Daishowa-Marubeni International Ltd.
FMA Timber Harvest Planning and Operating Ground Rules

2016

Daishowa-Marubeni International Ltd.
Peace River Pulp Division
FMA OPERATING GROUND RULES

Daishowa-Marubeni International Ltd.

ALBERTA
AGRICULTURE and FORESTRY

ENDORSEMENTS

The Daishowa-Marubeni International Ltd. FMA Operating Ground Rules, having been prepared in accordance with Section 16 (2) of FMA's 0900044 and 0900045, and hereby endorsed this 9th day of August, 2016. Alberta has determined that these Operating Ground Rules will apply to all operations within the aforementioned FMAs as well as Forest Management Units P14, PO2, PO5, P22 and S26.

Daishowa-Marubeni International Ltd.

Per: Original Signed

Stephan Szabo
(print name)

Woodlands Manager
(title)

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

Per: Original Signed

Darren Tapp
(print name)

Executive Director
(title)

DMI FMA Operating Ground Rules

Revisions From 2013 to 2016

(Effective Date: May 1, 2016)

2016 Revisions

Ground Rule Number	2011 Version of the Ground Rule	2016 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.**	
3.2 Compartment Assessment (Discussion)	(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/compartment/decade as determined by the Forestry Program Manager and the manager of FMB).	(e.g., Forest fire, insect or disease, species of special management concern, a major change in land use direction or an unacceptable level of substantial additions of >20% of the SHS/compartment/decade as determined by the appropriate government delegated authority).
3.3.1	**The GDP submission date is May 1 of each year unless otherwise approved by Alberta. Alberta shall respond within 30 working days. The GDP shall be approved subject to an appraisal by Alberta.**	**The GDP submission date is no later than June 1 of each year unless otherwise approved by Alberta. Alberta shall respond within 30 working days. The GDP shall be approved subject to an appraisal by Alberta.**
3.3.3	**Other forest operators affected by the GDP must agree in writing (email is acceptable) to the GDP before approval (see section 5.1.1).**	**Other forest operators affected by the GDP must acknowledge receipt of the GDP in writing (email is acceptable) before approval (see section 5.1.1).**
3.3.5 g)	**a description of variances (as per 3.3.2) from the SHS and FMP long-term corridor plan supported by documentation;**	**a description of variances (as per section 4.1) from the SHS and FMP long-term corridor plan supported by documentation;**
3.4.1	**An FHP shall be approved by acceptance if:** **a) validated by a RFP;** **b) deletes less than 20% of the area sequenced in the SHS, by compartment per decade;** **c) the harvest area (ha) does not exceed 100% of the total area in the SHS for core and contingency by compartment per decade as tracked in the GDP; and** **d) it adheres to all ground rules as per the FHP checklist (see Appendix 4).**	**An FHP shall be approved by acceptance if:** **a) validated by a RFP;** **b) adds less than 20% of the operator's assigned SHS area, by compartment per decade;** **c) the harvest area (ha) does not exceed 100% of the total operator assigned SHS area for core and contingency by compartment per decade as tracked in the GDP;** **d) it adheres to all ground rules; and** **e) all other affected forest operators have agreed to the FHP in writing.**

3.4.6 a)	**opening number;**	**opening number for each proposed harvest area;**
3.4.6 h)	**list of watercourse crossing locations;**	**list of watercourse crossing locations, and classification of waterbody;**
3.4.6 m)	**New**	**spatial data as required by Alberta's policy directives.**
3.4.8	**Where applicable the following items shall be mapped and/or described for each harvest area:**	**The following items shall be mapped and/or described for each harvest area where the described situation is present:**
3.4.8 a)	**block comments may be included on the individual block map;**	**Deleted**
3.4.8 b)	**layout bordering and encompassing riparian management zones when different than the standards in section 6.0;**	**a) layout bordering and encompassing watercourse protection areas when different than the standards in section 6.0;**
3.4.8 c)	**where available, the wet areas mapping layer,**	**b) upon request, non-frozen ground harvest areas, where portions of the block area have an estimated depth to water of less than 1.0m.**
3.4.8 d)	**watercourse classification and protective buffer;**	**Deleted**
3.4.8 f)	**identification of understorey (see section 7.5);**	**identification of coniferous understorey when avoidance or protection criteria is met as per section 7.5**
3.4.8 i)	**protection of roadside vegetation – yes or no, if yes, how;**	**g) harvest areas where special aesthetic or recreational concerns need to be addressed when required to meet OGRs (e.g. 5.2.1, 5.5.1)**
3.4.8 k)	**important wildlife sites as defined in section 7.7.6.2; they may be designated as no harvest zones with the detail stored elsewhere.**	**i) important wildlife sites as defined in section 7.7.6.2; they may be designated in general terms as no harvest zones, with the detail record maintained by the company.**
3.4.8 l)	**historical site considerations addressed; and**	**j) layout required to address actual or high potential historical site considerations**
3.5.4 a)	**Shape files or points (or other digital format as approved by Alberta) of approved FHP harvest areas, laid out structure retention, inter block roads and watercourse crossings locations;**	**Deleted**

3.5.5.1	**Changes meeting the following criteria are considered 'Minor Amendments' and must be approved by a company representative and require only company RFP validation and notification to Alberta. Minor Amendments don't require Alberta's approval, provided all appropriate background checks have been made and rationale for the change has been provided (changes can be implemented prior to notification but must be reported within 7 working days unless otherwise stated). Changes shall not adversely affect buffers established for the protection of riparian areas, wildlife sites, historical resources, or aesthetic values. A resubmission of shape files is not required for minor amendments.**	**Changes listed in the "Minor Amendments" column require only company RFP validation and notification to Alberta. Minor amendments don't require Alberta's approval, provided all appropriate background checks (e.g. GLIMPs Land Status check) have been made and rationale for the change has been provided (changes can be implemented prior to notification but must be reported on the next bi-weekly operations report after implementation). 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 5 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.**
3.5.5.1 a) – h)	**Updated**	**Converted to tabular format. Renumbered a) – f).** **See Section for updates.**
3.5.5.2	**All changes not described in 3.5.5.1 are considered major amendments and require an FHP/AOP amendment prior to implementation and a resubmission of applicable shape files for the amendment. Alberta will provide the company feedback and/or approval of the AOP amendment within 10 working days of the submission.**	**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.**
3.6 Reforestation Program	**8.2 Reforestation Program**	**Renumbered. Section moved in its entirety. No change to content.**
4.1 Stand Utilization	**Updated**	**Entire Section updated – see 4.1 for details**
Table 1		**New**
4.2.3	**Trees with butts (or large ends) of nineteen (19) cm diameter or less, containing advanced decay, may be bucked at 0.61 meter intervals to one hundred percent (100%) clear face. For butts (large ends) greater than nineteen (19) cm in size, the normal bucking rules shall apply.**	**Deleted**
4.2.8	**New**	**Company processing practices cannot make an unmerchantable piece from a merchantable tree.**

5.1.3	**New**	**Specific endorsement at a block level is required from the integrated operator when the tenure holder submitting a Forest Harvest Plan includes polygons that are assigned to another tenure holder's landbase.**
5.3.1	**A representative of the forest operator shall personally contact, or send a registered letter to the senior partners of a RFMA during the preparation of the FHP. Information 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 integrated into the plan. The forest operator shall provide the trapper with a copy of the approved FHP map.**	**A representative of the forest operator shall personally contact, or send a registered letter to the senior partners of a RFMA during the preparation of the FHP. Information 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 integrated into the plan if applicable. The forest operator shall provide the trapper with a copy of the approved AOP map.**
Table 2 (Equipment Operation on Transitional)	**Heavy equipment may operate within 20 m only frozen or dry periods. No skidding through watercourse except on snow/ice bridge or logfill. Crossings must be planned with adequate crossings to be removed on completion of operations.**	**Renumbered Table 3.** **Heavy equipment may operate within 20 m only during frozen or dry periods (when soil condition is not susceptible to degradation). No skidding through watercourse except on snow/ice bridge or logfill.**
Table 2 (Equipment Operation on Intermittent)	**Heavy equipment may operate within 20 m only during frozen or dry periods. No skidding through watercourse except on snow/ice bridge or logfill. Crossings must be planned with adequate crossings to be removed on completion of operations.**	**Heavy equipment may operate within 20 m only during frozen or dry periods (when soil condition is not susceptible to degradation). No skidding through watercourse except on approved crossing as per Table 6.**
Table 2 (Equipment Operation on Ephemeral)	**Skidding restrictions apply on Class "A" and "B" waterbody tributaries;** **Skidding shall only be at a crossing site with temporary crossings to be removed on completion of operations, see 11.4. 19;** **On Class "A" and "B" waterbody tributaries, special crossing structures that do not cause stream siltation may be required.**	**Skidding shall only occur during frozen or dry conditions (if soil condition is not susceptible to degradation). Any crossing required as per Table 6 (excluding low-profile crossings) shall be approved and reported as per 11.4.** **Equipment crossing ephemeral watercourses shall be minimized.**
7.2.1 – 7.2.3	**Preliminary Harvest Plans**	**Deleted**
7.4 Structure Retention	**Updated**	**See Section 7.4 for details**

