculture, and reclamation operations within the RFMA in the upcoming year.**
- 5.3.3 At least ten days prior to commencing operations, the forest operator shall notify the trapper, preferably by personal contact that timber operations are beginning in the RFMA.**

5.4 RANGE MANAGEMENT

PURPOSE

To integrate forest and range management operations.

DISCUSSION

The goal is to develop a co-operative, long-term relationship between grazing disposition holders and forest operators to sustain fibre and forage resources.

At the GDP, FHP and AOP stages of planning, the emphasis is to integrate harvesting, silviculture, and grazing schedules to ensure the sustainability of timber, forage, wildlife and watershed values (i.e., wildlife habitat, watershed protection). Specific harvesting and reforestation operations and grazing systems would be identified within components of the AOP.

Effective communication between the timber and grazing operators is necessary. Discussions held early in the planning process are intended to enable the grazing disposition holder and the forest operator to work co-operatively minimizing the disruption to their individual operations.

GROUND RULES

- 5.4.1 The forest operator shall conduct all operations in accordance to the Grazing Timber Integration Manual as well as Directive SD 2011-03.**
- 5.4.2 The forest operator shall consult with any grazing disposition holder affected directly by the FHP, to address specific concerns during the development of the FHP. As per section 3.4.8 (i).**
- 5.4.3 The forest operator shall ensure that timber operations do not negatively impact the range management of the grazing disposition. Examples of these impacts include: damage or disruption to range improvements (e.g. fencing, water developments), infrastructure, roads, and bridges. The forest operator is responsible to repair and/or replace any damage to these improvements and infrastructure.**
- 5.4.4 The forest operator shall contact the grazing disposition holder in person (or by phone or e-mail) a minimum of 10 working days prior to commencing timber operations and after completion to discuss access and any other issues affecting the GTA as agreed.**

5.5 FOREST AESTHETICS

PURPOSE

To manage the visual impact of timber operations on the forest landscape.

DISCUSSION

The objective is to mitigate the impact of timber operations on the visual quality of the forest landscape by:

- identifying the location of forest landscapes and other areas of high visual and scenic value, and setting objectives for their management; and
- addressing visual quality issues in the FMP.

Areas considered highly sensitive are those:

- a) within, adjacent to or viewed from recreational sites and tourist developments;
- b) seen from elevated viewpoints;
- c) adjacent to or viewed from major travel corridors (roads, lakes and rivers), rural/urban forest interface and site-specific areas identified during the referral and public review process;
- d) adjacent to primary and secondary highways in Alberta.

Tactics to reduce the impacts of timber harvest and reforestation on visual quality may include: retention of forest structure and lesser vegetation at strategic vantage points in the harvest area, modification of harvest area design, low impact scarification techniques, vegetative buffers, and utilizing natural topography.

GROUND RULE

- 5.5.1 **Highly sensitive areas shall be assessed and tactics shall be identified in the FHP to mitigate the impacts of harvesting and reforestation on visual quality.**
- 5.5.2 **Where the approved FMP identified highly sensitive areas and tactics, these areas will be identified in the FHP and a description of the mitigating tactics provided as per section 3.4.11.**

5.6 HISTORICAL RESOURCES

PURPOSE

To ensure that forest operators identify and protect historical and cultural resources.

DISCUSSION

There are many thousands of historical resources (e.g. archaeological and paleontological sites) located on Alberta's Crown land. In keeping with the requirements of Alberta, forest operators shall develop and implement a process for identifying and protecting resources that are regulated by the Historical Resources Act.

GROUND RULES

- 5.6.1 All known historical resources shall be identified and managed in keeping with the requirements of Alberta Culture.**
- 5.6.2 Historical resource records are confidential and shall not be shared with the public.**
- 5.6.3 If a previously unknown historical resource is discovered during road building, harvesting, or silviculture operations, the operations shall cease and Alberta Culture shall be notified.**
 - 5.6.3.1 Historical cabins identified during operations will have a minimum buffer of 25 metres applied.**

6.0 WATERSHED PROTECTION

PURPOSE

To manage the implications of timber operations on water quality, quantity, and flow regime by:

- minimizing the potential for sedimentation in watercourses;
- preventing soil, logging debris and deleterious substances from entering watercourses;
- maintaining aquatic and terrestrial habitat; and
- complying with the Water Act.

DISCUSSION

The FMP shall address watershed water quantity and flow issues. Ground rules define operating practices to protect water quality and riparian values.

Riparian areas adjacent to watercourses and water source areas perform a number of ecological functions. Riparian areas help to regulate stream flows (storage and release of surface and groundwater), reduce sheet, rill and gully erosion, and moderate stream temperature. Functional riparian areas provide bank stability, debris for creating aquatic habitats and provide a source of food and nutrients for aquatic organisms. Riparian areas also provide habitats supporting a high diversity of wildlife species and other terrestrial biota, and provide corridors that can link different landscape and habitat features.

Authorizations by Alberta do not imply authorization under federal legislation and requirements, notably the federal Fisheries Act. The proponent must seek advice and approvals of the federal agencies (Department of Fisheries and Oceans) regarding federal legislation requirements.

GROUND RULES

- 6.0.1 Watercourses shall be classified according to Table 3, Watercourse Classification. In the event the channel classification is not distinctly evident, the width shall be determined by the average of measurements taken at 50 m intervals at representative points of undisturbed stream channel over the length of the watercourse bordering the block.**

- a minimum of four measurements are required with the measurement location flagged for audit purposes;
- the channel width is the horizontal width of the channel between high-water marks (mean or annual), or the rooted vegetation on the banks, measured at right angles to the direction of flow. Multiple channel widths are summed to represent total channel width. Measured from where the channel bank begins to slope down towards the channel bottom across to the same point on the opposite bank;
- where the distance bordering the block is not enough for four measurements, reduce the measurement interval as required.

- 6.0.2** Measures shall be implemented, including temporary and permanent erosion control measures, to minimize erosion and prevent sedimentation from entering a watercourse or waterbody as a result of the company's operations.
- 6.0.3** Riparian protection areas shall be established as in Table 4, Standards and Guidelines for Operating beside Watercourses. Where uncertainty exists on the classification of the watercourse, the watercourse protection area shall be that required by the higher class of watercourse.
- 6.0.4** All watercourses shall be given the appropriate protection as described in Table 4.
- 6.0.5** Sediment, logging debris or deleterious materials (e.g., fuels, oils, greases, industrial or household chemicals or refuse) shall not be deposited into the water or onto the ice of any watercourse or water body during road construction, maintenance, harvesting, and reclamation or silviculture operations.
- 6.0.6** Only crossings meeting the requirements of section 11.4 shall be used by equipment to cross watercourses.
- 6.0.7** Logs shall not be decked in watercourses or seepage areas.

- 6.0.8** Authorized in-stream activities in fish-bearing watercourses shall be scheduled to avoid disturbing migration, spawning and incubation of fish species, and carried out in such a manner as to avoid stream sedimentation.
- 6.0.9** Beaver ponds shall have the same classification as the watercourse flowing out of the pond as measured at the smallest width within 50 m of the dam.
- 6.0.10** Harvesting is not permitted within water source areas during non-frozen periods.

Table 3. Watercourse Classification

Watercourse Classification					Fisheries/Wildlife Values	Potential Impacts
Type	Mapping Designation	Physical Description	Portion of Year Water Flows	Channel Development		
Large Permanent	Solid heavy line or double line	Major streams or rivers; Well-defined flood plains; Often wide valley bottoms.	All year	Non-vegetated channel width exceeds 5 m	Resident and migratory fish populations; Important over wintering, feeding and rearing habitat; Important wildlife feeding/travel corridors.	Water quality often reflects all upstream land use impacts and natural processes; Primarily sedimentation of stream channels; Loss of wildlife habitat, restriction of movement.
Small Permanent	Usually solid although are sometimes broken heavy lines	Permanent streams; Often small valley bottoms; Bench floodplain development.	All year but may freeze completely in the winter or dry up during periods of drought. Some are 'transitional' to intermittent and dry up during drought	Banks and channel well-defined Channel width from greater than 0.5 m to 5m	Significant insect populations; Important spawning and rearing habitat; Resident and migratory fish populations; Over wintering for non-migratory species; Important wildlife feeding/travel corridors.	Primarily sedimentation of stream channels; Water quality and water yield; Fish population sensitive to siltation; Loss of stream bank fish habitat; Loss of wildlife habitat, restriction of movement.
Intermittent	Usually broken line To be identified during layout.	Small stream channels; Small springs are main source outside periods of spring runoff and heavy rainfall.	During the wet season or storms Dries up during drought	Distinct channel development; Channel usually has no terrestrial vegetation; Channel width less than 0.5 m; Usually some bank development.	Food production areas; Potential spawning for spring spawning species; Drift invertebrate populations in pools and riffles; Spring fed areas may provide spawning potential for fall spawning species.	Sedimentation from bank and streambed damage will damage fish spawning and invertebrate habitat as well as downstream fish habitat; Water quality and water yield.

Type	Mapping Designation	Physical Description	Portion of Year Water Flows	Channel Development	Fisheries/Wildlife Values	Potential Impacts
Ephemeral	Not normally mapped	Often a vegetated draw.	Flows only during or immediately after rainfall or snowmelt	Little or no channel development; Flow area is usually vegetated.	Siltation may impact fish habitat downstream.	Sedimentation downstream due to ground disturbance.
Water-Source Areas	To be identified during layout	Areas with saturated soils, surface flow or seepages contributing directly to stream flow.	All year; May or may not freeze in winter	No channel development, but may be pronounced vegetation changes.	Year-round springs provide potential value to fall spawning fish; Potential high-use areas terrestrial wildlife.	Disturbance may cause downstream sedimentation; Interruption of winter flow may disrupt fish egg incubation; Loss of mineral licks.
Lakes	Solid outline a water body Reserved areas noted on referral map	Large water collection areas (> 1ha) permanently filled with water.	Normally frozen in winter	Shorelines defined by absence of permanent terrestrial vegetation.	Important fish-bearing habitat; Important bird nesting/rearing areas.	Aesthetic values may be disrupted; Potential for wildlife disturbance; Local sedimentation.
Oxbow Lakes	Solid Heavy or Outline	Large water collection area formed when oxbow cut off from main river channel. Often vegetated.	Normally frozen in winter	N/A	Important habitat for ungulates	Thermal cover/grazing areas.

Table 4. Standards and Guidelines for Operating Beside Watercourses

Watercourse Classification	Roads, Landings, and Bared Areas	Watercourse Protection Areas	Operating Conditions Within Riparian Areas and Water Source Areas Where Operations are Approved	
			Tree Felling	Equipment Operation
Large Permanent	Not permitted within 100 m of the high water mark or water source areas within the riparian management zone unless specifically approved in the AOP.	No disturbance or removal of timber within 60 m of high water mark unless specifically approved in the AOP. No removal of timber shall be approved within 10 m of the high water mark.	Trees shall be felled so that they do not enter watercourse. Should slash or debris enter the watercourse immediate removal is required without a machine entering the watercourse.	Where removal of timber within 60 m is approved, no machinery is permitted within 20 m of the high water mark.
Small Permanent	Not permitted within 30 m of the high water mark or water source areas within the riparian management zone unless specifically approved in the AOP.	No disturbance or removal of timber within 30 m of high water mark unless specifically approved in the AOP. No removal of timber shall be approved within 10 m of the high water mark.	Trees shall be felled so that they do not enter watercourse. Should slash or debris enter the watercourse immediate removal is required without a machine entering the watercourse.	Where removal of timber within 30 m is approved, no machinery is permitted within 20 m of the high water mark.

Watercourse Classification	Roads, Landings, and Bared Areas	Watercourse Protection Areas	Operating Conditions Within Riparian Areas and Water Source Areas Where Operations are Approved	
			Tree Felling	Equipment Operation
Intermittent	Not permitted within 30 m of the high water mark or water source areas within the riparian management zone unless specifically approved in the AOP.	Buffer of brush and lesser vegetation to be left undisturbed along the channel. Width of buffer shall vary according to soils, topographical breaks, water source areas and fisheries values.	Trees shall be felled so they do not enter watercourses, unless otherwise approved by Alberta. Should slash or debris enter the watercourse, immediate removal is required without the machine entering the watercourse.	Heavy equipment may operate within 20 m during dry or frozen conditions (when soil condition is not susceptible to degradation). No skidding through watercourse except on approved crossing as per Table 6. Where fish and spawning movements have been identified, special crossings that do not obstruct upstream fish passage or cause stream siltation may be required.
Ephemeral	Construction not permitted within a watercourse or water source area.	Buffer of undisturbed vegetation in wet gullies, Class "A" and "B" waterbody tributaries to be left undisturbed.	Accumulations of slash and debris to be removed progressively.	Skidding shall only occur during frozen or dry periods (soil condition is not susceptible to degradation). Any crossing required as per Table 6 shall be approved and reported as per 11.4. Equipment crossing ephemeral watercourses shall be minimized.

Watercourse Classification	Roads, Landings, and Bared Areas	Watercourse Protection Areas	Operating Conditions Within Riparian Areas and Water Source Areas Where Operations are Approved	
			Tree Felling	Equipment Operation
Lakes	For shorelines not located within reserved areas, no disturbances shall be permitted within 100 m of the high water mark unless specifically approved in the AOP.	On lakes exceeding 4 ha in area, no disturbance or removal of timber within 100 m of the high-water mark unless approved. Alberta may require additional protection in the FHP. On lakes less than 4 ha, removal of timber prohibited within 30 m of the high-water mark and any removal within 100 m requires Alberta's approval.	Trees shall be felled so they do not enter the waterbody, unless otherwise approved. Should slash or debris enter the watercourse, immediate removal is required without the machine entering the watercourse.	If timber removal is approved, no machinery to operate within 40 m of the high water mark.
Water Source Areas	Construction not permitted unless approved in the AOP. No log decks permitted. The number of stream crossings must be minimized. No disturbance of organic duff layers or removal of lesser vegetation.	Treed riparian management zone of at least 20 m on all water source areas. No harvest of merchantable trees or disturbances of lesser vegetation unless specifically approved in the AOP. Buffer width may be altered according to its potential to produce surface water, provided it is approved in the AOP.	Heavy machinery not permitted with in water source areas during unfrozen soil conditions. Minimal disturbance or removal of duff or lesser vegetation. Timber may be harvested if stream sedimentation is the only resource concern, provided there is no disturbance of the organic soils and lesser vegetation when harvesting the trees. On unstable areas subject to blowdown, merchantable trees shall be carefully harvested from water source areas to minimize root disturbances of duff layers and watercourse damming.	Road construction, timber harvest, reforestation and reclamation shall be done with equipment capable of operating without causing excessive disturbance to the soil layers. Heavy equipment is not permitted during moist or wet soil conditions, but may be operated during frozen periods. No soil caps or depositing of soil permitted on roads in water source areas, unless a separation layer is incorporated or the road is designed to provide adequate surface and sub-surface drainage away from the road bed. Where a separation layer is used, the soil cap shall be removed as operations are completed.
Oxbow Lake	Construction not permitted within 100 m of oxbow lake unless specifically approved in the FHP.	Operational buffer of brush and lesser vegetation to be left undisturbed along the channel.	Heavy equipment not permitted around oxbow lakes during unfrozen conditions. Trees shall be felled so they do not enter the waterbody, unless otherwise approved. Should slash or debris enter the watercourse, immediate removal is required without the machine entering the watercourse.	Approved activities shall be done with equipment capable of operating without causing excessive disturbance.

7.0 HABITAT MANAGEMENT

7.1 LANDSCAPE PLANNING AND HARVEST AREA DESIGN

PURPOSE

To implement timber operations in a manner that ensures landscapes maintain biodiversity and ecosystem function.

DISCUSSION

Forest operators are expected to manage the forest cover in a manner that maintains biodiversity and ecological integrity. The SHS approved in the FMP is the mechanism by which the forest cover is managed.

Wildlife movement corridors are required to ensure that animals with large home ranges find passage between and within managed landscapes. When planning for wildlife habitat and movement corridors, the following factors shall be considered: watercourse classification/ profile/ pattern and associated valley definition, timber types and proximity to watercourses, travel corridor width, harvesting method, and harvest area shape, continuity of forest cover or

7.2 HARVEST AREA DESIGN AND LAYOUT

PURPOSE

To provide direction for designing harvest areas.

DISCUSSION

Detailed planning of harvest areas must address reforestation, wildlife habitat (e.g., line of site, hiding cover, and sensitive sites), watercourse protection, integration with other land uses, understorey protection, structure retention, road development and reclamation, and visual quality.

The following items affect harvest area size and shape:

- current inventory polygon boundaries;
- tree species, age and silvicultural characteristics;
- habitat requirements of species of management concern and species at risk;
- key wildlife zones;
- amount and distribution of non-productive lands and immature treed lands;
- location and size of watercourses and buffers;

- location of roads, pipelines and power lines;
- topographic features;
- presence of viable understorey;
- retention of shrub and tree patches;
- accessibility to all or part of the compartment;
- potential blowdown of peripheral and within-harvest area trees;
- insects and diseases;
- visual sensitivity.

GROUND RULES

- 7.2.1 Line of sight shall be minimized where harvest areas are adjacent to all-weather permanent Class I, II or III roads. Targets for the limits of sight distance shall be 400 m, but may be exceeded if justified in FHP.**
- 7.2.2 Shrubs and advanced growth adjacent to permanent all weather roads shall be protected to limit the line-of-sight across the harvest area. The number of entry points into the harvest area shall be minimized.**
- 7.2.3 Timber harvesting shall not occur on any area where the likelihood of soil water table increases following harvesting is high, and the risk that the reforested area will not achieve the regeneration standard is also high.**
- 7.2.4 Alberta permanent sample plots shall be protected by retention of the plot buffer (blue paint), unless such action is approved by Alberta.**

7.3 DEBRIS MANAGEMENT

PURPOSE

To manage the amount and distribution of woody debris left in harvest areas to:

- minimize wildfire risk, particularly near communities
- optimize ecological benefits
- minimize the loss of productive landbase
- minimize the risk of wildfires, and to improve fire suppression capability.

DISCUSSION

Debris or slash accumulation resulting from timber harvest operations must, as a priority, be redistributed or disposed of to minimize the risk of wildfire ignition and spread. However, it is recognized that some retention of debris is valuable from an ecological perspective, and that a reasonable amount of debris retention shall occur to emulate natural forest floor accumulations. Ecological benefits include microtine habitat, furbearer habitat (when piled), and soil nutrient inputs. When debris is maintained, it must be in such a distribution and amount to: 1) minimize wildfire risk as a priority, 2) minimize the amount of productive landbase loss by limiting lost area available for deciduous species suckering, or tree planting, and 3) provide ecological benefit (coarse filter vs. fine filter).

Landscape-level issues regarding the risk of large fires are addressed in the development of the SHS. The FMP shall develop objectives, strategies and tactics that consider the risk of occurrence and spread of fire at the stand and landscape levels.

Opportunities may exist to implement fuel reduction, isolation and conversion on the landscape while accounting for other values. Where applicable, forest operators shall follow the guidelines in the FireSmart Protecting Your Community from Wildfire manual.

Acceptable methods of reducing slash hazards are defined in Directive AF-FDP-2017-07, Debris Management Standards for Timber Harvest Operations.

GROUND RULES

- 7.3.1 Slash accumulations resulting from timber harvesting, road, and campsite construction shall be disposed of within 12 months (as defined in the Directive) of harvest operation completion in a manner acceptable to Alberta.**
- 7.3.2 Slash fuel accumulation is not permitted within 5 m of the perimeter of the harvest area. The bordering undisturbed forest floor can be used as a benchmark to determine what constitutes a significant accumulation. Unacceptable accumulations include piles of trees or non-merchantable timber, and tops or branches deposited during logging that could create fuel ladders for fire bordering the stand.**

- 7.3.3 Burning operations shall :**
- a) not be conducted during the fire season, unless otherwise approved in the Fire Control Plan;**
 - b) require a post burning survey to ensure all holdover fires are extinguished; and**
 - c) have 80% of each pile consumed with an attempt to burn all piles.**
- 7.3.4 A Fire Control Plan, consistent with “Schedule A” of a company’s Fire Control Agreement shall be submitted as part of the AOP.**

In the absence of a Fire Control Agreement, the company shall fill out and submit the TM118C Fire Control Supplement form.

- 7.3.5 The fire control plan (may be submitted as a requirement of fire control agreement) of the AOP shall contain the following:**
- a) duty roster;**
 - b) list of company woodlands personnel and their fire control training;**
 - c) key company contacts;**
 - d) heavy equipment resource list;**
 - e) small hand tool resource list and their location;**
 - f) company communication system and numbers and call-signs;**
 - g) fire prevention policies;**
 - h) fire prevention strategies;**
 - i) fire prevention priorities (high values at risk);**
 - j) fire operations schedule (i.e., harvesting and silviculture activities within the fire season);**
 - k) identification of barriers to fire spread.**

7.4 STRUCTURE RETENTION

PURPOSE

- To create temporary refuges for forest biota to re-colonize harvest areas.
- To maintain snags and live residual trees in harvested areas for biota that depend on these structures following natural disturbances.
- To provide wildlife thermal and hiding cover within harvest areas throughout the rotation.
- To provide wildlife travel corridors within large harvest areas and compartments.

DISCUSSION

Although many types of natural disturbance (fire, floods, avalanches, wind events, insects and disease infestations, and slumps) occur within Alberta's forests, fire is the most common. Virtually all trees within intense fires are killed, but following low and moderate-intensity fires many scattered live trees are present. In addition, within all fire types, fire "skips" or "islands" result in residual patches of live trees remaining within larger burned areas. Following other types of natural disturbances, even higher densities of live trees, and patches of live trees, are present. Approximately 30% of the birds and mammals living in Alberta's forests nest, forage or find shelter within live trees that have a basal diameter greater than 20 cm. Many of these species are able to use single large live trees and residual patches of large live trees that remain after natural disturbances.

The retention of single trees and patches of large live trees in harvest areas makes the harvested areas more similar to burned areas. In addition, residual live trees may create some old forest attributes in young regenerating harvest areas. Many of the birds, mammals, insects, beetles, fungi and nonvascular plant species that live in recently disturbed forests require large snags for food and shelter. This unique biotic community changes rapidly as the snags fall and the downed logs are incorporated into the forest floor. Some biota become rare within ten years following a fire, and many of the early colonizing species have disappeared by the time the stand is twenty years old.

Retaining some large snags within harvest areas creates habitat for some biota associated with naturally disturbed habitat. Additional large snags may be created, by retaining large live trees, as some of these trees will die throughout the rotation. To a large extent, however, it will be necessary to rely on natural disturbances to create abundant large snags for biota that depend on this dead woody material.

Where larger harvest areas are created, it is important to retain a number of individual trees, snags and residual tree patches distributed across the harvest area. These residual tree patches shall be located such that natural features, riparian areas, wildlife features, stand structure and composition, and proximity to standing forests are taken into account to maximize their utility or usefulness by the biotic community.

There may be zero patches of residual structure in any particular harvest area as long as the amount identified in the TSA is met across the landscape over time.

Larger patches of residual structure generally have more benefits than smaller patches (lower blowdown probability, interior forest characteristics, hiding and thermal cover) and patches generally have more benefit than individual stems.

GROUND RULES

- 7.4.1 Residual structure shall be retained in harvest areas during harvest and silviculture operations (including salvage operations) according to the FMP. The merchantable retention target will be applied to each forest operator, across all harvest areas, reported as described in VOIT 10 (objective 1.1.2.1).**
- 7.4.2 Merchantable residual structure can be defined as live, commercially viable trees retained post-harvest to create old forest characteristics in young and mid-aged regenerating stands. Target of 4% of the harvested area, representative of pre-harvest stand conditions.**
 - 7.4.2.1 Harvest areas less than 5 ha may have less than 4% merchantable retention, including zero. With Alberta's approval, there may be zero patches of residual structure in any harvest area if there is compensation in other harvest areas to meet the FHP average with justification provided by Disposition Holder.**
 - 7.4.2.2 All identified retention will be excluded from harvest for one rotation (based on minimum harvest ages as indicated in the TSA).**
 - 7.4.2.3 Retention shall be left as islands (undisturbed patches) or as dispersed (single trees / clumps), distinctly inside block, and representative of the original stand harvested.**
 - a) Retention islands that are surrounded by disturbed area not by design, but by default due to its location on a harvest block edge that borders a previously harvested area (equal to or less than 14 years old) or a constructed permanent disposition can contribute to the target in 7.4.2. Retention left in this manner can only be attributed to the harvest area in which it is planned and must still adhere to the criteria identified in 7.4.2, 7.4.2.1, and 7.4.3.**
- 7.4.3 Non-merchantable retention includes residual structure that does not meet the utilization standard(s) as defined in 4.2. Forest operators shall retain non-merchantable structure in the following manner:**
 - 7.4.3.1 Leave individual stems of residual structure throughout harvested areas where operationally and silviculturally feasible. Other considerations:**
 - a) leaning snags or trees of non-merchantable species that are greater than 6 m in height that create a safety hazard should be felled to create safe working conditions;**

- b) snags within 40 m of roads, camps, landings, fence lines, power lines and machine maintenance areas should be felled to create safe working conditions.

7.4.4 The following are guidelines for the spatial distribution of residual structure:

- a) retain residual structure near the harvest area boundary to create a gradual ecotone between the harvest area and un-harvested forest;
- b) retain residual structure in patterns and locations that minimize the potential for blowdown;
- c) retain residual structure near ephemeral draws and intermittent streams;
- d) retain residual structure adjacent to inoperable areas whenever possible.

7.5 UNDERSTOREY PROTECTION

PURPOSE

To protect coniferous understorey during timber harvesting and reforestation operations.

DISCUSSION

The main objective of this ground rule is to protect coniferous understories (understorey) that may contribute to future forest values. Understorey protection must be practiced in all stand types containing white spruce understorey, and balsam fir where desirable. Techniques will vary depending on the characteristics of the understorey.

There is one level of understorey protection:

- **Avoidance** – is carried out where the overstorey is recognized in the timber supply analysis as the storey of primary management. Wind buffering tactics and pre-planning are not specifically required for avoidance protection.

The following factors shall be considered when planning for protection of understories:

1. Understorey Characteristics - species, density and height, the health and vigour of the understorey, the size and wind permeability of the crown, greater than 50% live crown, and height-diameter ratio (slenderness coefficient).
2. Site Conditions – soil conditions that may limit rooting (e.g., depth to water table), topographic features that may enhance or diminish wind-firmness, adjacent stand features and impacts on understorey wind firmness.

GROUND RULES

7.5.1 The FMP provides direction for avoidance protection.

7.5.2 Understorey avoidance shall be practiced on all landbases.

7.6 FISHERIES AND THE AQUATIC ENVIRONMENT

PURPOSE

To conduct timber operations in a manner that shall minimally affect:

- the health, diversity and natural distribution of aquatic biota;
- the quantity and productive capacity of the aquatic environment, including fish habitat; and
- fisheries management objectives identified in the FMP.

DISCUSSION

Current provincial and federal legislation require that the aquatic environment and fisheries resources in Alberta must be protected.

Timber operations can directly affect the aquatic environment and fish habitat in a number of ways. Tree removal in riparian areas and along stream banks can alter light intensity, nutrient supply, sediment inputs, water temperatures, stream bank stability and recruitment of large woody debris to the watercourse. Watercourse crossings, if not properly designed, can create physical barriers to the movement of fish and other aquatic biota along watercourses. Roads and ditches can intercept and transport sediments from the upland source to crossing sites where they are deposited in the watercourse. Upland timber harvesting can also affect watershed water yield and flow regimes. These effects can lead to changes in aquatic primary productivity, food-web pathways, aquatic species abundance and distribution, and channel morphology.

The primary strategy for maintenance and protection of the aquatic environment and fish habitat values is to maintain treed buffers along watercourses and water bodies and adopt rigorous watercourse crossing and erosion control measures. Alternate management proposals for riparian areas would be considered to support aquatic environment and fisheries management objectives in the area, where acceptable to Alberta.

Authorizations by Alberta do not imply authorization under federal legislation and requirements, notably the federal Fisheries Act. The proponent must seek advice and approvals of the federal agencies (Department of Fisheries and Oceans) regarding federal legislation requirements.

Additional ground rules for any work carried out in and around watercourses are found in section 11.4 – Watercourse Crossings.

GROUND RULES

- 7.6.1 All waterbodies and watercourses are presumed to be fish bearing or support fish-bearing habitat. However, the company can gather information related to the distribution of fish and fish habitat within the planning areas by:**
 - a) checking the Fisheries Management Information System (FMIS), Water Act Codes of Practice and fisheries inventory data;**
 - b) conducting new inventories; and**
 - c) consulting with the appropriate Area Fisheries Management Biologist.**

- 7.6.2 For any activity that disturbs or alters the bed and banks of a fish-bearing waterbody, an assessment of the potential effects on fish and fish habitat must be conducted by an individual with expertise in fisheries and aquatic assessment methods and habitat mitigation measures. For assessment requirements and methods, refer to Schedule 4 of the Code of Practice for Watercourse Crossings.**

- 7.6.3 As per VOIT 14 (FMP) there are additional considerations in watersheds where cold water fish species (Athabasca Rainbow Trout, Bull Trout and Arctic Grayling) have been identified and the ECA (Equivalent Clearcut Area) exceeds 30 to 35% (as identified in Fig 6-31 FMP). Harvesting has been deferred in the vast majority of these identified watersheds. Where harvesting is proposed in one of these higher risk watersheds, the following mitigation strategies may be considered at the operational level:**
 - a) careful consideration given when balancing additions with deletions and deferrals (SHS);**
 - b) incorporate watershed values when locating structure retention (as per 7.4);**
 - c) consider focusing retention requirements in proximity to ephemerals, intermittents, or other water source or collection areas; and**
 - d) utilizing LIDAR and wet area mapping.**

7.7 SPECIES OF SPECIAL MANAGEMENT CONCERN

PURPOSE

To conduct planning and timber operations in a manner that shall:

- Conserve and plan for an agreed upon level of effective habitat for species of special management concern including grizzly bear, trumpeter swan and others as determined by Alberta from time to time.
- Maintain the effective habitats for ungulates in river valley environments.