Table 4	**New**	**See Table 4 (Section 7.4) for details**
7.4.12	**Quota holders specific structure retention requirements will be consistent with the approved FMP and implemented as part of the AOP approval**	**Deleted**
7.5 Understorey Management (Discussion)	• **Avoidance –** Used in the low density stands and/or highly aggregated (clumped) coniferous understorey distribution. Wind buffering tactics and pre-planning not specifically required. • **Protection** –Used in high density and/or evenly spaced coniferous understorey. Wind buffering tactics utilizing structure retention, pre-planned strip harvest/skid trails are to be used.	• **Avoidance –** Used in harvesting containing less than 500 sph of pre-harvest acceptable stems. Wind buffering tactics and pre-planning not specifically required. Operations strive to avoid pockets of young conifers and roads and decking are located in areas where there is lesser concentration of understory. • **Protection** – Used in harvesting containing patches greater than or equal to 500 sph of pre-harvest acceptable stems. Wind buffering tactics utilizing structure retention, pre-planned strip harvest/skid trails.
7.5.5	**Understorey management is required during all phases of timber operations (i.e. falling, skidding, hauling, reclamation and reforestation).**	**Avoidance methods (see discussion) shall be used to protect the white spruce understorey in harvesting containing less than 500 stems per hectare (sph) of pre-harvest acceptable stems.**
7.5.6	**New**	**Unless approved by Alberta, containing patches greater than 2ha with at least 500 sph of pre-harvest acceptable stems, shall utilize protection methods (see discussion) to protect the white spruce understorey.**
7.5.7	**Renumbered**	**Renumbered from 7.5.6**
7.5.7	**Where understories are to be protected, harvest areas shall be designed and operated to minimize the risk of blowdown to understorey trees.**	**Deleted**

7.7.1.9	**New**	**When operations are inactive in a forest harvest plan operating area within a Caribou Range or the Key Wildlife and Biodiversity Zone for a consecutive period of time exceeding 48 hours, access to the forest harvest plan operating area will be temporarily restricted with a physical barrier to prevent unauthorized access. Physical access restrictions will be located in a manner which restricts highway vehicle access to the forest harvest plan operating area.**
7.7.2 (Discussion)	Woodland caribou are classified as a "Threatened" species under both the Alberta Wildlife Act and the National Species at Risk Act. The "1996/97 Operating Guidelines for Industrial Activity in Caribou Ranges in West Central Alberta" and the "2001 Boreal Caribou Committee Strategic Plan and Industrial Guidelines for Boreal Caribou Ranges in Northern Alberta" provide background, intent, and specific direction for managing industrial work on caribou range.	Woodland caribou are protected as a "Threatened" species under Alberta's Wildlife Act and the Federal Species at Risk Act. "A Woodland Caribou Policy for Alberta" provides Government of Alberta intent and direction for recovery of woodland caribou populations and habitat, including managing industrial work on caribou range.
7.7.4 (Discussion)	Trumpeter swans are classified as a "Threatened" species under the Alberta Wildlife Act.	Trumpeter swans are classified as a "Species of Special Concern" species under the Alberta Wildlife Act.
7.7.6.3	**New**	**Added – other confirmed den sites – 20 m**
8.1	**Updated**	**Renamed to Planning Operations**
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. For felled inventory, the reforestation start clock is the start of the timber year following the year of cut and not when skid clearance was declared.**	**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.**
8.1.5	**New**	**Harvest areas (openings) shall be clearly identified. e.g.** maps, spatial files, or delineation on the ground through visual markings. **Where stumps are left to delineate areas (e.g. harvest areas) they shall be approximately 30 m apart and no higher than 2 m, see 4.2.4.**
8.1.8 to 8.1.11	**(Moved from 8.3)**	**N/A**
9.2	**Areas susceptible to rutting, puddling or compaction shall be harvested during dry or frozen conditions) e.g., harvest areas with predominantly imperfectly-poorly drained soils).**	**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., harvest areas with predominantly imperfectly-poorly drained soils).**

9.4	**For non-frozen operations only, operations shall not occur during heavy rainfall or when soil conditions are above field capacity (saturated).**	**Operations shall not occur during heavy rainfall or when soil conditions are above field capacity (saturated).**
11.3.1.4	**New**	**Added incidental activities with respect to temporary road construction – see Section for details.**
Table 6	**Added**	**Low profile crossings are used where bank protection is achieved through simple freezing in during frozen conditions or levelling the road in non-frozen conditions.**
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.**	**Deleted**

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Daishowa-Marubeni International Ltd. Peace River Pulp Division FMA's 0900044 and 0900045 Operating Ground Rules

1.0 GROUND RULE SCOPE

Ground rules are the practices used in planning and conducting timber harvesting operations which constitute the methods used to implement decisions made in the FMP and other higher level plans such as Integrated Resource Plans (IRP). In the event that these strategic plans do not exist, the ground rules shall establish practices that minimize the chance of negative impacts from roads, timber harvesting and forest management operations and activities. 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 appropriate Government of Alberta 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 must be completed in writing and conform to departmental policy, the Forests Act, the Timber Management Regulation, the Public Lands Act and all other applicable provincial legislation or statutes. Ground rule waivers identified in the FHP meet the intent of "in writing" as required above.

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.

2.0 THE TOPICS

These ground rules cover all 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.

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**
   - **Approved Long Term Road Network**

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 licences 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 or as individual submissions on a schedule approved by Alberta:**
   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

   (see section 3.5)

3.2 COMPARTMENT ASSESSMENT (CA)

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 level of substantial additions of >20% of the SHS/compartment/decade as determined by the appropriate government delegated authority). 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 affected 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 on which a CA is required and the requirements of the CA after consultation with the forest disposition holder. Disposition holder involvement will be detailed by Alberta.

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.

3.2.4 The CA shall include any maps, analyses, and reports deemed necessary by Alberta to adequately address the issues. Quota holders and FMA holders shall make time, resources and data available where required for a CA.

3.3 GENERAL DEVELOPMENT PLAN (GDP)

PURPOSE

To provide a projection of activities for the next five years to:
a) guide the integration of activities;
b) schedule timber disposition administration activities;
c) predict cut control status;
d) 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 and long-term road plans outlined in the FMP. The GDP must also include the current status and forecast of the respective 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. It is expected that there will be substantial discussion on significant issues with Alberta before the FHP is submitted. Consultation of the GDP with First Nations is a requirement of Alberta's First Nations Consultation Guidelines on Land Management and Resource Development.

GROUND RULES

3.3.1 The GDP submission date is no later than June 1 of each year unless otherwise approved by Alberta. Alberta shall respond within 30 working days. The GDP shall be approved subject to an appraisal by Alberta.

3.3.2 The GDP shall contain a summary of any proposed variances from the harvest sequence and long-term corridor plan in the FMP. Variances must be approved by Alberta. (see section 4.1)

For sections 3.3.3 and 3.3.4 the following applies: If agreement between other forest operators and the FMA holder cannot be achieved after substantial discussion, and the process has been well documented, the dispute resolution process under OGR 5.1.1 shall be used.

3.3.3 The GDP shall describe volume supply by operating area, source and tenure, road standards and construction schedule, and reclamation activities. The plan is a notification to Alberta of proposed activities and exceptions (see 3.3.2) to guide future regulatory activities. Other forest operators affected by the GDP must acknowledge receipt of the GDP in writing (email is acceptable) before approval (see section 5.1.1). It is expected that there will be substantial discussion to resolve significant issues with Alberta before the AOP is submitted for approval. It is the responsibility of the operator to ensure that total volume harvested does not exceed that allowed in their tenure document.

3.3.4 When a major change in a company's general development strategy is proposed after the GDP is received, a revision may be requested by Alberta where the change may affect issuance of dispositions, the orderly review of AOPs, or integration with other forest operators.

3.3.5 The GDP consists of the following:

1. **Schedules with the following information:**
   - **a) the operating areas to be harvested each year of the next five-year period;**
   - **b) timber production summary table for all dispositions (by year);**
   - **c) Class I, II and III road developments showing planning and construction time lines and the status of DLO applications;**
   - **d) all roads that are to be monitored, and all outstanding and anticipated reclamation work related to DLO road and stream crossings;**
   - **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;**
   - **f) proposed and actual volumes in satellite yards;**
   - **g) a description of variances (as per section 4.1) from the SHS and FMP long-term corridor plan supported by documentation; and**

2. **A map or maps (of appropriate scale) that show the following:**
   - **a) the mill site location;**

b) proposed haul routes (differentiating existing roads from roads to be constructed) and primary routes to be used for reforestation access;
c) satellite yard locations;
d) the timber dispositions to be operated by compartment and operating area.
e) other important forest resource areas or facilities that could be directly affected by logging;
f) the general location of routes, dispositions and facilities where reclamation work is scheduled and where roads and watercourse crossings are to be reclaimed; and
g) as built plan (unless as provided at a later timeline as per 12.3)

3.4 FOREST HARVEST PLAN

PURPOSE:

To describe the laid out harvest and road design

DISCUSSION

The primary components of a Forest Harvest Plan (FHP) are a map and report that clearly show and document the harvest area boundaries, roads and water crossings for the compartment. 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 RFP;
b) adds less than 20% of the operator's assigned SHS area, by compartment per decade;
c) the harvest area (ha) does not exceed 100% of the total operator assigned SHS area for core and contingency by compartment per decade as tracked in the GDP;
d) it adheres to all ground rules; and
e) all other affected forest operators have agreed to the FHP in writing.