GROUND RULES

7.7.1 Access management within, Grizzly Bear, and Key Wildlife and Biodiversity Zones:

- 7.7.1.1 To the extent possible, all new access roads must follow existing disturbances, unless doing so will compromise options for subsequent access management or wildlife objectives (i.e., “traditional access” issues).**
- 7.7.1.2 Preference shall be given to development and use of winter (frozen ground) roads since this reduces negative impacts on wildlife, permits minimization of long-term infrastructure, and facilities reclamation.**
- 7.7.1.3 It is recognized that in some cases work will occur throughout the winter season to take advantage of frozen ground access. Frozen ground operations using frozen ground roads take precedent over early-in/early-out. Completing operations in ungulate habitat areas early in the winter season remains a management objective.**
- 7.7.1.4 As an alternative to winter (frozen ground) roads, summer roads may be developed and used, subject to the following:**
 - a) Road width and grade shall be minimized. Preferentially, summer roads shall be temporary “dry weather” routes, with use suspended when ground conditions are unfavourable.**
 - b) Summer harvesting areas shall preferentially be located outside of grizzly range as well as outside of ungulate habitat in river valleys, or as an alternative, in proximity to previously existing all-weather access roads to assist in reducing the need for new summer access routes. As an alternative, summer harvesting in more remote areas shall have hauling deferred to take advantage of frozen ground conditions.**

- 7.7.1.5 Except where identified and agreed upon within the FHP, only temporary access roads shall be used.**
- 7.7.1.6 Roads shall be built no sooner than one year prior to harvesting operations. Temporary roads shall be re-contoured and reclaimed (and potentially reforested) within 18 months of completion of harvesting and hauling operations, unless otherwise agreed to in the operating schedule.**
- 7.7.1.7 As agreed to between the company and Alberta, effective forms of public access control for highway vehicles shall be maintained. Control of highway vehicle use of any open temporary or permanent access route may be required. All “non-traditional” access routes that are open must have measures in place to prevent highway vehicle traffic. Options for access management on “traditional” routes must be considered during the CA or FHP. The need for options to manage off highway vehicle traffic must be considered in the CA or FHP. See section 11.5 for more detail on Access Management.**
- 7.7.1.8 Reclamation techniques used on access routes must strive to prevent highway vehicle use and attempt to limit off-highway vehicle use.**

Grizzly Bear

DISCUSSION

The SHS and FMP shall address the harvesting program that is agreed will create the desired future forest, taking into consideration the full range of values including habitat for species of special management concern.

Grizzly bears are classified as a “Threatened” species under the Alberta Wildlife Act and as a species of “Special Concern” under the national COSEWIC system. The Federal Species at Risk Act (SARA) shall apply to grizzly bears in Alberta. A provincial grizzly bear recovery process has been initiated which may have implications for timber harvest in Alberta.

Timber operations in grizzly bear range can affect grizzly bear populations directly or indirectly in three main ways: 1) altering natural and human caused bear mortality rates through the creation and maintenance of access routes 2) altering the amount, quality, and effectiveness of grizzly bear habitat, and 3) displacing and causing undue sensory disturbance to individual grizzly bears.

Landscape level planning is necessary to ensure the availability of effective habitat and managing mortality risk for grizzly bears. The indicators of suitable landscape conditions for grizzly bears are habitat effectiveness, security areas, road density and habitat connectivity. Specific strategies for landscape planning for grizzly bear shall be agreed upon in the FMP and at the FHP level.

It has been determined that access routes in key grizzly habitat have negative effects on grizzly bear populations through increased mortality rates, disturbance and displacement. These negative effects shall be managed by minimizing the amount, tenure and class of new access

roads, and by reviewing and acting upon management options (i.e., access management, reclamation strategies for existing routes, avoiding or minimizing access development in key grizzly bear habitat and by using grizzly bear habitat maps, as provided by the department in planning new access).

7.7.2 Grizzly Bear

The following ground rules are to be implemented in key grizzly bear habitat.

- 7.7.2.1 Companies shall minimize the amount of permanent roads in identified key grizzly bear zones.**
- 7.7.2.2 Where possible, summer roads and crossings should attempt to avoid riparian corridors.**
- 7.7.2.3 Roads, skid trails, landings and campsites shall be located where they avoid natural meadows and den locations.**
- 7.7.2.4 Known or discovered den sites shall be buffered from harvest area boundaries with a minimum of 100 m.**
- 7.7.2.5 Harvest areas exceeding 100ha shall use structure retention patches to assist as movement corridors through the harvest area and along the riparian areas.**
- 7.7.2.6 Retention areas should be used in harvest areas to provide hiding cover and connectivity to forest patches. Harvest area boundaries shall be based upon natural stand edges, breaks in topography, and other natural features.**
- 7.7.2.7 Harvesting of stands within the core grizzly bear area will be during frozen conditions where possible.**

Trumpeter Swan

DISCUSSION

The FMP shall describe the harvesting program that is agreed will create the desired future forest, taking into consideration the full range of values including habitat for species of special management concern.

Trumpeter swans are classified as a “Species of Special Concern” species under the Alberta Wildlife Act. The “Recommended Land Use Guidelines for Trumpeter Swan Habitat in Alberta” provides background, intent, and specific direction for managing industrial work near trumpeter swan breeding wetlands. Locations of breeding wetlands are found on provincial land use referral maps.

Trumpeter swans are sensitive to human disturbance, and human activity in breeding areas may decrease survival of eggs or cygnets. Trumpeter swans that are disturbed may not nest or may

abandon an existing nest. Therefore, the breeding population continues to be dependent on current management practices and habitat protection.

Timber harvest planning and operating ground rules must reflect the sensitive nature of this species. These operating rules serve three primary purposes:

- a) protection of the long-term integrity and productivity of trumpeter swan breeding habitat;
- b) avoidance of industrial disturbance to trumpeter swans during nesting and rearing of cygnets; and
- c) minimize the access created near swan lakes to reduce the potential for secondary disturbance of trumpeter swans from recreational use.

During the breeding season (April 1 to Sept. 30), low-level (<2000') aircraft flights may disturb trumpeter swans. Low-level aircraft flights are discouraged over identified trumpeter swan lakes or water bodies.

GROUND RULES

7.7.3 Trumpeter Swan

7.7.3.1 From April 1 to Sept. 30, there shall be no harvesting, hauling, road building or scarification activity within 800 m of the high water mark on identified trumpeter swan lakes or water bodies.

7.7.3.2 There shall be no timber harvesting within 200 m of the high water mark on identified Trumpeter Swan lakes or water bodies.

7.7.3.3 An area 200-500 m from the high water mark on identified trumpeter swan water bodies shall be managed in a manner that provides additional protection for the swans. Special measures shall be determined on a site-specific basis during the FHP. Special measures within this zone shall include site preparation that reduces the potential for future vehicular access, no aerial application of herbicides unless approved by Alberta, and attempts to limit maximum line of sight to 100 m. Attempts to retain sufficient structure to contribute to a “forested” habitat in this zone are encouraged. Techniques that limit line of sight and contribute to the treed buffer of the wetland are encouraged.

7.7.3.4 There shall be no development of long-term infrastructure (roads and camps) within 500 m of the high water mark on identified trumpeter swan water bodies. Only seasonal winter routes shall be permitted within the 500 m buffer.

Key Wildlife and Biodiversity Zone

DISCUSSION

The FMP shall describe the harvesting program that is agreed will create the desired future forest, taking into consideration the full range of values including habitat for species of special management concern.

For deer, elk and moose in Alberta, key winter range is often found, in river valleys. These landforms contain the topographic variation and site productivity conditions that provide winter foraging conditions in proximity to forest and topographic cover. Also, south-facing valley slopes have relatively lower snow accumulations and warmer bedding sites. The valley landform itself provides protection from high wind chills. Traditional, high use and high quality winter ranges have been identified and mapped (provincial land use referral maps) on the basis of several decades of winter aerial population surveys, supplemented by habitat assessments using aerial photo interpretation and ground surveys.

Key ungulate winter ranges play a disproportionately large role, given their localized size and distribution, in maintaining the overall productivity of regional ungulate populations. These ranges ensure that a significant proportion of the breeding population survives to the next year. Females not only have to survive, they have to be in good enough shape in the spring to provide a healthy new crop of young.

Habitat effectiveness, including maintenance of thermal cover, foraging areas and escape cover is important for ungulates. Timber operations within and adjacent to key wintering areas adds stress and increases energy drain for animals. They may be forced to move about unnecessarily and even relocate to less favourable habitat. This becomes an increasingly significant factor as winter progresses. Activities associated with timber harvest may also create temporary and permanent access that exposes animals to additional non-industrial disturbances, increased levels of harvest from licensed and non-licensed hunting, and to increased predator efficiency.

In the interest of maintaining productive ungulate populations, operating ground rules must reflect an understanding of the biology of these animals and the importance of their key winter ranges. These must serve two primary purposes:

- a. protection of the long term integrity and productivity of key ungulate winter ranges; and
- b. avoidance of direct and indirect sensory disturbance to animals that are using these winter ranges during the mid-to late-winter period.

Best Management Practices

7.7.4 Key Wildlife and Biodiversity Zone

7.7.4.1 The FMP and SHS shall provide direction on the location/adjacency of harvest areas and retention areas, and on rate of harvest.

7.7.4.2 The amount, tenure and class of new access roads shall be minimized and consistent with the land use objectives in regionally defined key wildlife zones (regional land use referral maps). Access development will strive to minimize new human infrastructure.

- 7.7.4.3 The alignment and standard of new long-term and permanent access roads must be identified and agreed upon within the FHP or GDP. New long-term and permanent access roads shall not be developed below the valley “breaks” of rivers, except in isolated cases for river crossings.
- 7.7.4.4 New permanent watercourse crossings shall be avoided.
- 7.7.4.5 Where possible all access roads shall avoid known key habitat features.
- 7.7.4.6 Use of existing access roads must be described in the FHP, with particular reference to public access management, any proposed road improvements and ongoing maintenance. Potential opportunities for partial or complete route closure and/or reclamation following planned harvesting and silviculture shall be discussed.
- 7.7.4.7 Unless otherwise agreed to by Alberta, timber operations should be conducted outside of the period January 15 to April 30. Operations that are approved in an AOP are not subject to this timing restriction.
- 7.7.4.8 Stand tending activities shall only remove competing deciduous vegetative growth that interferes with RSA (Reforestation Standard of Alberta) standards. The intent is to maintain browse availability.

Other Species

DISCUSSION

Additional habitats of selected wildlife species require maintenance of undisturbed habitats, e.g. breeding or denning locations. These species require specific sites in order to complete all or part of their life cycles.

7.7.5 Other Species

7.7.5.1 Sensitive sites listed in 7.7.5.2 shall be protected by retention of an undisturbed buffer (or other management technique) from the edge of the opening associated with these sites, or from the centre of sites without openings. Both Alberta and the forest operator shall make a reasonable effort to identify sensitive sites in the FHP. Sites discovered in the field shall receive the same buffer as those sites previously identified in planning. Buffer widths and duration shall be agreed to in the FHP.

7.7.5.2 In the event that site-specific buffers or other management techniques are not agreed to in the FMP and FHP, the following buffer widths shall apply. In the event that a sensitive site not previously identified during layout and is found during harvest activities, it shall be identified on the block status report and buffered as appropriate and feasible.

<u>Sensitive Site</u>	<u>Width of Forested Buffer</u>
Breeding Sites and Hibernacula of Species at Risk Salamanders, Amphibians and Reptiles	100 m
Bat Hibernacula	100 m
Colonial Bird Nesting Area	100 m
Sandhill Crane Nesting Area	100 m
Wolverine Den	100 m
Mineral Licks	100 m
Raptor Nest Tree	100 m
Black Bear Den	30 m
Natural Springs and Beaver Ponds with no outflow channel	20 m-vegetated

8.0 SILVICULTURE

PURPOSE

To plan and implement silviculture practices that result in reforested stands that meet approved regeneration standards.

DISCUSSION

A reforestation program is required by Alberta under TMR 143.1. The reforestation program is a component of the Annual Operating Plan and contains reforestation prescriptions by strata, and a schedule of treatments for the upcoming year. The proposed reforestation program provides a link between reforestation operations and the FMP. The reforestation program must be based on the most current knowledge of treatments (by strata) which lead to reforestation success in terms of reforestation standards. Reforestation prescriptions are a critical point in the sustainable forest management planning system where growth and yield strata targets from the FMP are delivered through well-planned silviculture treatments. Knowledge of how sites respond to different treatments result in better treatments, and greater probability of success in meeting growth and yield strata targets, for height, stocking, density and ultimately, strata volumes.

An acceptable silviculture process includes:

- site assessment (pre or post-harvest);
- a prescription table or 'matrix' of silviculture treatments or tactics for specific strata;
- regeneration standards based on yield curve strata targets;
- an annual treatment schedule of activities;
- an assessment/survey system, and feedback mechanisms to ensure regeneration data is used to refine the prescription matrix and, in conjunction with all data sources (including permanent sample plot information), the regeneration standards and post-harvest growth and yield assumptions.

8.1 PLANNING

GROUND RULES

- 8.1.1 The conditions outlined by Alberta must be met prior to planning reforestation of balsam fir or alpine fir as an acceptable species (see Directive 2001-01 or successors).**
- 8.1.2 Harvest layouts bordering previously harvested areas shall avoid damaging regeneration.**
- 8.1.3 Reforestation timelines prescribed by Alberta shall begin at the start of the timber year following the end of the timber year when the harvest area has**

received skid clearance from Alberta, or from a company representative pursuant to a self-inspection agreement between the company and Alberta.

- 8.1.4 Reforestation prescriptions shall be based on site assessments (pre or post-harvest) that include considerations specific to the site (e.g., Ecosite field guide for Alberta).
- 8.1.5 The Alberta Forest Genetics Resource Management Standards (FGRMS) shall be adhered to in all silviculture planning and operations. The standards specify rules for seed and vegetative material collection, registration, storage, handling, and testing for improved stock.

8.2 REFORESTATION PROGRAM

- 8.2.1 The reforestation program, which is part of the AOP, shall be submitted:
 - a) before March 1, for silviculture operations commencing between May 1 and October 31, or
 - b) before September 1, for silviculture operations commencing between November 1 and April 30; or
 - c) as otherwise specified in an FMA, or at a time agreed to by Alberta.
- 8.2.2 Harvest areas (openings) shall be clearly identified (e.g. maps, spatial files, or delineation on the ground through visual markings).
- 8.2.3 The reforestation program shall include the following components and information:
 - a) silviculture prescription;
 - b) proposed silviculture treatment schedule;
 - c) maps as requested by Alberta; and
 - d) proposed blocks for declaration in lieu of survey and re-treatment.

a) Silviculture Prescription

The Forest Management Plan contains a Silviculture Strategy Table (SST) for prescriptions specific to different forest stratum. Variances to the approved strategy in the FMP are identified in the Reforestation Schedule.

Proposals for herbicide application shall be submitted for approval in accordance with approved vegetation management strategies and Alberta requirements. (See Herbicide Reference Manual). Herbicide proposals are a component of the reforestation program in the AOP, but may be submitted separately from the AOP.

b) Proposed Silviculture Treatment Schedule

The Silviculture Treatment Schedule shall contain the following information:

- opening number;
- a list of harvest areas and the estimated area (ha) to be treated; and
- the reforestation strata standard for each harvest area (see below for more detail).

The following proposed reforestation activities for each harvest area (or stand) shall be listed:

- I. Site Preparation – mechanical or chemical treatment
- II. Planting – primary species, density range, and notification if outside approved seed zone
- III. Deployment of stream 1 seed
- IV. Seeding – species and notification if outside approved seed zone
- V. Leave for Natural –
- VI. Manual Tending – type (cleaning vs spacing or combination)
- VII. Fertilization – type of fertilizer
- VIII. Herbicide/Insecticide application – type of chemical and method (ground vs. aerial) and target species for insecticide
- IX. Regeneration Surveys – establishment and performance
- X. Cone/cuttings Collection – (if unknown, Alberta shall be notified regarding collections as per the 'Standards for Tree Improvement in Alberta')
- XI. Let it grow as a retreatment strategy.

Should the proposed reforestation activities for a harvest area change after Reforestation Schedule (AOP) approval, the following items require a minor amendment (as defined in 3.5.6.1):

- completing establishment or non-legislated surveys in openings not listed in the approved AOP;

Should the proposed reforestation activities for a harvest area change after AOP approval, the following requires a major amendment to the AOP:

- changing to a treatment not approved in the silviculture strategy table for the specific strata.

All approved changes require notification to Alberta through Alberta Regeneration Information System (ARIS) reporting.

Note that proposals to deploy seed or vegetative material outside the seed zone or breeding region require prior approval of the Provincial Seed Officer at the Alberta Tree Improvement and Seed Centre.

Sample Silviculture Treatment Schedule

Opening Number (ARIS)	Harvest Area (ha)	Preliminary Strata Declaration	Activity	Activity Area (ha)	Comment
5051002412A	10	C	Mounding	4	

c) Map

As part of the reforestation program, a map may be requested (at Alberta's discretion, the FHP map may be used) that identifies:

- I. all harvest areas to be treated;
- II. all road and stream crossings to be constructed or used.

d) A listing of harvest areas where a declaration is proposed in lieu of a survey for areas not likely to meet regeneration standards (per TM Reg 141.61(1) and harvest areas where re-treatment is proposed (per TM Reg 141.6(2.))

- I. blocks where 'let it grow' is the retreatment strategy will require survey information supporting re-treatment rationale;
- II. may be submitted for review and approval at any time throughout the year for approval to ensure timeliness of treatments.

See Section 12.0 REPORTING for reforestation activity reporting requirements.

8.3 SILVICULTURE OPERATIONS

- 8.3.1** Site preparation and other silviculture activities must follow the same AOP conditions and ground rule standards that apply to timber operations (i.e., stream crossing requirements, watercourse buffers, and tree/understorey retention).
- 8.3.2** Herbicide, pesticide and fungicide use shall be performed in accordance with Alberta requirements.
- 8.3.3** Site preparation equipment shall be cleaned and free of noxious and prohibited noxious weed seed or plant parts before entry into the working area or before mobilizing between projects according to Alberta requirements.
- 8.3.4** Planting boxes shall be removed to an appropriate disposal facility if ground access exists or the block does not contain any debris piles. If ground access does not exist, boxes may be securely placed within existing debris piles for disposal by burning. All plastic shall be removed from boxes and disposed of at an approved waste disposal site prior to burning.
- 8.3.5** Site preparation creating linear disturbance patterns shall be oriented to minimize channelling of water downslope and to ensure sediment is not directly entering watercourses.

9.0 SOILS

PURPOSE

To conduct timber harvest, road construction, reforestation and reclamation operations in a way that shall:

- Minimize the potential for soil erosion
- Prevent soil, logging debris and deleterious substances from entering watercourses
- Ensure that the capability of the site to support healthy forest tree growth is maintained.

DISCUSSION

Minimizing soil displacement, compaction and rutting/puddling during road construction, harvesting, and silviculture operations is a primary concern. Soils are most at risk of compaction and rutting/puddling when the soil is moist or wet, with the more poorly drained soils remaining wetter longer. The soils are equally at risk in the winter months if they are wet and the soil has not frozen, which is a common occurrence. Rehabilitation of compacted soil in harvest areas (off road) is seldom an option because they are generally wet and additional machine traffic will often cause more soil damage. Therefore, protection of soil is best achieved in choice of equipment, staff training and advanced planning of operations. In terms of advanced planning, it is recommended that a pre-harvest site assessment include the evaluation of soil drainage class across the harvest area delineating sensitive areas with imperfectly and poorly drained soils. Management of field operations shall involve operating on soils when they are as dry as possible. The weather and percentage of sensitive areas in the harvest area shall be taken into account when scheduling areas for harvesting. Following a long dry period in summer, the sensitive sites shall be scheduled accordingly.

GROUND RULES

- 9.1 Areas susceptible to rutting, puddling or compaction shall be avoided when planning decks, landings and skidding patterns.**
 - 9.1.1 Areas susceptible to rutting, puddling or compaction shall be harvested during dry or frozen conditions (when soil condition is not susceptible to degradation e.g. blocks with predominantly imperfectly-poorly drained soils, soils exceeding field capacity).**
- 9.2 Operations shall not occur during heavy rainfall or when soil conditions are above field capacity (saturated).**
- 9.3 Minimize the machine traffic on sensitive areas, depending on soil susceptibility to disturbance according to the results of a hand test (see figure 2).**

- 9.4 Operations shall cease when instances of multiple ruts in a limited area are created that are clearly related to operations during unfavourable ground conditions.**

Note: Areas with single ruts or a limited number of short ruts can be indicative of an operator becoming aware of unfavorable conditions and making the decision to cease operations.

- 9.5 During road construction, erosion and soil disturbance shall be limited. Effort shall be made to retain organic matter for reclamation**

Change in soil moisture and susceptibility to compaction and rutting following rainfall

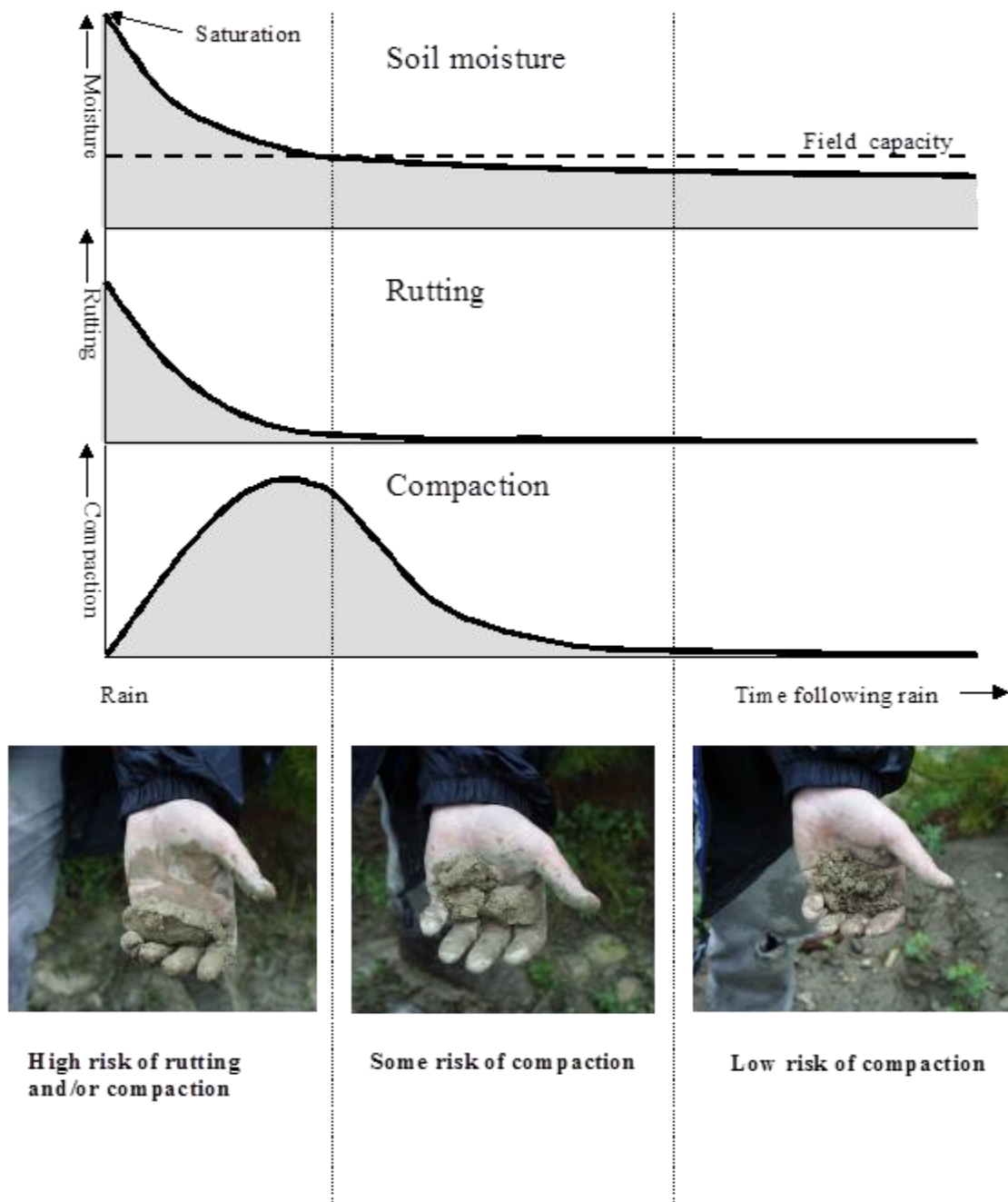


Figure 2. Soil Compaction Risk

Courtesy of Andrei Startsev, Alberta Research Council

10.0 FOREST HEALTH/PROTECTION

10.1 INSECT AND DISEASE

PURPOSE

To minimize the risk of occurrence, and spread of insects and disease, which have the potential to impact forest management objectives.

To prioritize the salvage of timber damaged by insects and disease.

DISCUSSION

The impact of certain insects and diseases shall be addressed when planning harvesting, silviculture operations, and surveys. Several biotic and abiotic forest health agents affect the growth and survival of trees. Each agent poses a threat to the forest. Priority for management shall be given to those agents that have the greatest impact or could potentially cause the most damage by:

- a) increasing the wildfire hazard;
- b) reduction or loss of merchantable volume; and
- c) detracting from landscape aesthetics.

GROUND RULES

10.1.1 Harvest plans and operations shall be prioritized in stands with insect and disease issues. Variance from the SHS to address insect or disease issues may be acceptable if approved by Alberta. Infected and infested stands shall be ranked based on the type and intensity of insect and disease present, or the presence of dead trees. Stands or trees shall be ranked for treatment or harvest as follows:

Rank 1: Stands or trees with the presence of mountain pine beetles or spruce beetles.

Rank 2: Stands with a significant number of dead or dying trees resulting from fire, insects or disease, and windthrow.

Rank 3: Stands infected with mistletoe, spruce budworm, forest tent caterpillar, root disease (Tomentosis, Armillaria) or jack pine budworm.

Rank 4: Stands infected with needle cast, Western gall rust, root collar weevils, Atropellis or other miscellaneous forest health agents.

10.1.2 Management tactics are based on the Forest Protection ranking as follows:

Rank 1 stands or trees: Control Measures must be undertaken before adult beetles take flight, either through harvest or single tree treatment. Alberta and forest operators shall work co-operatively to prevent spread through aggressive action.

Rank 2 stands: Shall be addressed through salvage planning process (see section 3.6, Salvage Planning). Highly unpredictable spread therefore, salvage planning is initiated.

Rank 3 stands: To manage dwarf mistletoe operators shall:

- create a 20 m wide mistletoe-free zone adjacent to the harvest area;
- create a 20 m wide non-host buffer beside the harvest area perimeter; or
- reforest the harvest area to a non-host species.

Rank 4 stands: Generally, no control is required for mature stands. Regenerated stands affected by Western gall rust or root collar weevils may require site treatments. Contact Alberta.

10.1.3 Insect and disease assessment information shall be utilized in the CA. Where a CA is not required, the assessment information will be used to develop the GDP. Where new infestations are found, or for known infestations already sequenced through the SHS, they shall be addressed in the FHP.

10.1.4 Where dues relief is requested, mistletoe infected stands must be surveyed using an acceptable rating system (e.g. Hawksworth system).

10.2 WEED MANAGEMENT

PURPOSE

To minimize the impact of non-native, prohibited noxious, and noxious weeds, in the Green Area.

DISCUSSION

The invasion of prohibited noxious and noxious weeds in the forested area of Alberta negatively affects the integrity of the ecosystem. The invasive weeds alter natural processes and displace organisms that naturally occur in the area.

Under Alberta statutes, the occupant (or owner if there is no occupant) must destroy all prohibited noxious weeds, control all noxious weeds and prevent the spread or scattering of nuisance seeds.

GROUND RULES

10.2.1 Forest operators shall follow Alberta's requirements (Directive 2001-06) for weed management in forestry operations.

11.0 ROADS

11.1 ROAD CLASSIFICATION

PURPOSE

To define a road classification system that provides guidelines to all forest operators and potentially all resource users in the Ground Rule Zones.

DISCUSSION

As roads are one of the most significant components of forest harvesting operations, forest operators along with Alberta shall co-ordinate and integrate road planning and construction plans with other resource operators. This classification system will provide consistent working guidelines to be used in planning and operations to facilitate integration. It is important to identify not only construction schedules but closure and reclamation timelines as well. Long term planning of access roads is a significant tactic to address landscape access issues.

GROUND RULES

- 11.1.1 The operator shall utilize the classification system described in Table 5 during planning and operations.**
- 11.1.2 All roads, regardless of class, with a lifespan of greater than three years from the start of construction shall be built under the authority of a DLO.**

Table 5. Road Classification and Design

Road Description and Tenure	Planning Requirements	Layout ¹	Design and Construction Descriptions ¹		Borrow Pits ¹	Timber Salvage ¹	Debris ¹	Erosion Control ¹
			Right of Way					
			Clearing Width	Road Surface Width				
Class I Primary Permanent All Weather 20+ Years	Identified in higher-order plans, i.e. long term access plans. Phased planning approach shall be followed. DLO required. Detailed design plan (see “guidelines”).	Centre line marked. Side ribbons required.	30-40 m With Alberta approval, variable widths may be required for cut and fill situations	8 – 12 m	Location identified prior to construction environmental field report (EFR) or as per submitted temporary field authority (TFA).	As per TMR and EFR under DLO.	Total disposal. Stripping and fine debris to be retained for erosion control by spreading on cuts and fills and any other critical area.	Progressive reclamation concurrent with construction. Cross drains and ditch blocks dictated by slope and soil conditions. Drainage water to be diverted off the ROW in as short a distance as possible.
Class II Secondary Permanent All Weather or Dry Weather 5 – 20 + years	Identified in higher-order plans, i.e. long term access plans. DLO required. Detailed design plan: through route selection process a need for detail shall be assessed, i.e. need for cross-sectional profiles based on sensitive area identification.	Centre line marked. Side ribbons may be required for DLO roads and sensitive sites.	20 – 30 m	5 – 10 m	Location identified prior to construction (EFR) or as per submitted TFA.	As per TMR and EFR under DLO.	Total disposal. Stripping and fine debris to be retained for erosion control by spreading on cuts and fills and any other critical area.	Progressive reclamation concurrent with construction. Cross drains and ditch blocks dictated by slope and soil conditions. Drainage water to be diverted off the ROW in as short a distance as possible.