Alberta shall notify the organization by acknowledging acceptance within 5 working days of submission when the document meets the requirements for acceptance. Where the FHP does not meet one or more of the above standards, the FHP shall undergo a full review by Alberta with a response provided to the company within 30 days. Variances from the SHS shall be reported in a format acceptable to Alberta. (see section 4.1.2)

3.4.2 If a CA was completed, the FHP shall undergo a full review by Alberta to ensure the direction in the CA has been implemented.

3.4.3 All FHPs submitted by operators who harvest more than 30,000 m^3 each year from crown land, must be validated by a RFP. Validation means that, the OGRs were followed, the SHS was followed or variances identified, and all affected operators have agreed (email is acceptable) to the design. (see section 5.1.1)

3.4.4 Other forest operators affected by the FHP must agree, in writing, with the FHP before it will be approved. If agreement between other forest operators and the FMA holder cannot be achieved after substantial discussion, and the process has

been well documented, the dispute resolution process under OGR 5.1.1 shall be used.

3.4.5 Maps shall accurately show the following information:

- **a) the approved forest inventory as agreed to by Alberta;**
- **b) approved SHS and variances from the SHS;**
- **c) all laid out Class 1 – 3 roads within harvest areas and harvest area boundaries for all timber operators;**
- **d) all proposed inter block Class 4 roads and associated numbered watercourse crossings locations, these may be moved from the location shown as per 3.5.5;**
- **e) all current active Public Lands Act dispositions, reservations and notations (see glossary)**
- **f) Registered Fur Management Area (RFMA) boundaries**
- **g) Alberta permanent sample plot locations;**
- **h) identified waterbodies, springs, water source and seepage areas;**
- **i) road corridors and DLO numbers (may be in table format in 3.4.6) and differentiate class 1-3 from class 4 for both existing and proposed roads.**
- **j) Locations of access control measures; and**
- **k) company current information on previously harvested areas, existing trails, seismic lines, power lines, pipelines and access routes.**

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

- **a) opening number for each proposed harvest area;**
- **b) area (ha), and coniferous and deciduous volume for each proposed harvest area;**
- **c) SHS map with an overlay of laid-out harvest areas and SHS depicting variances from the SHS;**
- **d) summary table of variances from the SHS by harvest area for each FHP, (see section 4.1.2);**
- **e) regeneration stratum for each proposed harvest area (based on dominant or largest area of pre-harvest stratum within the harvest area, or stratum conversion if known. (see applicable Alberta policy directives for further details);**
- **f) potentially affected Public Lands Act dispositions, reservations and notations and other potentially impacted Forests Act timber dispositions;**
- **g) description of how the CA is addressed in the FHP;**
- **h) list of watercourse crossing locations, and classification of waterbody;**
- **i) access control methods employed;**
- **j) table showing status of non-DLO roads (see section 11.2.1.1);**
- **k) description of integration with other users (see section 5.1.1); and**
- **l) description of protection for sensitive wildlife sites as per section 7.7.6.2.**
- **m) spatial data as required by Alberta's policy directives.**

3.4.7 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.

3.4.8 The following items shall be mapped and/or described for each harvest area where the described situation is present:

- **a) layout bordering and encompassing watercourse protection areas when different than the standards in section 6.0;**
- **b) upon request, non-frozen ground harvest areas, where portions of the block area have an estimated depth to water of less than 1.0m.**

c) **layout bordering restricted areas, e.g., permanent sample plots (PSPs), private land;**

d) **identification of coniferous understorey when avoidance or protection criteria is met as per section 7.5**

e) **harvest area-specific structure retention and woody debris management strategies, e.g. 7.7.2.7,7.7.3.7, and 7.7.4.3;**

f) **tactics to address forest health issues in stands with classified Forest Health concerns as per OGR 10.1.1;**

g) **harvest areas where special aesthetic or recreational concerns need to be addressed when required to meet OGRs (e.g. 5.2.1, 5.5.1)**

h) **strategies to try and maintain sight distance of 400m or less from Class I II or dry or all weather Class III roads;**

i) **important wildlife sites as defined in section 7.7.6.2; they may be designated in general terms as no harvest zones, with the detail record maintained by the company.**

j) **layout required to address actual or high potential historical site considerations**

k) **soil protection measures when any of the following are present:**

- **identified unstable areas, water-source areas, springs or seepages;**
- **side cuts on slopes greater than 20% and longer than 50m;**
- **steep or sustained slopes or grades (>30%);**

3.4.9 **Detailed harvest area plans (DHAP) are required when there is higher than average potential for environmental damage. Circumstances that merit DHAPs are:**

a) **areas of steep topography (as per 3.4.8 l) requiring specific road location and construction or specialized harvesting equipment; (unstable slopes are generally to be avoided but if this is not possible it is necessary to plan operations carefully to minimize impacts);**

b) **harvest areas with numerous water source areas, seepages, intermittent, or ephemeral watercourses;**

c) **harvest areas that contain or border sensitive wildlife sites as per section 7.7.6.2;**

d) **harvest areas requiring understorey protection using protection techniques (see section 7.5);**

e) **harvest areas located near high-value recreation areas, tourism areas, and facilities;**

f) **partial harvests, excluding commercial thinning (CT) and pre-commercial thinning (PCT); and**

g) **when harvesting is used as a tool to control insects and disease infestations a DHAP may be requested by Alberta.**

The DHAP shall include a map of appropriate scale to the issue(s) and describe how the concern will be addressed in operations. DHAPs must be available to Alberta upon request.

3.5 ANNUAL OPERATING PLAN

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 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) DFMP Corridor Plan
g) General Development Plan

GROUND RULES

3.5.1 The AOP submission date is a minimum of 30 working days prior to commencement of operations 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 summary of block volumes and areas, Reforestation Program, Fire Control Plan, and Road Plan, are submitted as in 3.5.1 above, unless otherwise agreed to by Alberta. The schedule for submitting any necessary CA, GDP and FHPs may be different.

3.5.3 Only harvest areas and roads with FHP approval shall be scheduled for operations in the AOP submission.

3.5.4 The AOP shall contain the following components:

a) Administrative and Timber Production information:

I. number of the disposition(s);
II. date of submission and effective period;
III. where harvest volume, chargeability and reforestation responsibility are clearly identified by block for all merchantable species;
IV. proposed harvest volume to be harvested by timber disposition;
V. utilization standards;
VI. an assurance that for all proposed land use of existing dispositions, permission will be obtained prior to use. A table is to be submitted indicating which dispositions will be used, and which corresponding holders will be contacted.

b) Operating Schedule – a table which outlines:

I. list of harvest areas proposed for harvest (including 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. It includes watercourse crossings to be built or installed or removed/maintained;
III. a table or report listing all non DLO roads over two years old;
IV. declaration of outstanding operational items, or an agreement with Alberta on reporting of outstanding operational items;

V. debris disposal details.

c) Annual Reforestation Program (see section 3.6)

e) Fire Control Plan which covers suppression equipment (see section 7.3 Fire Management, ground rule 7.3.5 for requirements for operations during the fire season)

f) Road Plan (see section 11.2)

g) GDP and CA if applicable

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

MINOR AMENDMENTS

3.5.5.1 Changes listed in the "Minor Amendments" column require only company RFP validation and notification to Alberta. Minor amendments don't require Alberta's approval, provided all appropriate background checks (e.g. GLIMPs Land Status check) have been made and rationale for the change has been provided (changes can be implemented prior to notification but must be reported on the next bi-weekly operations report after implementation). 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 5 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.

	Minor Amendments (Reportable/ Notification Required)	Major Amendments (Delegated Authority Approval Required)
a.	**For blocks >10 ha, final area must be ≤ 5% larger due to operational additions; for blocks < 10 ha, operational addition must not exceed 0.5ha.**	**For blocks >10 ha, operational additions are ≥ 5% larger than original block size; for blocks < 10 ha, operational additions exceed 0.5ha.**
b.	**Any size of operational deletion to the approved FHP harvest area boundary.**	**N/A**
c.	**Inter-block roads moved to existing access or conventional seismic lines where re-growth is less than 3m. New clearing distance of 100m is permitted to get from approved AOP access to the existing access.** **Inter-block roads requiring development of new right-of-way (ROW) clearing that are moved less than two ROW widths (maximum width in Table 3) from the approved FHP road location.**	**Inter-block roads that require development of new right-of-way (ROW) greater than two ROW widths from the approved FHP location.** **(Note, use of seismic lines with regrowth greater than 3m is consisting new ROW development)**
d.	**Any block where roading and bared areas exceed 5% provided a commitment to decompact, rollback and plant roads within a harvest area.** **Where there is no commitment to decompact, and plant roads, the roading and bared areas may exceed 5% only in blocks less than 10ha or narrow blocks.**	**Blocks exceeding 5% roading and bared areas where either no commitment is made to decompact, rollback and plant, or where the block is greater than 10ha or not a narrow block.**

e.	**Adding crossings to unmapped or unidentified small permanent, transitional, intermittent and ephemeral watercourses.**	**Added crossings to large permanent watercourses.**
f.	**Change in harvest season from non-frozen ground operations to frozen ground operations.**	**Change in scheduled harvest season from frozen ground operations to non-frozen ground operations.**

MAJOR AMENDMENTS

3.5.5.2 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.