Road Description and Tenure	Planning Requirements	Layout ¹	Design and Construction Descriptions ¹		Borrow Pits ¹	Timber Salvage ¹	Debris ¹	Erosion Control ¹
			Right of Way					
			Clearing Width	Road Surface Width				
Class III Tertiary Permanent Winter or Dry Weather Up to 20 Years	Phased planning approach must be followed if road is to be used for more than three years. DLO Required if > than 3 years.	Centre line marked. Side ribbons may be required for DLO roads and sensitive sites.	7 – 20 m	5-10 m	Location identified prior to construction (EFR) or as per submitted TFA.	As per TM Regulations and EFR under DLO.	Total disposal. Stripping and fine debris to be retained for erosion control by spreading on cuts and fills and any other critical area.	Progressive reclamation concurrent with construction. Cross drains and ditch blocks dictated by slope and soil conditions. Drainage water to be diverted off the ROW in as short a distance as possible.
Class IV Temporary Winter or Dry Conditions Up to three years	Details to be addressed in development plans. Approved under the cover of an AOP.	Centre line marked. As-built inside harvest area road locations submitted annually through air photo updates. Harvest area access roads mapped.	7 - 20 m	5 – 10 m	Location identified prior to construction or as per submitted TFA.	As per FHP.	Partial disposal. Mechanical or manual cutting of slash and debris to reduce fire hazard to acceptable levels.	Progressive reclamation concurrent with construction. Cross drains and ditch blocks dictated by slope and soil conditions. Drainage water to be diverted off the ROW in as short a distance as possible.

¹For Department License of Occupation (DLO) roads, actual requirements may be different in approved Disposition document

11.2 ROAD PLANNING AND DESIGN

PURPOSE

To plan the construction, maintenance, and reclamation of roads.

DISCUSSION

The impacts of permanent roads on the values associated with the forested landscape shall be recognized as long-term. It is therefore important that the initial placement of roads be carefully examined. Resource values shall be assessed during the process in order to best mitigate impacts or enhance benefits associated with those values.

The submission of road plans will assist Alberta to facilitate the integration of access management among all resource users (e.g., oil and gas industry). Road plans shall forecast corridor development linking all compartments and other industrial developments.

Safety needs to be addressed throughout the road planning process.

GROUND RULES

11.2.1 Long-Term Roads (Class I, II, III)

Road Planning

11.2.1.1 Forest operators shall annually submit a road corridor plan and construction schedule in the GDP. Proposed variances from the FMP long-term corridor plan require Alberta's approval. The minimum scope of the road construction schedule shall be a five-year forecast with the content requirements being:

Map showing:

- existing forest operator roads by class;
- other existing roads if the digital information is available;
- proposed forest operator corridors, including corridors approved in the FMP;
- access control points – See section 11.5 Access Control.

Tables describing proposed road targets, current status and completed activities (examples below).

Proposed Road Schedule

Comp./ Ops. Area	Road Identifier	Phase 1 Submission	Phase 1 Approval	Phase 2 Submission	Phase 2 Approval	Phase 3 Construction	Tenure
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Current Road Status

Comp./ Ops. Area	DLO Number	Road Class	Status	Length	Crossings	Access Control	Tenure
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Completed Road Activity (for previous year)

Comp./ Ops. Area	DLO Number	Activity	Date	Comments
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11.2.2 Temporary Roads: Class III and Class IV (with lifespans up to three years from start of construction).

11.2.2.1 These roads shall be built as per the approved AOP and reclamation shall be done within three years of construction. Only roads with FHP approvals shall be included in the AOP submission.

11.3 ROAD CONSTRUCTION, MAINTENANCE, AND RECLAMATION

PURPOSE

The roads shall be constructed, maintained and reclaimed in a timely manner to minimize environmental impacts.

GROUND RULES

11.3.1 General

- 11.3.1.1 Existing access (e.g., seismic lines, trails, and existing roads) shall be used as a priority wherever practical and feasible.
- 11.3.1.2 Road ROWs shall be cleared according to standards established in Table 5, road comments, and any additional conditions approved in the FHP.
- 11.3.1.3 Roads and landings shall be constructed to avoid unstable soils, water source areas, springs and seepage areas;
- 11.3.1.4 Temporary road construction activities that are required outside an approved ROW can be considered incidental to construction and will be approved as part of the AOP provided the following is met:
 - a) Be immediately adjacent to AOP approved disposition (temporary road and associated ROW only);
 - b) Be reclaimed or reforested in the same fashion as the adjacent AOP approved disposition (if applicable);
 - c) Be without conflict of existing dispositions and/or adjacent land uses; and
 - d) Be an activity type and within the parameters as described below:
 - Log Decks or Decking Areas:
 - i. ≤ 0.18 hectares in size;
 - ii. Located on average ≥ 400 metres apart
 - Bank Stabilization:

- i. Related to hill cuts impacted during construction;
- Push Outs:
 - i. ≤0.04 hectares in size;
 - ii. Located on average ≥800 metres apart. Where this distance is not feasible due to operational constraints, line of sight between push outs should be minimized.

11.3.2 Construction

- 11.3.2.1 Roads, skid trails and landings shall be placed in locations and constructed so that soil erosion, damage to streambeds and sedimentation of watercourses are minimized.
- 11.3.2.2 On those parts of the ROW not used for grade construction, disturbance to the duff and organic soil shall be minimized to reduce damage to the roots of bordering trees and to provide a protective soil cover.
- 11.3.2.3 With Alberta's approval, trees with root systems seriously damaged by road construction activities shall be removed from the edge of a road cut.
- 11.3.2.4 The fill required for road construction shall be taken from the ROW when feasible.
- 11.3.2.5 All borrow pits required off the ROW must be authorized with an appropriate land use disposition before they are developed.
- 11.3.2.6 All sand and gravel pits off the ROW must be authorized under an appropriate disposition.
- 11.3.2.7 Removal of sand and gravel from within the channel or floodplain of any watercourse is prohibited.

11.3.3 Erosion Control/Prevention

- 11.3.3.1 Erosion control shall be implemented as per Table 5.
- 11.3.3.2 Initial erosion control measures shall be concurrent with grade construction. Preferably, no more than a two kilometre length of bared surface shall be developed between the time the sub-grade is constructed and the completion of erosion control activities.

- 11.3.3.3** Constructed roads require erosion control and stabilization of disturbed soils.
- 11.3.3.4** Ditches shall be constructed to the same gradient as the road and shall be deep enough to drain the sub-grade, unless limited by topography. Ditch backslopes shall have a regular profile from the top of the cut to the bottom with no hanging banks or vertical cuts.
- 11.3.3.5** Water from roads, ditches and bared soil surfaces shall not be permitted to drain directly into watercourses. Where vegetated buffers alone do not retard water and sediment movement effectively, appropriate obstructions (e.g. logs, rocks, mounds) or sediment control structures shall be installed to dissipate the flow of water and capture sediment prior to entering the watercourse.
- 11.3.3.6** Cross-drainage culverts and other drainage devices shall be installed as road sub-grade construction progresses. Cross-drainage structures shall:
- a) reduce water movement along ditches;
 - b) divert water from the ROW into the surrounding vegetation directly as possible;
 - c) provide cross movement for water from seeps and springs; and
 - d) be installed with adequate spillways or downspouts where they drain onto unstable or bare soil.
- 11.3.3.7** Re-vegetation shall be completed concurrent with operations or as soon as soil conditions permit. Existing ditch vegetation shall be protected during road maintenance wherever possible and re-established where necessary.
- 11.3.3.8** A portion of the debris from clearing, and strippings from road and landing construction shall be retained and used for re-vegetation and erosion control on disturbed areas.

11.3.4 Reclamation

- 11.3.4.1** Roads not under DLO that are no longer required shall be reclaimed, have crossings removed, and their condition monitored until they are considered satisfactorily stabilized.
- 11.3.4.2** Certified weed free seed (native) shall be used when seeding is used for reclamation.

- 11.3.4.3 Roads under DLO that are no longer required shall be reclaimed, and require a Letter of Clearance (DLO process).
- 11.3.4.4 All borrow and gravel pits no longer required must be reclaimed (re-contoured to stable slopes and re-vegetated) and require a Reclamation Certificate unless approval has been given to allow water to fill the pit for wildlife or wildfire purposes (DLO process).

Seasonal Deactivation (Partial Reclamation)

- 11.3.4.5 Certain roads that are not used continuously throughout the year may require intermediate erosion control measures such as:
- a) shallow surface cross ditches based on slope and soil type;
 - b) re-established drainage;
 - c) slope stabilization;
 - d) rut-free driving surface establishment;
 - e) access control measures.

Partial Reclamation

- 11.3.4.6 Roads that are not immediately required but necessary for future operations shall be reclaimed to the following standards unless otherwise approved in the AOP:
- a) watercourse crossing and drainage structures that have a high risk of erosion or failure are removed, and stream banks and approaches reclaimed;
 - b) all potentially erodible slopes are stabilized through rollback, seeded to approved vegetation species, and cross-ditched to disperse runoff and suspended sediment into undisturbed areas;
 - c) access closure structures are installed where required.

Total Reclamation

- 11.3.4.7 Roads and associated bared areas that are no longer required, shall be permanently reclaimed by completing all of the following:

- a) decompacting and returning them to an acceptable landform; decompaction is required when hauling is done during non-frozen conditions.
- b) removing all watercourse crossing and drainage structures and reclaiming stream banks and approaches;
- c) cross-ditching, rolling back topsoil (including slash and logging debris) and re-vegetating erodible bared surface areas;
- d) reforesting disturbed areas inside harvest areas;
- e) reclaiming and planting inter block roads where;
 - the roads are not required for future access,
 - where the road has been developed through a reforested cutblock, or
 - an existing access that has been widened to facilitate access (planting of widened area only).
 - Planting shall be to a density to support future stand growth.
 - Planting is not required where the road passes through non-productive stands or where natural regeneration is expected to provide satisfactory stocking;
- f) establishing access closures where required;
- g) with Alberta's approval road reclamation may occur in a manner that permits all terrain vehicle (ATV) or snowmobile access considering the following:
 - reforestation plans and/or further management requirements,
 - wildlife concerns,
 - fire control requirements,
 - erosion potential,
 - trapper or other user needs,
 - aesthetic concerns,
 - recreation requirements,
 - grazing concerns.

11.4 WATERCOURSE CROSSINGS

PURPOSE

To provide guidance so that crossings are constructed, maintained and reclaimed in a manner that ensures negative environmental impacts are minimized and fish and fish habitat are protected.

DISCUSSION

It is important to implement watercourse crossings of acceptable standards to meet the needs of all users. Of primary importance is protection of the aquatic environment. It is intended that water quality, fish passage, bank stability and aquatic fauna habitat are not compromised during watercourse crossing construction, maintenance and reclamation.

The planning of watercourse crossings must consider tenure, user integration, timing constraints, existing plans and assessments, and pertinent policy and legislation. Watercourse crossings shall be designed, installed, maintained and deactivated in accordance with all applicable policy and legislation. See Section 7.6.3 for additional information on the implications of the Federal *Fisheries Act*.

GROUND RULES

11.4.1 The company shall require approval for any crossing structure not listed in Table 6 for the appropriate watercourse type.

11.4.1.1 Notification of crossing type to Alberta is required on the first block status report after installation or as otherwise agreed to by Alberta.

11.4.1.2 Any change within a category only requires notification to Alberta.

Table 6. Acceptable Crossing Structures

Stream Classification	Acceptable Structure	
	Non-Frozen	Frozen
Ephemeral	Temporary Machine Crossing Logfill/Modified Logfill Culvert Bridge	Temporary Machine Crossing Logfill/Modified Logfill Snow Fill Culvert Bridge
Intermittent	*Temporary Machine Crossing *Logfill *Modified Logfill Culvert Bridge	Temporary Machine Crossing Logfill Modified Logfill Snowfill Culvert Bridge
Small Permanent	Culvert Bridge	Modified Logfill Snowfill Culvert Bridge
Large Permanent	Bridge	Bridge

*Flow is not impeded.

* Logfills, modified logfills and temporary machine crossings will only be installed when no flow is present in the channel.

- Modified logfill can be used on streams less than 1.5 m wide. It consists of an appropriately sized pipe supported by logs and constructed as defined in 11.4.21.
- “Bridge” includes native timber bridges, engineered bridges and ice bridges.

11.4.2 Intermittent and higher-order streams shall be classified in the FHP.

11.4.3 Proposed watercourse crossing locations shall be identified in the FHP as per 3.4.7 (f) and (h).

11.4.4 Unless otherwise approved, watercourse crossings shall:

- prevent erosion and sedimentation;
- have stable approaches;
- be at right angles to the watercourse;
- be at locations where the channels are well defined, unobstructed and straight;

- e) be at a narrow point along the watercourse;
- f) allow room for direct gentle approaches;
- g) have no direct ditch drainage;
- h) shall have erosion control structures during construction;
- i) shall maintain fish passage if applicable.

11.4.5 Watercourse crossings shall accommodate peak stream flows at the following levels as measured using a method acceptable to Alberta:

- a) long-term roads (Class I – III) – shall be designed for a minimum of 1: 50 year flood levels; and
- b) temporary roads (Class IV) – shall be constructed such that the crossing is at or above the high water mark, will allow water flow and meet the minimum requirements of an adequately designed crossing as per section 11.4.

11.4.6 On approaches to watercourse crossings, the organic soil layer and lesser vegetation shall not be stripped from portions of the ROW not needed for the road grade.

11.4.7 Any in-stream activities shall be scheduled to avoid migration, spawning and incubation periods of migratory or resident fish species (restricted activity periods). Mitigative measures approved by Alberta may allow for deviations from the in-stream timing constraints.

11.4.8 Fish passage for migratory or resident species must be maintained at all watercourse crossings on fish-bearing waterbodies.

11.4.9 The flow of the watercourse must be maintained at all times when carrying out in-stream activities, unless otherwise approved under the Water Act.

11.4.10 Measures must be implemented to minimize the duration and amount of disturbance of the bed and banks of the watercourse or waterbody. Where damage to the bed and banks of a watercourse occur, appropriate measures to restore the bed and banks must be undertaken.

11.4.11 During timber operations measures must be implemented to prevent the deposition of soil, logging debris or other deleterious substances and materials that are toxic, or an immediate threat to fish and other aquatic organisms into any watercourse. Any such substances or materials

unavoidably deposited in a watercourse must be removed immediately and reported to Alberta.

11.4.12 Measures must be implemented to prevent the transfer of biota that are not indigenous to the environment at the watercourse-crossing site.

11.4.13 Stream crossings shall be kept free of accumulated debris. Culverts plugged with ice shall be reopened to prevent flooding during spring thaw.

11.4.14 Interim erosion control measures (e.g., silt fences, or matting, gravel check dams) must be implemented and maintained until permanent vegetation and erosion control measures are established where necessary.

11.4.15 Stream crossings that fail shall be reclaimed or replaced (if necessary) with more appropriate crossing structures as soon as possible.

11.4.16 Bridge abutments shall not constrict the normal stream channel. Where stream banks must be built up to construct a bridge abutment, soil shall be brought in and deposited from the end of the grade – no equipment shall enter the stream channel. Bridge spans must extend beyond stream banks and abutment walls.

11.4.17 The use of bridges is preferred on fish-bearing streams; however, culverts may be permitted where they will not restrict upstream passage of fish.

11.4.18 Culverts for all classes of streams must be properly sized and installed to prevent erosion at both the inflow and outflow ends of the structure. Culverts shall be of sufficient length beyond the fill with the overburden properly backsloped and stabilized to prevent sediment from entering the watercourse, and the ends of the culvert open at all times. Any culvert that becomes a hanging culvert must be correctly re-installed as soon as possible.