3.6 REFORESTATION PROGRAM

3.6.1 The reforestation program shall be submitted:

a) before April 1 for silviculture operations commencing between May 1 and October 31;
b) with the AOP 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.

3.6.2 The reforestation program shall be approved by acceptance if:

a) all reforestation or silviculture plans or prescriptions are consistent with the approved FMP silviculture strategies.

If any reforestation or silviculture plans or prescriptions vary from FMP silviculture strategies the reforestation program shall be appraised by Alberta.

3.6.2 The reforestation program shall include the following components and information:

a. Reforestation Strategy

The Forest Management Plan contains a Silviculture Strategy table for prescriptions specific to different forest stratum. Changes to the approved strategy in the FMP are outlined in the reforestation program.

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.

b. Proposed Silviculture Treatment Schedule

The Silviculture Treatment Schedule shall contain the following information by opening:

1. opening number;

2. the estimated area (ha) to be treated;
3. the reforestation strata standard for each opening
4. season or date of activity – frozen vs non-frozen.
5. The following proposed reforestation activities and minimum information for each harvest area (or stand) shall be listed where applicable:
    a) Access and associated operations implications for reforestation activities
    b) Site Preparation – mechanical or chemical treatment
    c) Planting – primary species, density range, and notification if outside approved seed zone
    d) Seeding – species and notification if outside approved seed zone
    e) Leave for Natural – species
    f) Manual Tending – type (cleaning vs spacing or combination)
    g) Fertilization – type of fertilizer
    h) Herbicide/Insecticide application – type of chemical and method (ground vs. aerial) and target species for insecticide
    i) Commercial Thinning (Area and density range of remaining stand)
    j) Regeneration Surveys – establishment and performance
    k) Cone/cuttings Collection – (if unknown, Alberta shall be notified regarding collections as per the 'Standards for Tree Improvement in Alberta)
    l) Let it grow as a retreatment strategy.

Should the proposed reforestation activities for a harvest area change after approval of the reforestation program, the following items require a plan amendment:

- changing to a strategy not approved in the silviculture strategy table for the specific strata;
- additional harvest areas to be treated by any means of treatment;

Any remaining changes require notification to Alberta through self-reporting and ARIS reporting.

If a harvest area is declared sensitive, the forest operator shall provide additional information beyond the strategic and tactical levels (see section 3.4.9). This information shall include the actual techniques (e.g., type of site preparation machine) and their expected impact on the harvest area attribute(s) that make it a sensitive site (e.g. providing frequent furrow trenching breaks on downhill run to reduce erosion).

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.

3.7 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 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 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 as agreed to by Alberta.

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

3.7.1 Salvage planning is initiated on the natural disturbance when deemed appropriate by Alberta.

3.7.2 A FHP 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, yields)**
- **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 is considered the FHP planning unit and is typically smaller than an FMA defined compartment or subunit. Within the FHP planning unit, the operator will 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) to delay harvest outside the first 10 year period (deferral) or to delay harvest till later in the first period (bypassed stand). Where deletions, deferrals, or bypassed stands 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 1** 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 in 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.

Core and Contingency Criteria –Criteria that have been established in the FMP to segregate the AAC based on stand condition and economic considerations. Harvesting of contingency stands is at the company's discretion and therefore normal tracking of variance is not possible in the contingency zone. To ensure continued monitoring of activities, variance will be tracked separately by each of these criteria. Variance within Core area will be tracked as per 4.1.1 – 4.1.5 and harvesting of Contingency stands will be tracked as per 4.1.6. Core and contingency ground rules apply to FMA0900044 and FMA0900045 only.

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.

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 (either planned or as-built) 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)

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

FHP Planning Unit: 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.

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. Variance is the sum of deletions and deferrals and does not include additions.

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**
- **silver deletions and deferrals (combined)**
- **substantial additions**
- **Sliver 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. 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. The Table 1 shall include cumulative information from all previously approved FHP's in the compartment.

Variance shall be tracked separately for core and contingency landbase within FMA0900044 and FMA0900045.

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 1 for all compartments operated within the current FMP effective period.

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 There shall be no operator specific unassessed spatial harvest sequence in an FHP Planning unit (for core areas). All SHS must either be classified as planned for harvest, deletion or deferral within the FHP planning unit.

4.1.7 The company shall track harvesting of contingency stands as per the following and report by stratum and compartment:

i. **Planned SHS Area (ha)**
ii. **Additions (ha)**
iii. **Variance (ha) (only calculated on stands that are laid out or stands that are deletions)**

Table 1.SHS Assessment (Variance Reporting)

Harvest Profile					As-Built														Planned for Harvest (ha)						Combined As-Built & Planned				
					Harvested (ha)							Variance						SHS Assessment (Excluding Slivers)							Variance			SHS Assessment (Excluding Slivers)	
												Substantial			Slivers										Substantial				
Compartment	Compamy Specific Yield Strata	Provincial Yield Strata	Approved DFA 10 Year SHS	Operator Approved FMP 10 Year SHS	SHS 1-10yr	SHS 11-20yr	SHS 21-70 yr	Contributing Landbase Outside SHS	Non-Contributing Landbase	Total		Additions	Deletions	Deferrals	Additions	Deletions & Deferrals	Total	Total Slivers (%)	SHS Variance (Additions %)	Difference in Area (Subst. Add. - D&D)	Difference in Area Total Harvested - 10yr FMP SHS	SHS 1-10yr	SHS 11-20yr	SHS 21-70 yr	Contributing Landbase Outside SHS	Non-Contributing Landbase	Total		Additions	Deletions	Deferrals	SHS Variance (Additions %)	Difference in Area (Subst. Add. - D&D)	Difference in Area Total Harvested & Planned - 10yr FMP SHS
100	All	All	-	-	-	-	-	-	-	-		-	-	-	-	-	-	#####	0%	-	-	-	-	-	-	-	-		-	-	-	0%	-	-
	1A	1	-	-	-	-	-	-	-	-		-	-	-	-	-	-	#####	0%	-	-	-	-	-	-	-	-		-	-	-	0%	-	-
	2A	2	-	-	-	-	-	-	-	-		-	-	-	-	-	-	#####	0%	-	-	-	-	-	-	-	-		-	-	-	0%	-	-
	3A	3	-	-	-	-	-	-	-	-		-	-	-	-	-	-	#####	0%	-	-	-	-	-	-	-	-		-	-	-	0%	-	-
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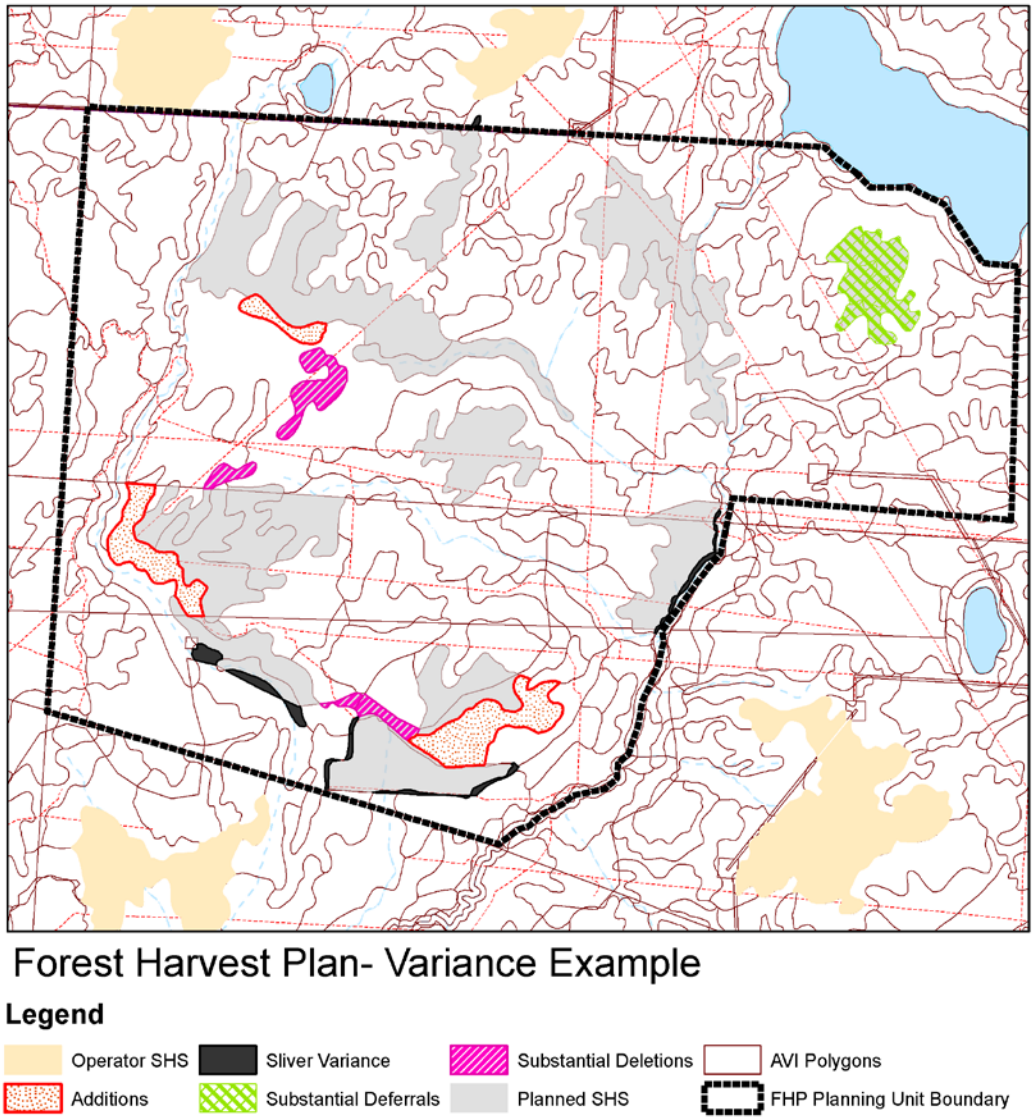
Figure 1.SHS Variance Example



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/piece utilization standards are stated in the applicable timber disposition and shall normally be one of the following standards.