11.4.19 Properly constructed logfills (see 11.4.21 below) on temporary roads may be used to cross ephemerals, and to cross intermittent watercourses during dry or frozen periods. Logfills shall be removed so that no soil is allowed into the water channel.

11.4.19.1 On intermittent watercourses, logfills shall be removed before the spring runoff. Modified logfills may be left in place for continued operations provided that damming of water does not occur.

11.4.19.2 A logfill or modified logfill may be left in an ephemeral for a maximum of two years after the reforestation clock has started, as long as it is tracked as per 11.4.26. A bottom layer of logs may

be left in place when removing the logfill to provide for summer crossing of ephemerals.

11.4.20 Crossing intermittent or ephemeral watercourses within harvest areas shall be avoided when possible. When the crossings are necessary, they shall be constructed at specified locations using appropriate watercourse crossing structures. If temporary machine crossings are used, they are done in accordance with 11.4.20.1.

11.4.20.1 A properly constructed temporary machine crossing avoids disturbance to watercourse channels, minimizes bank disturbance, does not impede natural water flow, prevents deposition of debris, soil and slash and includes the following:

- a) Crossing is not associated with or on a road;**
- b) Tree stems or logs are placed parallel to the channel no closer than the thickness of the stem used;**
- c) Width of crossing does not exceed 1.5 times the width of the machine using the crossing; and**
- d) Provisions for removal are in place that do not disturb the banks or introduce sediment to the watercourse.**

11.4.21 A properly constructed logfill has all of the following:

- a) enough logs to adequately fill an ephemeral draw or watercourse channel so that when the logs are removed there is little or no damage to the banks or channel bottom;**
- b) logs delimbed and bucked to at least 1.5 m longer than the grade fill at each end;**
- c) logs covered by a layer of suitable material that separates the soil from the logs, which shall permit total removal of the soil cap;**
- d) provisions have been made to allow for easy removal, that does not disturb the banks or watercourse.**

11.4.22 In fish-bearing watercourses, any negative impacts on the stability and fish habitat values of stream banks must be minimized. Any damage to streambanks and the corrective measures taken by the company shall be reported to Alberta within 7 days of the occurrence.

11.4.23 A native timber bridge may be used on watercourses as per Table 5 provided that all of these requirements are met:

- a) bridge abutments do not restrict stream channel;
- b) a brow log is installed on both sides of the bridge deck to prevent soil from entering the stream;
- c) no equipment enters the stream channel;
- d) timber of suitable size and strength is available for construction;
- e) the span extends beyond stream bank and abutment walls;
- f) a separation layer is used between soil cap and timber;
- g) the soil cap and separation layer is removed as soon as harvest, hauling and silviculture are complete;
- h) the remainder of the structure is removed as soon as harvest, hauling, and reclamation operations are completed unless a proposal to leave crossing structures in place after hauling is approved by Alberta and an acceptable monitoring program is in place.

11.4.24 Snow-fills may be used on watercourses as per Table 5 during frozen conditions provided that all of the following requirements are met:

- a) sufficient snow exists to fill creek channel;
- b) any soil cap installed over the snow is removed prior to break-up;
- c) measures are in place to prevent soil or other debris from entering stream channel or ice surface;
- d) suitable measures are taken during deactivation to ensure flow is not impeded.

11.4.25 Ice bridges may be used during frozen conditions provided that all of the following requirements are met:

- a) no capping material is used on the bridge;
- b) winter stream flows are not impeded;
- c) approaches of snow and ice constructed of sufficient thickness to protect the stream bank;

d) appropriate ice thickness exists to bear necessary load requirements;
and

e) no alterations to streambed or bank are required.

11.4.26 Each operator shall establish a monitoring program acceptable to Alberta, for their watercourse crossings. Documentation as to current condition, repair requirements, or removal dates of the crossing structures must be maintained and made available to Alberta upon request.

11.4.27 Watercourse crossings that are no longer required shall be reclaimed and inspected following reclamation to verify that the crossing has been satisfactorily stabilized and suitable measures to minimize the risk of erosion have been implemented. Suitable measures include:

- a) removing all watercourse crossing and drainage structures and reclaiming stream banks and approaches;
- b) cross-ditching approaches, rolling back topsoil (including slash and logging debris) and within one year re-vegetating erodible bared surface areas with vegetation capable of maintaining bank stability, e.g. this may include the use of sedges and willow cuttings.

11.5 ACCESS CONTROL

PURPOSE

To manage existing and proposed surface access recognizing key resource values.

DISCUSSION

The impacts of roads on resource values may require mitigation through access control measures. Wildlife, sensitive areas (i.e. historical sites, soils), protection of road quality and safety are reasons for implementing access control. A number of strategies and tactics are available for controlling or restricting access.

Access control measures for long-term roads shall be identified through the submission and review of the phased planning process. For temporary roads, the CA or GDP, and FHP shall be the mechanisms used in identifying access control requirements.

The following list of access control methods identifies a number of options that may be implemented:

- physical barriers (e.g. gates; barricades, pilings, crossing removal);

- road condition (e.g. berms, ditches, road standard, selective grade removal, roll-back, no snow removal);
- regulatory (e.g. sanctuaries, timing restrictions, signage).

GROUND RULES

11.5.1 Where access control has been identified as an objective in strategic land use plans, the forest operator shall consult with Alberta to determine an access control strategy. In the event that a strategic land use plan has not been developed, the FHP shall describe specific access control measures identified in the GDP or FMP (see section 3.4).

11.5.2 In designated areas, Alberta may direct forest operators to restrict road access during specified periods, implemented in accordance with Alberta policy. Restricted access issues shall be dealt with differently depending on whether the road is new access or is existing access. All closures of existing access must be submitted to the Minister or his authorized delegate for approval whereas new access shall have the terms defined in the approval of the disposition.

11.6 CAMPS AND FACILITIES

PURPOSE

To give guidance to forest operators so that the planning, construction, maintenance and reclamation of camps and miscellaneous facilities is done in a manner that minimizes negative impacts on the forest environment.

DISCUSSION

Camps and other facilities are often a necessary part of operations in remote areas. Forest operators require that such facilities operate in an efficient and cost-effective manner and are implemented without compromising the integrity of the environment.

Some of the best practices for camps and facilities include:

- place sites out of visual and auditory range from mineral licks and key wildlife areas or use a default of one kilometre;
- safe camp locations are a priority. Therefore, an evaluation of all potential risks shall be conducted prior to selecting a final camp location;
- camps and fuel storage sites shall be identified in the annual fire control plan when proposed locations are known;

- camps shall be kept clean. Proper mechanisms for the disposal of hazardous and non-hazardous waste shall be implemented;
- camp food and garbage storage shall minimize the potential for problems with wildlife.
- Camps and facilities should follow the *Bear-Human Conflict Management Plan for Camps* available on the Alberta Environment and Parks website.
- Problems with wildlife shall be dealt with in consultation with Alberta.

GROUND RULES

- 11.6.1 Any facility or camp that shall be in place for more than twelve consecutive months requires an appropriate disposition under the Public Lands Act. Temporary field authorities (TFAs) are required for camps to be in place less than twelve consecutive months.**
- 11.6.2 Any facility or camp must adhere to all provincial regulations related to the camp (i.e., Public Health Act – *Work Camp Regulation*.).**
- 11.6.3 Where feasible, forest operators shall establish temporary camps and/or other facilities within either new harvest areas or existing clearings (i.e., gravel and borrow pits).**
- 11.6.4 Temporary fuel storage sites shall not be located within 100 m of any channelled watercourse.**

12.0 REPORTING

PURPOSE

To ensure that timber operation activities are reported to Alberta in order to maintain an accurate and current database across the Province.

DISCUSSION

Silviculture and harvest operations reporting and monitoring is necessary to ensure legislated requirements are met in all treatment areas. Ground rules governing operations reporting are required to ensure consistency among forest operators. The intent of activity reporting is to communicate that a given activity has occurred, where it occurred and when it occurred. This information shall also be used for annual and stewardship reports and shall be RFP validated as per Appendix 1.

GROUND RULES

SILVICULTURE AND HARVEST ACTIVITY REPORTING

- 12.0.1 Forest operators who conduct silviculture work on their disposition shall report the details of all work completed in the previous year annually into ARIS no later than May 15. The required information is outlined in the ARIS Industry Operations Manual. Information shall be submitted in accordance with all requirements of the manual and associated policy directives.**
- 12.0.2 Alberta may require additional reporting for forest management activities such as thinning, herbicide, pesticide spraying, or fertilization. Alberta shall consult with the company on the appropriate format of such reports. Reporting of herbicide projects are as per Alberta requirements.**
- 12.0.3 Companies harvesting more than 30,000 m³/yr shall have self-inspection agreements in place and shall carry out periodic inspections of active timber operations and report the information to Alberta in a format acceptable to Alberta. Reports based on the 2006-04 Directive shall be submitted to Alberta once per month or at agreed to intervals.**
- 12.0.4 Shape files of as built harvest areas shall be submitted to Alberta by November 1 each year as per Directive 2015-02 (or at a time acceptable to Alberta) showing all harvest areas from the previous year's operations including location and type of all watercourse crossing structures.**

Appendix 1 - FHP/AOP Checklists

Forest Harvest Plan Checklist					
Area _____ Company _____ Submission Date _____	Disposition Number _____ Date Disposition Issued _____ Date Disposition Expires _____				
APPROVAL ITEMS		Yes/No (Company)	INITIAL DATA (Agriculture and Forestry) - AAF		
1) Has the FMP been validated by an RFP?					
2) Is the Planned SMS Variance $\leq 100\%$ compliance based?					
3) Is the sum of proposed area to harvest and previously harvested area (since SMS approval) less than or equal to 100% of the SMS area?					
4) Does the FMP adhere to all Ground Rules?					
		Company (Y/N/N/A)	Company Comments (optional)	AAF (Y/N/N/A)	AAF Comments (optional)
A. Administrative Considerations					
- Have a copy of the FMP been provided to: - Area Forester? - Forest Officer? - Fish & Wildlife? - Other? _____					
- Is the FMP consistent with approved higher order plans (DMP, SMS, GOR)?					
- Has the required disposition been issued and is active?					
- Is the FMP complete and legible?					
- maps					
- block tables					
- detailed block plans where required					
- contingency plans					
B. Utilization					
- Has the SMS variance been reported and summarized for the FMP?					
- Does the utilization standard match nature document?					
- Are the deviations from utilization standards identified, explained and justified (sub-pools, high stumps, retention, etc)? If there are no deviations, enter N/A.					
C. Ground Rule Deviations - Complete if answered "NO" to Approval Item #4 (top of page), otherwise enter N/A					
- Have all the blocks containing ground rule deviations been identified?					
- Has an explanation and justification been provided for all ground rule deviations?					
D. Integration with Other Users					
- If the plan is not integrated, has an explanation and justification been provided?					
- Has the recipient of incidental volume and chargeability been identified? If there are none, enter N/A.					
- Have all the affected trappers been identified and contacted? If there are none, enter N/A.					
- Have known trapper cabins, trails and other improvements been identified and integrated into the plan? If there are none, enter N/A.					
- Have known recreational groups been identified and contacted where issues have been observed? If there are none, enter N/A.					
- Have GTRs been completed and grading disposition holders been contacted (Directive 2006-01)? If there are none, enter N/A.					
- Have the required biological resource assessments been completed and, if necessary, integrated into the plan?					
- Have all issues raised by other users or the public regarding this plan been documented? If there are none, enter N/A.					
- Have potential land use conflicts been documented and integrated (PNT, CNT, road use agreements, etc)? If there are none, enter N/A.					
E. Access Management (temporary access only)					
- Have access management measures been described and identified (location, timing, signage, etc)? If there are none, enter N/A.					
F. Sensitive Sites					
- Have sensitive recreation concerns been addressed? If there are none, enter N/A.					
- Have water source areas been identified and potential impacts mitigated? If there are none, enter N/A.					
G. Road Design					
- Have the location, design and width of temporary road corridors been identified? If there are none, enter N/A.					
- Have list of watercourse crossings including watercourse classification been provided? If there are none, enter N/A.					
- Have any drainage not depicted under the Water Act been identified? If they are all depicted, enter N/A.					
- Have existing access DLOs which have been integrated into the plan been identified on the map? If there are none, enter N/A.					
H. Wildlife					
- Have wildlife species within the planning area been identified and incorporated into the plan (as per OGR, Section 7.7)? If there are none, enter N/A.					
- Have blocks with timing restrictions been identified? If there are none, enter N/A.					
- Have all known sensitive wildlife areas been addressed (general blocks, riparian zones, den areas, etc)? If there are none, enter N/A.					
I. Insect, Disease & Fire					
- Does the FMP comply with direction provided in Community Treatment Plans? If there are no plans, enter N/A.					
- Have known insect and disease infestations been identified and described? If there are none, enter N/A.					
- Have mitigation strategies for infestation, disease or endangered timber been described? If there are none, enter N/A.					
- Have fire disposal methods been identified?					
J. Silviculture					
- Have all watercourse crossings and/or roads that will be maintained for silviculture purposes been identified?					
- Have pre-harvest stream declaration been included for each opening?					
-FMPs are approved through acceptance and will be considered approved on the date Alberta acknowledged receipt of the work. -Alberta shall notify the organization by acknowledged receipt within 5 working days of submission. -The notification date will be documented by Alberta as the start date for FMP approval. -Alberta shall periodically check the work and supporting documentation to verify its accuracy. -At any time, approval can be revoked where Alberta learns the FMP is inaccurate or deficient in content.					
Company Validation					
Submitting RFP Validation		Company		Date	
AAF Validation					
Revising RFP Validation				Date	

Note: This Checklist should reflect regional or FMA Operating Ground Rule - this is a template.

Annual Operating Plan (AOP) Checklist					
Area	_____	Volume Summary (m3)	_____	Confir	Decisions
Company	_____	Quadrant Allowable Cut	_____	_____	_____
Disposition Number	_____	Quadrant Production to date	_____	_____	_____
Date Disposition Issued	_____	Quadrant Volume Remaining	_____	_____	_____
Date Disposition Expires	_____	Proposed Production (AOP year)	_____	_____	_____
Submission Date	_____				
APPROVALS		YES/NO (Company)	INITIALS DATE (Agriculture and Forestry - AAF)		
Validated by RFP					
AOP has been approved FWP (s)					
	Company (Y/N/N/A)	Company Comments (optional)	AAF (Y/N/N/A)	AAF Comments (optional)	
Administration					
<ul style="list-style-type: none"> Have digital copies of AOP been provided (if required) to: <ul style="list-style-type: none"> - Area Forester - Forest Officer - other Have any FWP conditions been addressed? If there are none, state N/A. Is the Company requesting duty relief with an explanation and justification? Have any amendments to AOP components been submitted and justified (reforestation program, GDP, FWP)? 					
Operating Schedule (as per section 3.5.4 c)					
<ul style="list-style-type: none"> Have all been submitted for all blocks scheduled for harvest including area & volume by species with tons? Have time temporary roads proposed for construction, maintenance & reclamation including watercourse crossings to be built or installed or removed maintained been provided? Have declaration of outstanding operational items, or an agreement with Alberta on reporting of outstanding operational items been provided? Have outstanding operations been identified (deline disposal, hauling, draw-up, reclamation, etc)? Are required amendments to any AOP components explained (reforestation program, road plan, etc)? 					
Applicable Forest Harvest Plans (as per section 3.4)					
<ul style="list-style-type: none"> Do all blocks and roads included in the AOP have FWP approval? 					
Reforestation Program (as per section 3.6)					
<ul style="list-style-type: none"> Is the proposed silviculture treatment schedule provided? Are summaries of stream declarations, stream charge final status, QAC adjustments provided? Proposed blocks are listed for declaration in lieu of survey & re-forest? Are seed inventory sufficient as per FGRMS manual section 11.2 or otherwise approved by AAF? 					
Wildfire Protection (as per section 7.3)					
<ul style="list-style-type: none"> Is the Forest Protection Supplement complete and provided? 					
Road Plan (as per section 11.2)					
<ul style="list-style-type: none"> Are all roads scheduled to be built under authority of the AOP planned to have a lifespan of >= 2 years? Is a table tracking the status of all non DL Or roads over two years old submitted? Are all required watercourse crossings documented in the monitoring program as per section 11.6.2.6? 					
General Development Plan (as per section 3.3)					
<ul style="list-style-type: none"> Have summary of variance as per section 6.1 been provided? Have summary of volume supply by area been provided? Have DL Or ad construction and reclamation schedule been provided? Have GDP schedule & map as per section 3.3.2 been provided? Have consultation activities been completed as per the First Nations Consultation Guidelines? 					
Company Sign Off					
Submitting RFP Validation		Company		Date	
AAF Sign Off					
Submitting RFP Validation				Date	

Note: This Checklist should reflect regional or FMA Operating Ground Rules - this is a template.

Appendix 2 - Glossary

Alberta	The Department of Agriculture and Forestry, including the Forestry Division, Fish and Wildlife Division, and Lands Division or as amended from time to time.
Alberta Vegetation Inventory (AVI)	An inventory of vegetation and forest stands including non-vegetated areas.
Analysis	A detailed examination of a body of data, a series of decisions, or the implications of one or more policies, and a determination of what this examination reveals about the nature, function and/or relationships in effect.
Annual allowable cut (AAC)	The volume of timber that can be harvested under sustained-yield management in any one year, as stipulated in the pertinent approved forest management plan. In Alberta it is the quadrant cut divided by the number of years in that quadrant, usually five.
Annual Operating Plan (AOP)	A plan prepared and submitted by the forest operator each year, which provides the authorization to harvest. An AOP is a requirement of the Timber Management Regulation. (see section B 1.4)
Approval	Issued by Alberta. Approval Decision is prepared outlining significant items considered in plan approval and outlining conditions to be met within specified time periods by the Organization or a decision made by Alberta on an AOP.
As built harvest boundary	An opening number accompanied by a spatial depiction of the harvest area generated either from cutover photography or from GPS technology capable of 3m or better accuracy.
Assumptions	A judgmental decision made by a planner or decision maker that supplies missing values, relationships, or societal preferences for some informational component necessary for making a decision.
Audit	An official examination and verification of records, activities, accounts, actions, operations, etc., against stated standards of performance and compliance.
Bared soil	Any soil where the organic layers and vegetation have been removed.
Borrow pit	A small quarry or excavation, which provides material for use in the construction project. [Revised from Dunster]
Buffer	Used in several contexts. 1 In protecting critical nesting habitat areas, the buffer is an area of forest land that reduces the impacts of adjacent activities on the critical area. The dangers associated with adjacent disturbances might include wind-throw or wind damage to nest trees and young birds in the nest, increased predation and loss of

	interior forest conditions. 2 A strip of land between two areas under different management regimes. Pesticide buffer zones are used to limit the possible drift, run-off or leachate of pesticide from a site into other areas, such as waterbodies or creeks. Streamside buffers are used to limit the effects of logging on creeks, such as siltation, loss of shading, loss of nutrient inputs from trees and degradation of riparian zones. The size and composition of the buffer zone depends on its intended function. 3 An area maintained around a sample or experimental plot to ensure that the latter is not affected by any treatment applied to the area beyond the buffer. 4 In GIS work, a new polygon computed on distance from a point, line or existing polygon. 5 In managing biosphere reserves, an area or edge of a protected area. Examples of compatible activities might include tourism, forestry, agroforestry, etc. The objective of the buffer zone is to provide added protection for the core reserve area. [Dunster]
Channel width	The bank full width typically extends from the base of the lowest stable woody vegetation on one bank across to the stable woody vegetation on the other bank – Foothills Research Institute, Quicknote #1.
Coarse filter	Conservation of land areas and representative habitats with the assumption that the needs of all associated species, communities, environments and ecological processes will be met. [Dunster]
College	The College of Alberta Professional Foresters (CAPF) or the College of Alberta Professional Forest Technologists (CAPFT).
Commercial Thinning	A partial cut where trees of a merchantable size and value are removed to provide an interim harvest while maintaining a high rate of growth on the remaining, well-spaced, final crop trees. Used to capture volume likely to succumb to competition pressures and be lost to disease, insect, or dieback.
Commercial timber permit (CTP)	A timber disposition issued under Section 22 of the Forests Act authorizing the permittee to harvest public timber.
Compaction	A transfer of wheel pressure to soils causing collapse of large air-filled pores, a type of disturbance when tire imprint is often invisible under the duff layer. Soil susceptibility to compaction is maximal when soil is at field capacity, which can be detected by stability of hand cast. Most of soil compaction occurs during the first passes of equipment because soil gains strength with each additional pass.
Compartment	A subsection of an FMA for which operational plans are developed.
Connectivity	A measure of how well different areas (patches or a landscape are connected by linkages, such as habitat patches, single or multiple corridors, or "stepping stones" of like vegetation. The extent to which conditions among late successional/climax forest areas provide habitat for breeding, feeding, dispersal and movement of late successional - or climax-dependent wildlife or fish species. Natural landscapes often

	tend to be better connected than those that have been heavily influenced and disturbed by human activities. Consequently, there is a body of opinion that the best way to avoid fragmentation of landscapes is to maintain, or re-establish, a network of landscape linkages. At a landscape level, the connectivity of ecosystem functions and processes is of equal importance to the connectivity of habitats. [Dunster]
Constraints	The restriction, limiting, or regulation of an activity, quality or state of being to a predetermined or prescribed course of action or inaction. Constraints can be a result of policies or political will; management direction, attitudes and perceptions; or budget, time personnel and data availability limitations; or, more typically, a complex interaction of all these factors. [Dunster]
Corridor	1 A physical linkage connecting two areas of habitat and differing from the habitat on either side. Corridors are used by organisms to move around without having to leave the preferred habitat. A linear habitat patch through which a species must travel to reach habitat more suitable for reproduction and other life sustaining needs. Many corridors, linking several patches of habitat, form a network of habitats. The functional effectiveness of corridors depends on the type of species, the type of movement, the strength of the edge effects and its shape. 2 An area of uniform width bordering both or one side of a lineal feature, such as a stream or route. [Dunster]
Cross-drainage structures	Culverts or other drainage structures that permit water to move from one side of a road to the other, normally under the road grade.
Deactivation	Taking a road out of active use through implementation of erosion control measures, road blocks and/or other methods.
Deciduous timber allocation (DTA)	A quota of deciduous timber.
Delegated Authority	The Government of Alberta personnel located at the Regional or Area level charged with supervision of all forest management activities in a defined Region or Area. It can also mean someone who is authorized to approve an AOP.
Deleterious material	Section 34(1) of the Fisheries Act defines “deleterious substance” as: (a) any substance that, if added to water, would degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water; or (b) any water that contains a substance in such quantity or concentration, or that has been so treated, processed or changed, by heat or other means, from a natural state that it would, if added to any other water, degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to

	be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water.
Department Licence of Occupation (DLO)	A disposition issued by Alberta authorizing occupation of a linear corridor, often for an access road.
Desired Future Forest	A spatially explicit projected range of conditions of the forest landscape 100+ years into the future. The range of forest conditions defines the goal towards which forest management will be directed. It is our best guess today on the arrangement of forest age classes, roads and habitats that will provide for a set of objectives and desired outcomes that have been identified for the area.
Displaced soil	Mixed mineral, surface and sub-surface horizons that have been deposited off the road or disturbed surface to a depth of 15 cm or greater.
Disturbance patterns	The spatial and temporal arrangement of disturbances.
Ditch blocks	Barriers constructed across ditches to retard water flow, to redirect water from the ditch or to form a small catch basin.
Drainage	A watercourse as defined in Table 3.
Drought	Extended period of below average precipitation causing a lowering of the water table. Generally occurs over several years but locally may happen seasonally. Signs would be lowering of lake levels and drying of streams that would normally flow all year.
Due Diligence	<p>- taking and documenting steps to ensure that the desired outcome is achieved or that the chances of a negative consequence or outcome is minimized;</p> <p>- ensuring completeness, correctness, consistency and repeatability;</p> <p>- demonstrating how conclusions were reached;</p> <p>- using mechanisms, such as but not limited to checklists and standard operating procedures, to demonstrate that appropriate procedures were followed and to ensure that no relevant steps or considerations were missed;</p> <p>- keeping and maintaining appropriate files and filing systems as well as document retention policies and practices.</p>
Duff	The organic horizons of the soil profile (LFH). Commonly referred to as the forest floor.
Dwarf mistletoe	<u>Arceuthobium americanum</u> Nutt.

Ecological integrity	The quality of a natural, unmanaged or managed ecosystem in which the natural ecological processes are sustained, with genetic, species and ecosystem diversity assured for the future. [Dunster]
Environmental field report (EFR)	A document that must be submitted for most green area disposition applications as required under the Public Lands Act. The disposition applicant completes the EFR, which includes details on construction practices and environmental issues, and contains operating conditions that apply to the approved disposition. The EFR forms part of the approval for the Public Lands Act disposition.
Exterior Road	Inter-block road that exists outside the block boundary.
Features	The features represented on a map which describe the physical aspects of the harvest design. e.g., harvest area boundaries, roads, buffers, wildlife habitat.
FireSmart Community Zone	A standard 10 kilometre radius around the community extending from the Wildland Urban Interface Zone. A unique data set will be gathered for this zone for community protection planning to provide a fundamental linkage between FireSmart Communities and FireSmart Landscapes.
FireSmart Landscape Zone	This zone extends beyond the FireSmart Community Zone overlapping multiple jurisdictions at a broad landscape level. This zone focuses on mitigating the likelihood of large, high intensity, high severity fires. Fire, Forest and Land Management planning are integrated and designed to reduce the negative ecological, economic and social impacts of wildfire while maximizing the positive attributes of wildfire.
FireSmart Landscapes	The philosophy that seeks to mitigate the likelihood of large, high intensity and high severity fires. FireSmart landscapes are designed to recognize the interaction between ecological, economic and social impacts, hence maximize the positive ecological impacts and minimize the negative economic and social impacts.
Floodplains	Flat land bordering a stream or river onto which a flood will spread. The underlying materials are typically unconsolidated and derived from past stream transportation activity. The extent of the floodplain varies according to the volume of water, and its 50-year-old floodplain would be defined by the largest flood that would, on average, occur once within a 50-year-period, estimated from historic stream flow records. [Dunster]
Forestry Program Manager	The senior Alberta manager located at a Forest Area charged with supervision of all forest management activities in a Forest Area. It may also mean someone else who is authorized to approve an AOP.
Forest Health	A condition of the forest; a forest is considered healthy if it can sustain itself to meet the specific forest land management objectives of today or in the future.

Forest Management Agreement (FMA)	<p>A contract between the province of Alberta and the FMA holder whereby the province provides an area-based Crown timber supply. In return, the FMA holder commits to the following:</p> <ul style="list-style-type: none"> - managing the timber resource on a perpetual sustained yield basis, taking into consideration a broad range of forest values in determining forest management practices; - meeting defined economic objectives, including capital investment and job creation, and seeking out new business opportunities that provide measurable economic benefits for both the province and the FMA holder. <p>The FMA gives the FMA holder the right to access Crown fibre. In return, the FMA holder commits to forest management responsibilities, which may change from time to time.</p>
Forest Management Unit (FMU)	An administrative unit of forest land designated by the Minister, as authorized under Section 14(1) of the <i>Forests Act</i> .
Forest operations	Includes all activities related to timber harvesting, including site assessments, planning, road construction, harvesting, reclamation and reforestation.
Forest operator	The timber disposition holder or person responsible for controlling harvest planning and operations in the timber disposition. It also refers to those persons working on behalf of the disposition holder while conducting forest operations.
Forest tent caterpillar	<i>Malacosoma disstria</i>
Forests Act, the	The legislative statute that authorizes the Minister to administer and manage the forested lands of Alberta.
Full Review	An evaluation of the acceptability for approval of a submitted document involving referrals to government departments, independent experts, or others as appropriate, and a risk analysis prior to Alberta granting approval to the submitting Organization.
Genetic Diversity	<p>The genetic variability within a population or a species; the number and relative abundance of alleles. Genetic diversity can be assessed at three levels:</p> <ul style="list-style-type: none"> - diversity within breeding populations; - diversity between breeding populations within any one geographic area; - diversity within the species.

Grazing disposition	An authorization issued by Alberta for the purpose of domestic livestock grazing on public land (i.e., lease, license or permit).
Ground Rules	Standards for operational planning and field practices that must be measurable and auditable and based forest management plan objectives.
Guideline	A preferred or advisable course of action respecting land and resource management. Guidelines imply a degree of flexibility, based on administrative judgment or feasibility of applying the guideline, and are consequently not normally enforceable through legal means.
Harvest area	A specified land area with defined boundaries where timber harvesting is scheduled, or has occurred (commonly referred to as a cut block).
Harvest Level	A volume or area of timber determined through timber supply analysis available for harvest on an annual sustainable basis within a DFA. A harvest level is not an AAC unless approved by the Minister.
Hiding cover	See " <i>sight distance</i> ".
High-water mark	Stream course water levels corresponding to the top of the unvegetated channel or lakeshore.
Historical cabin(s)	Cabin(s) that are no longer active and may or may not be intact. Historical cabins do not include existing or active RFMA (trapper) holder cabins.
Historical resource	Any work of nature or man that is primarily of value for its palaeontological, archaeological, prehistoric, historic, cultural, natural, scientific or aesthetic interest, including, but not limited to, the structure or object and its surrounding site.
In-block Road	Any temporary road that is wholly contained within a harvest area (block).
Insects and Diseases	Biological, physiological, and environmental agents that have an adverse effect on the health of the forest. These agents include insects; nematodes; micro-organisms (viruses, bacteria, fungi); parasitic plants; mammals; birds; and non-infectious disorders caused by climate, soil, applied chemicals, air pollutants and other physiographic conditions.
Integrated resource plan	A regional plan developed by provincial government agencies in consultation with the public and local government bodies. It provides strategic policy direction for the use of public land and its resources within the prescribed planning area. It is used as a guide for resource planners, industry and publics with responsibilities or interests in the area.
Inter-block Road	Any temporary road that extends through a block to reach another block. It ends at the edge of the last block connected to the road.