Coniferous Utilization Standards
15/11 Utilization

- Merchantable Tree: one that has a minimum diameter of 15 cm outside bark at stump height (30 cm) and a usable length of 3.66 m to a 11 cm top diameter (inside bark).
- Merchantable Piece: one that is 2.44 m (plus 5 cm trim allowance) or longer, with an 11 cm (inside bark) small end, where rot content or form does not render it unusable.

Deciduous Utilization Standards
15/10 Utilization

- Merchantable Tree: one that has a minimum diameter of 15 cm outside bark at stump height 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.
- Merchantable Piece: one that is 2.44 m or longer to a 10 cm (inside bark) small end, where rot content or form does not render it unusable.

Salvage Operations
19/13 Utilization

- This standard may be adopted by Alberta to encourage recovery of timber damaged by fire or insects and diseases in coniferous and deciduous stands.
- Merchantable Tree: one with a minimum diameter of 19 cm outside bark at stump height (30 cm) and a merchantable length of 5.0 m or greater to a 13 cm top diameter (inside bark).
- Merchantable Piece: one that is 2.44 m (plus 5 cm trim allowance) or longer, to a 13 cm (inside bark) small end, where rot content or form does not render it unusable.

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 0.61 m intervals or less to 50% sound wood.

4.2.3 Maximum stump height shall be no more than 30cm. The stump height shall be determined using the SOP from the Forest Operations Monitoring Program. Where stumps are left to delineate areas e.g. (harvest areas, create rub posts for understory protection, or to delineate poorly defined watercourses) they shall be approximately 30 m apart and no higher than 2 m and usually will consist of low merchantability species.

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. In the absence of FMP guidance, the standards in section 7.4 apply.

4.2.5 All trees/pieces used in the construction of crossing structures may be scattered or piled along the ROW or in the harvest area, but they shall not be piled in riparian areas if any chance of re-entering the watercourse. It is acceptable to use these pieces for erosion control on the road bed.

4.2.6 Volume associated with crossing structures shall be reported and charged in TPRS.

4.2.7 Company processing practices cannot make an unmerchantable piece from a merchantable tree.

5.0 INTEGRATION WITH OTHER USERS

5.1 DECIDUOUS/CONIFEROUS JOINT OPERATIONS

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;
c) enable prompt reforestation.

GROUND RULES

5.1.1 All operators with timber dispositions in an area covered by a FHP/GDP must agree 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 the Senior Forester for review with the reviewing forester. 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. If either proponent disagrees with the determination of the Senior Forester, they may appeal the decision to the Delegated Authority.

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.

5.1.3 Specific endorsement at a block level is required from the integrated operator when the tenure holder submitting a Forest Harvest Plan includes polygons that are assigned to another tenure holder's landbase.

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 shall have addressed recreational issues through a variety of tactics such as deferrals or buffers around specific sites or access management strategies.

GROUND RULES

5.2.1 Operational tactics to mitigate impacts on recreation and tourism shall be described in the GDP and FHP.

5.2.2 The forest operator shall work with groups 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 ensure they can be used safely while minimizing their impact on the recreation values of the area.

5.2.4 FHPs affecting recreational sites should provide opportunities for the enhancement of existing recreational trail and road systems 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 RFMAs and owners. Upon request the local Fish and Wildlife office shall provide the relevant list of trappers to the forest operators by January 1 of each year.

GROUND RULES

5.3.1 A representative of the forest operator shall personally contact, or send a registered letter to the senior partners of a RFMA during the preparation of the FHP. Information 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 integrated into the plan if applicable. The forest operator shall provide the trapper with a copy of the approved AOP map.

5.3.2 At least ten days prior to commencing operations, the forest operator shall notify the trapper, preferably by personal contact or if not possible, by registered mail 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. Alberta has developed standards to guide the integration of timber and grazing. These standards will be used by the two industries to ensure effective communication and integration is occurring on overlapping dispositions.

GROUND RULES

5.4.1 The forest operator shall conduct all operations in accordance to the Grazing Timber Integration Manual and Directive SD 2011-03.

5.4.2 The forest operator has ensured 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, infrastructure, roads, and bridges (e.g. fencing, water developments). The forest operator is responsible to repair and/or replace any damage to these improvements and infrastructure.

5.4.3 The forest operator has contacted the grazing disposition holder in person or by phone a minimum of 21 days prior to commencing timber operations to discuss access and any other issues affecting the range management of the grazing disposition.

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;
- 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 public 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 employed in the FHP to mitigate the impacts of harvesting and reforestation on visual quality.

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. Historical resources are to be dealt as per the requirements of Alberta.

GROUND RULES

5.6.1 All known historical resources shall be identified and assessed in keeping with the requirements of Alberta.

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 that may directly affect the historical resource shall cease and the appropriate government authority (Alberta) shall be notified.

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
- minimizing soil, logging debris and deleterious substances from entering watercourses
- maintaining aquatic and terrestrial habitat
- 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 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 2, 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.

- **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 unvegetated channel widths are summed to represent total channel width;**
- **Where the distance bordering the block is not enough for four measurements, reduce the measurement interval as required.**

6.0.2 Measures must be implemented, including temporary and permanent erosion control measures, to minimize erosion and sedimentation into the watercourse or waterbody.

6.0.3 Riparian protection areas shall be established as in Table 3, 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 unmapped or incorrectly classified watercourses encountered during operations shall be given the appropriate protection as described in Table 3. The company shall ensure the location of transitional and larger watercourses are updated into the next net landbase.

6.0.5 Unless otherwise approved in a FMP, the operator must ensure that variances from standards in Table 3, meet aquatic and terrestrial objectives. Proposals for variances from standards in Table 3 require a full review from Alberta prior to being considered for approval.

6.0.6 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, reclamation, or silviculture operations.

6.0.7 Equipment shall cross watercourses as per Table 3 and Table 6.

6.0.8 Logs shall not be decked in watercourses, riparian areas, or seepage areas.

6.0.9 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.

6.0.10 Beaver ponds shall have same classification as the watercourse flowing out of the pond as measured at a representative width within 50 m of the dam.

6.0.11 Harvesting is not permitted within water source areas during non-frozen periods.

Table 2.Watercourse Classification

Watercourse Classification					Fisheries/Wildlife Values	Potential Impacts
Type	**Mapping Designation**	**Physical Description**	**Portion of Year Water Flows**	**Channel Development**		
Class "A" Waterbodies	Solid Red Line on Watercourse Crossing Codes of Practice (Water Act)	Not applicable	Not applicable	Not applicable	Known habitats critical to the continued viability of locally or regionally important fish species; Habitat areas are sensitive enough to be damaged by any type of in-stream activity or changes to water quality or flow regime	Fish and fish habitat affected by sediment load, turbidity, disposition of sediment, chemical contamination or alteration of stream flow
Class "B" Waterbodies	Solid (Variable Colour) lines overlain by small circles on Watercourse Crossing Codes of Practice (Water Act)	Not applicable	Not applicable	Not applicable	Key broadly distributed habitat areas important to the continued viability of a population of locally or regionally important fish species; Habitat areas are sensitive enough to be potentially damaged by in-stream activities; Potential short and long-term effects of in-stream activities considered to have detrimental effects on, and are high risk to, the survival of fish populations	Fish and fish habitat affected by sediment load, turbidity, disposition of sediment, chemical contamination or alteration of stream flow
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 5m	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.	Banks and channel well-defined Channel width from greater than 0.7m 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

Continued…

Table 2. Watercourse Classification

Watercourse Classification					Fisheries/Wildlife Values	Potential Impacts
Type	**Mapping Designation**	**Physical Description**	**Portion of Year Water Flows**	**Channel Development**		
Transitional	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 0.4 m to 0.7 m.	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 0.4 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
Ephemeral	To be identified during layout	Vegetated draw connecting to a higher order stream	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 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	Not applicable	Important habitat for ungulates	Thermal cover/grazing areas

Table 3.Standards and Guidelines for Operating Beside Watercourses

Watercourse Classification	Roads, Landings, debris piles and Bared Areas, Except for Crossings	Watercourse Protection Areas	Operating Conditions Within Riparian Areas and Water Source Areas Where Operations are Approved	
			Tree Felling	Equipment Operation
Class "A" Waterbodies	Not permitted within 100 m of high water mark unless approved in AOP. Any existing roads may be maintained at present classification standards. Any proposed watercourse crossings must be a temporary crossing and specifically approved in the AOP.	No disturbance or removal of timber within 100 m of the high water mark of the main channel, tributaries are treated as per table 3; No duff disturbance of intermittent (min 10 m vegetated buffer) or ephemeral drainages (minimum 5 m vegetated buffer) within 2 km upstream of Class A waterbody.	Not permitted without specific Alberta approval.	Not allowed without specific Alberta approval.
Class "B" Waterbodies	Not permitted within 60 m of high water mark unless approved in AOP. Any existing roads may be maintained at present classification standards. Any watercourse crossings must be a temporary crossing specifically approved in the AOP.	No disturbance or removal of timber within the appropriate riparian area specified by stream type unless specifically approved in the AOP; No duff disturbance of intermittent (minimum 10 m vegetated buffer) or ephemeral drainages (minimum 5 m vegetated buffer) within 500 m upstream of Class B waterbody.	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 30 m of the high water mark.
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.