Jack pine budworm	<i>Choristoneura pinus</i> .
Laid Out	Field assessment of harvest blocks and roads (on the ground) required prior to submission of Forest Harvest Plan(s); also includes the delineation/marketing of both harvest area boundaries and roads on the ground. Examples of delineation/marketing include but are not limited to: ribbon, paint or other means approved by Alberta.
Landing	Any area where logs are gathered for processing or further transport to a mill site.
Landscape	A landscape (or LMU) is a heterogeneous area in which the pattern of the mosaic of local ecosystems or land uses is repeated in similar form throughout kilometres wide area (after Forman 1986). Landscapes may coincide with a climatic, physiographic or ecological boundary. However, landscapes are not strictly ecologically based and include human use and modification of the area.
Large residual tree	A residual tree with a diameter measured at breast height (DBH) greater than the approximate average merchantable tree DBH of the harvest area.
Large woody debris	Woody material > 1 cm in diameter, stumps and snags < 1.3 m tall and dead trees leaning > 45 degrees. The woody material left on site after logging including both pre-existing and harvest-generated material (downed boles, limbs, tops and stumps). Includes highly decomposed and vegetated material as long as it is recognizable as woody.
License of occupation (LOC)	A disposition issued by Alberta authorizing occupation of a linear corridor, often for an access road.
Logfill	Stream crossings constructed with logs placed in a streambed parallel to the flow of the water.
Mature stands	Stands that have reached rotation age or have a decreasing growth rate.
Modified logfill	Stream crossings constructed with logs placed over a pipe in a streambed parallel to the flow of the water.
Mountain pine beetle	<i>Dendroctonus ponderosae</i> .
Non-traditional access	Access with conditions on the disposition limiting its use by the public.
Noxious Weed	A plant designated under the Weed Control Regulation of the Weed Control Act.
Organization	The proponent charged with developing the FMP. This may be a corporation, cooperative, or a public agency.

Partial cutting	A treatment where significantly less than 100% of the trees are harvested from a stand or area. It includes commercial thinning, even when the intention is leading to a final clearcut.
Pattern	The arrangement of forest stands or harvest units.
Permanent roads	Roads that will be in use for more than three years.
Permanent sample plots (PSP)	A fixed or variable area plot established for (forest) sampling and measurement purposes, and designed for remeasurement.
Pre-commercial Thinning	A silvicultural treatment to reduce tree density in young stands, carried out before the stems reach merchantable size. The intent is to concentrate the site's growth potential on fewer trees thereby accelerating stand development and reducing the time to final harvest, retaining more live crown, creating opportunities for future commercial thinning activities and improving stand operability.
Prescribed burn	The planned use of carefully controlled fire to accomplish predetermined management goals (e.g., site preparation for planting, reduction of fire hazards or pest problems, improvement of the ease with which the site can be traversed, and creation of better quality browse for wildlife). [Dunster]
Prohibited debris	Any flammable debris or waste material that, when burned, may result in the release of dense smoke, offensive odours or toxic air contaminants. It includes: (a) garbage or refuse from commercial or industrial operations; (b) rubber or plastic, or anything containing or coated with rubber or plastic or similar substances; (c) used oil from internal combustion engines, hydraulic oil and lubricants (d) Motor vehicle tires.
Prohibited noxious weed	A plant designated under the Weed Control Regulation of the Weed Control Act.
Quota	The timber quota is a share of the allowable cut of coniferous timber within a forest management unit.
Reclamation of roads	Permanent removal of watercourse crossings; re-contouring of road crown and ditches; reseeding or planting of the former right-of-way.
Recreation Site	Includes areas designated by Alberta as Ecological Reserves, Wilderness Areas, Wildland Parks, Provincial Parks, Heritage Rangelands, Natural Areas, and Recreation areas.

Regeneration	The renewal of a tree crop by natural or artificial means. It may also refer to the young crop itself.
Regulated Forestry Professional	A Registered Professional Forester (RPF) on the Registered Professional Forester Register of the College of Alberta Professional Foresters (CAPF) or a Registered Professional Forest Technologist (RFPT) on the Registered Professional Forest Technologist Register of the College of Alberta Professional Forest Technologists (CAPFT).
Reserve	In its strictest sense, an area of land designated as being off-limits to any exploitive activities that might change the nature of the area. Not all reserves are so tightly controlled. [Dunster]
Residual structure	Standing structure that is taller than 2 m, within a harvested area. Areas buffered for sensitive ecological or wildlife habitat may be included for residuals. Required buffers for lakes and small and large permanent streams are not included. This includes non-merchantable trees and shrubs, live merchantable trees, snags and stubs.
Residual tree	A live canopy tree that is spatially within a harvested area. Areas buffered for sensitive ecological or wildlife habitat may be included for residuals. Required buffers for lakes, small and large permanent streams are not included.
Resources	Physical and intrinsic features of the land, including but not limited to timber, wildlife, water and soil.
Review	Acceptance or appraisal conducted by Alberta.
Right-of-way (ROW)	A cleared area, usually linear, containing a road and its associated features such as shoulders, ditches, cut and fill slopes, or the area cleared for the passage of utility corridors containing power lines or over- or under-ground pipelines. Typically, the right-of-way is a specially designated area of land having very specific rights of usage attached. Rights-of-way may be owned by someone else. [Dunster]
Riparian area or management zone	<p>(1) The band of land that has a significant influence on a stream ecosystem or is significantly affected by the stream. It often has specialized plant and animal communities associated with it. [Anon]</p> <p>(2) Terrestrial areas where the vegetation complex and microclimate conditions are products of the combined presence and influence of perennial and/or intermittent water, associated high water tables and soils that exhibit some wetness characteristics. Normally used to refer to the zone within which plants grow rooted in the water table of these rivers, streams, lakes, ponds, reservoirs, springs, marshes, seeps, bogs and wet meadows. The riparian zone is influenced by, and exerts an influence on, the associated aquatic ecosystem. [Dunster]</p>

Root collar weevils	<i>Hylobius</i> spp.
Rotation	The period of years required to establish and grow even-aged timber crops to a specified condition of maturity.
Ruts	<p>Machine depressions in the soil which are determined by depth and length:</p> <ul style="list-style-type: none"> - where the depth of the organic dark humus material is greater than 30 cm, a rut is a depression that shears the organic layer of soil (a sheared organic will expose a vertical face greater than 20 cm of the organic layer); - where the depth of the organic material is less than 30 cm, a rut is a depression exceeding 10 cm into the mineral soil; <p>Length:</p> <ul style="list-style-type: none"> - an impacted area meeting the rut depth criteria that is greater than 4 m long; - a continuous track with a rut less than 4 m because of stumps, logs or rocks lifting the vehicle will still count as a rut if the total length of the smaller holes is greater than 4 m.
Rutting/ puddling	A paste-like behaviour of wet soil when most of the soil pores are filled with water and soil literally flows from underneath the wheel to the sides and upward forming visible tire imprint into the mineral soil. Intensity/depth of rutting is directly related to the number of equipment passes. Soil is considered susceptible to rutting when it forms a stable hand cast.
Sensitive sites	Sites that have soil, water, slope, aesthetic, vegetation or wildlife characteristics that require special protection beyond the normal precautions described in the ground rules. They may be complex if many values or issues are involved.
Seral stages	A stage in succession. A series of plant community conditions that develop during ecological succession from a major disturbance to the climax stage. Most common characteristics/classifications include tree species and age.
Sight distance	The distance at which 90% or more of an adult big game animal is hidden from the view of a human. This distance may vary from one stand to another.
Silt fence	Permeable fabric barriers installed along the contour to filter surface water runoff and trap sediment from sheet or overland flow and prevent it from entering streams.
Silviculture	The theory and practice of controlling the establishment, composition, health, structure and growth of forests in order to achieve specified management objectives.

Site preparation	Any action taken in conjunction with a reforestation effort (natural or artificial) to create an environment favourable for survival of suitable trees during the first growing season. Altering the ground cover, soil or microsite conditions can create this environment; using biological, mechanical or manual clearing; prescribed burns; herbicides or a combination of methods. [Dunster]
Skid trail	An unimproved temporary forest trail suitable for use by equipment such as bulldozers and skidders in bringing trees or logs to a landing or road.
Small patch	A patch of less than 0.2 ha of undisturbed canopy forest surrounded by harvested area. The patch must be composed of at least four canopy trees. At least two of the trees in the patch should be large residual trees.
Snag	A dead tree that is taller than 2 m.
Soil degradation	A reduction in soil quality caused by but not limited to the following conditions: rutting, compaction, puddling or soil displacement.
Soil Displacement	A loss of nutrient-rich organic layers, and top mineral soil as a result of harvesting activities. Bare mineral soil is susceptible to raindrop impact causing soil crusting, increased surface runoff, and erosion.
Soil disturbance	In the context of the 5% maximum allowable area within a harvest area, includes bared landing areas, temporary roads, displaced soils or ruts.
Spatial	Of, or existing in, space. [Webster's]
Species at risk	Any species known to be "at risk" after formal detailed status assessment and designation as "Endangered" or "Threatened" in Alberta. The list of species is maintained by Alberta.
Species of management concern	Species within the forest management planning area that have an identified value (social, economic, ecological) and are managed to ensure their continued protection and/or use. This includes species that are hunted or trapped, as well as those that are endangered or threatened.
Spruce beetle	<i>Dendroctonus rufipennis</i> .
Stand	A community of trees sufficiently uniform in species, age, arrangement or condition as to be distinguishable as a group in the forest or other growth in the area. A stand may also be that polygon as defined in the AVI or Phase III inventory.
Strippings	Layers of humus-bearing topsoil and fine woody material above mineral soil that have been stripped off during road or landing construction.

Stub	A large residual tree that has been “topped off” at approximately 6 m to create an artificial snag.
Subsequent pass	Any harvest occurring after the first harvest pass.
Suppression capability	The effectiveness of traditional fire suppression tactics. It is an objective evaluation of initial attack response time, access for ground support resources, water availability and terrain which might adversely impact movement of resources.
Sustainable forest management (SMF)	Management to maintain and enhance the long-term health of forest ecosystems, while providing ecological, economic, social and cultural opportunities for the benefit of present and future generations.
Temporal	Of, or limited by, time. [Webster’s]
Temporary field authority (TFA)	An authority issued under Section 19 of the Public Lands Act by an Alberta officer to grant short-term land use activities on public land in the White or Green Areas. The TFA may or may not be related to an existing disposition that has also been issued under the Public Lands Act. The concept is to provide field-level service to an applicant, with access to public land for a specific purpose/use/activity, for a term of less than or equal to one year.
Temporary Machine Crossing	Crossing structure not connected to an existing road but used for equipment crossing of ephemeral and intermittent watercourses.
Temporary road	Roads that are part of a harvest area or that connect harvest areas, and are built, used and reclaimed before expiry of the Annual Operating Plan (AOP) or reclaimed within three years of construction.
Thermal cover	Generally, an area of at least 10 ha having a coniferous canopy at least 10 m in height, with at least 70% crown closure and a minimum width of 200 m. This cover is used by animals to assist in their temperature regulation during extreme weather conditions.
Timber disposition	Licenses and permits that allow forest operators to harvest from Crown lands.
Timber Management Regulation	The legislative statute that describes the mechanism and regulations by which the forested lands of Alberta are managed. The Regulation is associated with the Forests Act.
Timber Operations	Includes all activities related to timber harvesting including site assessments, planning, road construction, harvesting, reclamation and reforestation.
Timber supply analysis (TSA)	Calculations/computer models with built-in assumptions regarding forest growth patterns, used to determine the annual allowable cut (AAC).

Timing constraints	A restriction or limitation on when an activity may be carried out.
Trapper	Holder of a trapping license.
Understorey	The trees and other woody species growing under the canopies of larger adjacent trees and other woody growth. [Dunster]
Unstable slope	Slopes of loose or poorly consolidated materials beyond the angle of repose, geological features having a high probability of failure, or soils that will not support loads.
Utilization	The portion of the stand or individual tree used for manufacture of wood products, defined in terms of piece length and diameter at each end. Minimum standards for utilization are defined in the timber disposition.
Validated work (Validation)	Work that has been prepared by, or reviewed and approved by an RFP. These professionals are subject to an enforceable code of ethics and standards of practice and are expected to complete their work with due diligence to ensure such work is accurate. The RFPs who validate the work may have done the work themselves, contracted the work to be done, or supervised those who did the work, but in any case, the validating RFPs are accountable for the work being prepared with due diligence and being accurate. If more than one RFP is involved in preparing the work, the RFP that is most directly involved in the work is to validate the work.
Values at risk	A listing of values which may be at risk of being reduced by wildfire. In order to complete a spatial "priority" evaluation, information regarding values is required.
Variance (SHS)	Any deletion to a stand scheduled in the spatial harvest sequence. Additions to stands identified in the spatial harvest sequence are not considered variance but are tracked in section 3.4.1 of the ground rules.
Viable understorey	Trees of desirable merchantable species that are windfirm and of sufficient vigour that they will continue to grow after harvest.
Water source area	That portion of a watershed where soils are water-saturated and/or surface flow occurs and contributes directly to streamflow. The area of saturated interflow associated with a stream.
Watercourse	The bed, bank or shore of a river, stream, creek or lake or other natural body of water, whether it contains or conveys water continuously or intermittently.
Watershed	An area of land, which may or may not be under forest cover, that drains water, organic matter, dissolved nutrients and sediments into a lake or stream. The

	topographic boundary, usually a height of land, that marks the dividing line from which surface streams flow in two different directions. [Dunster]
Western gall rust	<i>Endocronartium harknesii</i> .
Wildlife	Any species of amphibian, bird, fish, mammal and reptile found in the wild, living unrestrained or free roaming and not domesticated. Some definitions include plants, fungi, algae and bacteria. [Dunster]
Wildlife corridor	A strip of forest with a minimum width of 100m or a series of forest retention patches that connect two forested areas. These may include merchantable or unmerchantable stems.
Wildlife zone	As defined on Fish and Wildlife Referral Maps.
Windfirm	The ability of a tree or stand of trees to remain standing post harvest.
Yield Curve	Graphical representation of a yield table.

List of Initialisms

AAC	Annual Allowable Cut
AOP	Annual Operating Plan
ARC	Approval Review Committee
BOR	Basic Operating Rules
CAPF	College of Alberta Professional Foresters
CAPFT	College of Alberta Professional Forest Technologists
CCFM	Canadian Council of Forest Ministers
CT	Commercial Thinning
COP	Codes of Practice (Watercourse Crossings Codes of Practice, Water Act).
CSA	Canadian Standards Association
C&I	Criteria and Indicators
DHAP	Detailed Harvest Area Plan

EFM	Enhanced Forest Management
FGRMS	Forest Genetics Resource Management and Conservation Standards
FHP	Forest Harvest Plan
FLUZ	Forest Land Use Zone
FMA	Forest Management Agreement
FMP	Forest Management Plans
FMU	Forest Management Unit
G&Y	Growth and Yield
GDP	General Development Plan
GLIMPS	Geographical Land Information Management and Planning System
IRM	Integrated Resource Management
IRP	Integrated Resource Management Plan
MAI _{Max}	Maximum Mean Annual Increment
PCT	Pre-commercial Thinning
PDT	Plan Development Team
PFMP	Preliminary Forest Management Plan
PPG	Public Participation Group
RFP	Regulated Forestry Professional
RPF	Registered Professional Forester
RPFT	Registered Professional Forest Technologist
SFM	Sustainable Forest Management
SYU	Sustained Yield Unit
ToR	Terms of Reference
TMR	Timber Management Regulation made under the Forests Act

VOIT	Values, Objectives, Indicators and Targets
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