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Table 3. Standards and Guidelines for Operating Beside Watercourses

Watercourse Classification	Roads, Landings, Debris Piles and Bared Areas, Except for Crossings	Watercourse Protection Areas	Operating Conditions Within Riparian Areas and Water Source Areas Where Operations are Approved	
			Tree Felling	Equipment Operation
Transitional	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.	Transitional streams: Buffer of treed vegetation will be left for 10 m from the high water mark or to the top of the break in slope, whichever is further.	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.	Heavy equipment may operate within 20 m only during frozen or dry periods (when soil condition is not susceptible to degradation). No skidding through watercourse except on snow/ice bridge or logfill. Where fish and spawning movements have been identified, special crossings that do not obstruct upstream fish passage or cause stream siltation may be required.
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 only during frozen or dry periods (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 conditions (if soil condition is not susceptible to degradation). Any crossing required as per Table 6 (excluding low-profile crossings) shall be approved and reported as per 11.4. Equipment crossing ephemeral watercourses shall be minimized.
Lakes (little or no recreation, waterfowl or sportfish potential	Not permitted within 100 m of high water mark unless specifically approved in the AOP.	On lakes exceeding 4 ha in area, no disturbance of timber within 100 m of high water mark except where specifically approved in FHP. Where approval is granted to remove timber within the 100m zone, no timber shall be removed within 30m of the high water mark.	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.	If timber removal is approved, no machinery to operate within 40 m of the high water mark.

Table 3. Standards and Guidelines for Operating Beside Watercourses

Watercourse Classification	Roads, Landings, Debris Piles and Bared Areas, Except for Crossings	Watercourse Protection Areas	Operating Conditions Within Riparian Areas and Water Source Areas Where Operations are Approved	
			Tree Felling	Equipment Operation
Lakes (with recreational, waterfowl or sport fish potential)	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.	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 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.	Consideration must be given to aesthetics when harvesting adjacent to lakes with recreational potential.
Water source Areas and Areas Subject to Normal Seasonal Flooding	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 bay 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.	The buffer shall encompass the area from the high water mark of the main watercourse to 20 m beyond the high water mark of the oxbow lake. Oxbow lakes outside the buffer of the main watercourse shall be treated as watersource areas.	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.

See Water Act for definitions of class A and B waterbodies.

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.

Within landscapes managed for timber production, landscape patterns, cover types and seral stages can be managed to produce a desired future forest. The coarse filter approach to maintaining biodiversity in managed landscapes involves managing for suitable amounts and patterns of all forest cover types and all seral stages, along with managing for inherent natural spatial and temporal variability.

The variability of natural disturbances shall be considered when planning harvest area size and shape. This variability will help to provide habitat for species that are dependent on natural disturbance regimes. The use of Alberta Vegetation (AVI) polygon boundaries will help to plan this variability. Use of natural features as harvest area boundaries is consistent with natural disturbance and shall be used whenever possible.

Landscape planning requires that targets be set that are measurable. Targets describe the amount of each landscape element that will be created, maintained, or managed, as well as the spatial and temporal variability (expressed as a range) of each. Creating variability in natural landscapes is important because element amounts vary between landscapes, and the requirements of biota also vary. Targets will be refined over time using analysis based on natural disturbances, natural succession processes, current and historical conditions within the region, sub-region and ecodistrict or ecoregion.

Wildlife species of special management concern are major considerations in the selection of the SHS in the FMP.

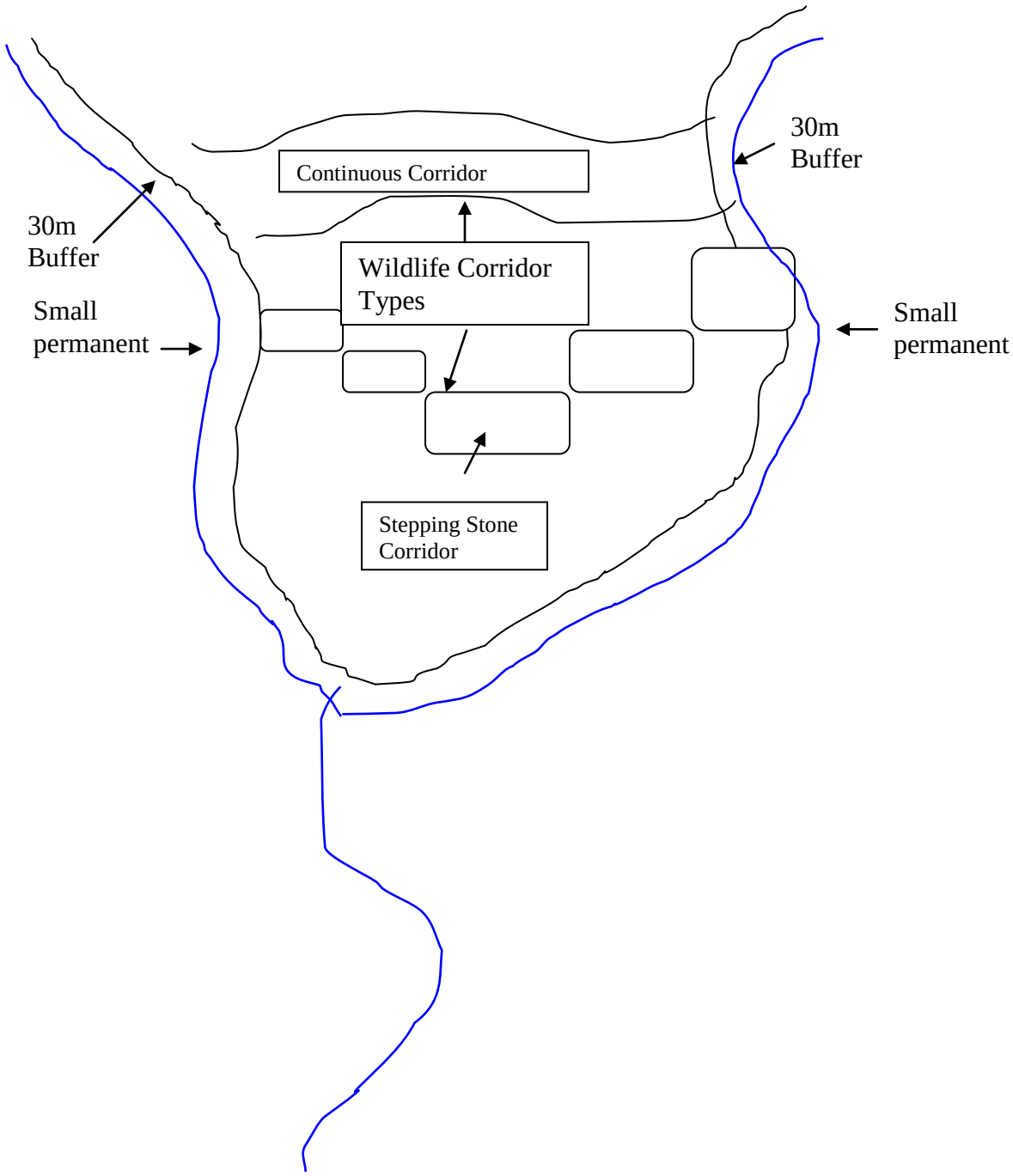
Wildlife movement corridors are required to ensure that animals with large home ranges find passage between and within managed landscapes. When planning for wildlife habitat and movement corridors, the following factors shall be considered: watercourse classification/profile/pattern and associated valley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

Unless otherwise approved by Alberta, the size distribution of harvest areas within a compartment shall be representative of the natural variation of the landscape, which for the purpose of harvest planning, is the range of stand polygon sizes prior to harvest within the compartment boundary.

GROUND RULES

If not otherwise addressed in an approved FMP, SHS or structure retention strategy, the following ground rules shall apply:

7.1.1 Adjacent watersheds of small permanent watercourses shall have wildlife corridors connecting their uplands. This corridor should be focused on natural travel corridors and may contribute towards structure retention targets.



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, 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.

In the absence of a SHS, a preliminary harvest plan will be required in addition to the forest harvest plan.

Ground rules 7.2.1 – 7.2.3 apply to both a spatial and non-spatial harvest plan.

7.2.1 Roadside vegetation shall be protected in harvest areas to limit the line-of-sight distance across the harvest area. To minimize breaks in the vegetation screen, only one road entry point shall be commonly allowed into the harvest area.

7.2.2 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.

7.2.3 Alberta permanent sample plots and protective notations as enabled by the Public Lands Act shall not be disturbed or harvested unless such action is approved by Alberta. PSP's shall also be protected from blowdown by preservation of the existing blue painted (GPS'd) buffer.

7.3 DEBRIS MANAGEMENT AND WILDFIRE PROTECTION

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.**

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 Debris Management Standards for Timber Harvesting Operations (2010).

GROUND RULES

7.3.1 Slash accumulations resulting from timber harvesting, road, and campsite construction shall be disposed of within 24 months of skid clearance 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 shall 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 (refer to 9.3 for further requirements).

7.3.3 Piling and burning operations shall:

a. not be conducted during the fire season, unless otherwise approved in the Fire Control Plan in the AOP;
b. 80% of the pile is burned; unburned portion of the pile may be left for wildlife/ecological purposes as small accumulations of coarse woody debris.
c. require a post burning survey to ensure all holdover fires are extinguished.

7.3.4 The FHP shall comply with Community Firesmart Plans.

7.3.5 The company shall have an approved fire control plan before operations during the fire season shall commence.

7.3.6 Piles left for hog fuel shall meet the following specifications:

- **a) Piles shall be no more than 15 metres in width ;**
- **b) Piles shall not exceed 40m in length;**
- **c) Slash free zone of at least 8m between piles;**
- **d) Piles may only be driven on with front tires of skidder/loader and piled as high as the skidder/loader can reach. Piles shall be located within 10m of the road edge to ensure access to hog procurement equipment; and**
- **e) Any unprocessed piles shall be burnt as per 7.3.1.**

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 habitat connectivity of various scales.
To provide structural complexity and old growth at the stand level.
To provide variability of structure retention (shapes, sizes and forms) across the landscape
To contribute towards emulating natural disturbance.
To maintain a continuum of deadwood structure for habitat and site nutrients.

Stand Level Structural Retention Strategy

Stand level retention is aimed at individual, or groups of blocks to ensure that cutovers have standing residuals within the block boundaries. This structure retention plan will use a target as identified in **Table 4: Retention Targets and Specifications.** The strategy for stand level structural retention is as outlined in the approved FMP (where applicable), and the ground rules below aid in the operational implementation.

GROUND RULES

7.4.1 The total landscape level retention target is a percentage of in-block area as outlined in Table 4 based on a five year roll up of actual harvest area by year (net harvested hectares). Specific Retention strategies are listed by FMU and operator within Table 4.
Retention will be left in the following three categories.

1. **Large patches - A greater than 2 ha patch of undisturbed representative canopy forest.**
2. **Small patches – A patch between 0.5 and 2ha of undisturbed representative canopy forest**
3. **Single trees and clumps – Less than .5ha of undisturbed representative canopy forest.**

Table 4.Retention Targets and Specifications by FMU

FMU	Operator	Landscape Level Target	Harvest Block Level	Proximal Retention	Target Structure	Specifications
P14	All	2%	0-50%	Cannot form part of target.	Area Based (ha)	minimum of 50% of structure retention must be laid out
P19	DMI/Canfor	15%	0-30%	Max. 1/3 of target	Area Based (ha)	target of 7.5% in large patches and 7.5% in small patches/single tree

	Tolko High Level	2%	0-3%	Max.1/3 of target.	Area Based (ha)	1% merchantable conifer and 1% merchantable deciduous, Average of 5% retained as residual material (lesser veg, standing dead, broken trees, understory etc.)
	Zavisha	2%	0-50%	Max.1/3 of target.	Area Based (ha)	All retention is operational. Mountain Pine Beetle blocks to have zero retention of infected pine
P21	DMI	15%	0-30%	Max. 1/3 of target	Area Based (ha)	target of 7.5% in large patches and 7.5% in small patches/single tree
	Tolko High Level	2%	0-3%	Max.1/3 of target.	Area Based (ha)	1% merchantable conifer and 1% merchantable deciduous, Average of 5% retained as residual material (lesser veg, standing dead, broken trees, understory etc.)
	West Fraser High Prairie, Seehta, Boucher Bros.	1%	0-30%	Max.1/3 of target.	Mixed (ha and m^3)	Harvest areas less than 24 ha: 0% retention, Harvest Areas 24-100 ha: 1% volume & area retention, Harvest areas >100ha: 5% area, 3% volume target
PO5	All	2%	0-30%	Max.1/4 of target.	Volume Based (m^3)	
P22	All	3%	0-30%	Cannot form part of target.	Area Based (ha)	
PO2	All	3%	0-30%	Cannot form part of target.	Area Based (ha)	

7.4.2 Retention shall be representative of all harvested stand types and shall range at a harvest block level as per the direction in Table 4: Retention Targets and Specifications.

7.4.3 For DMI and Canfor, retention shall be 5 – 20% annually with a 5 year minimum of 15% of the harvested area by compartment being left as retention.

7.4.4 Retention shall be left in any of the following arrangements:

a) Dispersed
b) Island aggregate
c) Proximal aggregate

7.4.5 Conifer retention should be left in larger patches and where possible with deciduous species (Aspen or Poplar) as it has a greater risk of blowdown.

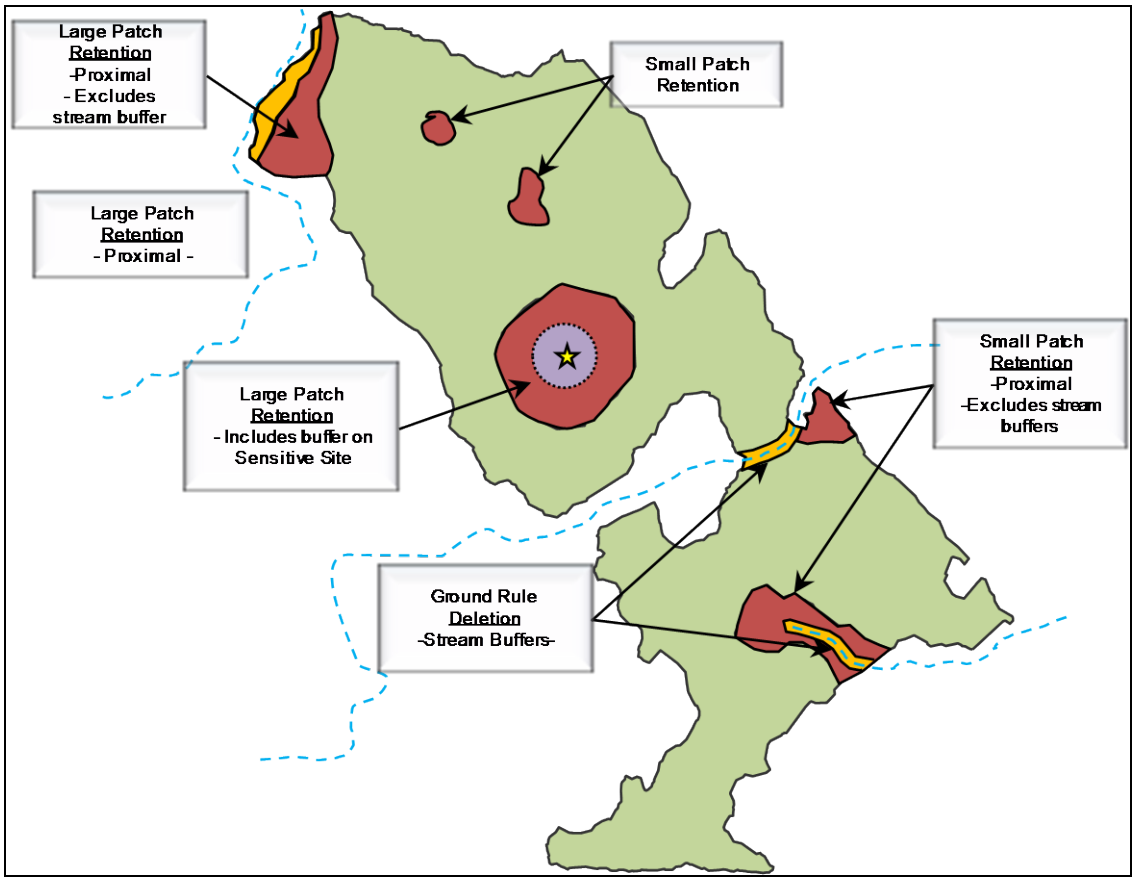
7.4.6 Retention shall be within the harvest block boundary except where Alberta has agreed it can be connected to the boundary (proximal aggregate).

7.4.7 Retention can only be in the net landbase. E.g. Buffers on permanent watercourses, steep slopes etc. are not to be used. Productive landbase used to buffer environmentally sensitive or wildlife areas can be counted towards the retention target. E.g. Hibernacula, den sites, raptor nests etc.

7.4.8 Unless approved by Alberta, historic two and three pass harvest designs scheduled for removal of the next pass can't leave entire blocks as structure retention and leave no structure in the remaining blocks.

7.4.9 Proximal aggregates can be left as per the following:

1. **Where a waterbody described in Table 2 runs into or along the block and retention is left in addition to the required buffer.**
2. **Where sensitive sites defined in 7.7.6.2 are within 100m of the block boundary.**
3. **Where the company chooses to leave a small or large patch along the block edge.**
4. **Proximal aggregates must be excluded from harvest for 70 years.**
5. **Proximal retention can only represent 1/3 of the retention target.**



7.4.10 Structure Retention should be left to achieve the following:

7.4.10.1 Harvest areas adjacent to accessible permanent dry or all weather roads should try to limit sight distance from the road to 400 m.

7.4.10.2 To limit direct distance to wildlife hiding cover to 200 m or less.

7.4.10.3 To protect natural accumulations of dead and standing woody debris.

7.4.10.4 To protect unique features (e.g. Squirrel midden, vernal pools and trappers' cabins)

7.4.10.5 To protect sensitive sites as defined in 7.7.6.2.

7.4.11 The following table describes how structural retention should be distributed among blocks according to net harvest area (ha). (DMI only)

Summary of DMI Structure Retention Strategy

Retention Type (within-block)		Spatial Area Definition	Proportional Target (5-year)
Single Stems	Single Stems	20m2/stem (0.002 ha/tree)	50% of total retention (= 7.5%*)
	Small Clumps	< 0.5 ha	
Small Patch		0.5 ha to 2.0 ha	
Large Patch		> 2.0 ha	50% (= 7.5%*)
* -all target percents are applied as spatial area (ha) of the merchantable harvest area			

Scale of Target	Achievement Period	Retention Spatial Targets *	
Landscape Area (FMA)	5-year	15%	Weighted average among population of blocks
DMI Compartment	Annual	5-20%	
Single-block Area	Annual	0-30%	
* -all target percents are applied as spatial area (ha) of the merchantable harvest area			

MONITORING AND REPORTING

7.4.12 Small merchantable patches <0.4 ha and scattered individual trees shall have the individual stems counted. An individual tree is defined as either live or dead, at least 15 cm stump diameter (IB), a 10 cm top diameter (IB) and at least 3.66 m long. The area equivalent of these small merchantable patches will be approximated using the relationship of 500 stems/ha.

7.4.13 Large merchantable patches >0.4 ha shall be GPS'd to determine area. This may occur pre-harvest or post-harvest. If the layout in a patch differs from the actual retention area remaining post-harvest, a post-harvest GPS measure of the patch shall occur.

7.4.14 All merchantable volume left as retention shall be charged against the AAC under the appropriate disposition.

7.4.15 Each operator shall annually submit a report of the structural retention by block along with as-built plans as per 12.3. The report shall include area of retention by cutover size group, retention patch size, field calls (species group) as outlined in the FMP and a summary table of the area and volume charged to the AAC. Where the target in 7.4.1 is not achieved the company shall submit an action plan detailing how the target will be achieved.

7.5 UNDERSTOREY MANAGEMENT

PURPOSE

To manage coniferous understorey during timber harvesting and reforestation operations.

DISCUSSION

The main objective of this ground rule is to manage coniferous understories (understorey) that will contribute to future forest values. Understorey management must be practiced in all stand types containing white spruce understorey, and balsam fir where approved by Alberta.

Two understorey management techniques are considered and can be used on both coniferous and deciduous landbases:

- **Avoidance –** Used in harvesting containing less than 500 sph of pre-harvest acceptable stems. Wind buffering tactics and pre-planning not specifically required. Operations strive to avoid pockets of young conifers and roads and decking are located in areas where there is lesser concentration of understory.

- **Protection** – Used in harvesting containing patches greater than or equal to 500 sph of pre-harvest acceptable stems. Wind buffering tactics utilizing structure retention, pre-planned strip harvest/skid trails.

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

1. Landbase Assignment From Approved FMP
2. Understorey Characteristics: species; spatial distribution; density and height; the health and vigour of the understorey; the size and wind permeability of the crown; height-diameter ratio (slenderness coefficient).
3. 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.

The SHS shall specify stands with understorey sequenced for harvest.

GROUND RULES

7.5.1 The FHP shall specify harvest areas for understorey protection vs. avoidance techniques. Detail on understorey management techniques shall be described in the FHP harvest area comments and DHAPs.

7.5.2 Understory discovered in the field, but not previously identified shall be treated as per 7.5.5 or 7.5.6.

7.5.3 Stands shall be assigned to the deciduous or coniferous landbase in the FMP based on the approved vegetation inventory.

7.5.4 Damage to some understorey may be unavoidable but understorey management should be done where feasible. Acceptable coniferous understories shall be avoided at all stocking densities; greater attention shall be given to protection of understories as their value increases. The value of the understory may depend upon any of the following factors:

- **density;**
- **height;**
- **spatial distribution;**
- **condition;**

- **species.**

7.5.5 Avoidance methods (see discussion) shall be used to protect the white spruce understorey where harvesting contains less than 500 stems per hectare (sph) of pre-harvest acceptable stems.

7.5.6 Unless approved by Alberta, patches consisting of greater than 2ha with at least 500 sph of pre-harvest acceptable stems, shall utilize protection methods (see discussion) to protect the white spruce understorey.

7.5.7 Post-harvest assessments shall be done by the company with the responsibility for reforestation to assess the success of understorey protection planning and to provide additional information for reforestation.

7.5.8 Pre-harvest acceptable stems are two metres or more in height, have 50% or more live crown, are of good health and vigour, and are crop trees as defined by the Reforestation Standard of Alberta or successor.

7.5.9 Post-harvest acceptable stems have 50% or more live crown and less than 25% of the crown lost due to top breakage, bole scars (bark removed to the cambium) less than 10 cm (vertical length) and less than 20% of the bole circumference, and are crop trees as defined by the Reforestation Standard of Alberta.

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 undisturbed vegetation along all watercourses and water bodies, provide treed buffers for defined water classes, maintain appropriate distancing from bared soil or hazardous materials, 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. Staff and contractor training in aquatic/riparian values stewardship is an important factor for success.

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 may confirm the distribution of fish and fish habitat within the planning areas by:

a) checking the Fisheries and Wildlife Management Information System (FWMIS), Water Act Codes of Practice and fisheries inventory data;

b) conducting new inventories; or

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.

7.7 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 woodland caribou, grizzly bear, trumpeter swan and others as determined by Alberta.**
- **Maintain the effective habitats for ungulates in river valley environments.**
- **Consider growing public value in a variety of other sensitive species and wildlife breeding features (amphibians, reptiles, wolverines, migratory birds, raptors)**

DISCUSSION

"Effective habitat" is a widely used term, which in Alberta is well-defined for some species and less understood for many other newly identified species of special management concern. In principle, this term suggests that consideration for a variety of life-requisites is necessary during planning and operational activities to ensure habitat remains functional. This includes the following areas: sensory disturbance avoidance during vulnerable breeding seasons (activity timing), food sources availability (i.e. key forage), protection of visible breeding features like dens/nests, connectivity for movement at various scales appropriate to the particular species, screening cover from mortality risks, thermal cover, important forest structure types, normal site moisture character, riparian or aquatic integrity.

In the interest of maintaining populations of species that are uniquely sensitive or of important economic value, operating ground rules must reflect currently evolving understanding of the biology of these animals, their sensitivities and the importance of their key habitat features. This serves two primary purposes:

a. Contributes to the long term integrity and productivity of key habitats; and

b. Avoidance of direct and indirect sensory disturbance to animals especially during vulnerable breeding periods or at breeding features.

Conservation for many of these species requires a strong link between strategic initiatives, integration between industrial activities and site-level operational practices to complement Alberta species-population management efforts. Staff and contractor training in sensitive species values and the connection to stewardship practices is also an important factor for success.

GROUND RULES

7.7.1 Access for Operations within Woodland Caribou, Grizzly Bear, and Key Wildlife and Biodiversity Zones (Where these zones overlap and management prescription conflicts, the Area Biologist will provide direction on which species to takes precedence)

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 (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. 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.

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 limit off-highway vehicle use. i.e. a section of

rollback, earth berms, etc. Such reclamation techniques should seek to provide efficient forest ecosystem recovery and reduction of wildlife mortality risks from human activity or predation during the vulnerable period before vegetation closure occurs.

7.7.1.9 When operations are inactive in a forest harvest plan operating area within a Caribou Range or the Key Wildlife and Biodiversity Zone for a consecutive period of time exceeding 48 hours, access to the forest harvest plan operating area will be temporarily restricted with a physical barrier to prevent unauthorized access. Physical access restrictions will be located in a manner which restricts highway vehicle access to the forest harvest plan operating area.

Woodland Caribou

DISCUSSION

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

Woodland caribou are protected as a "Threatened" species under Alberta's Wildlife Act and the Federal Species at Risk Act. "A Woodland Caribou Policy for Alberta" provides Government of Alberta intent and direction for recovery of woodland caribou populations and habitat, including managing industrial work on caribou range. Both national and provincial woodland caribou recovery processes have been initiated which may have implications for timber harvesting and access development in Alberta. The following ground rules apply to Woodland caribou range as delineated by Alberta.

Timber operations and management in caribou range can affect caribou populations and habitat directly or indirectly and in four main ways: 1) creating and maintaining public access routes; 2) altering natural and human-caused mortality rates on caribou populations (both through access route development and habitat changes); 3) altering the amount, quality, and effectiveness of caribou habitat; and 4) displacing and causing undue sensory disturbance to individual caribou. All of the four factors are consequential for caribou conservation; however, predation rates and habitat changes that are out of step with natural disturbances are of primary concern.

The negative effects of creating and maintaining access routes (public travel, predation, reduced habitat effectiveness, sensory disturbance and displacement) shall be managed by planning the amount, tenure and class of new access routes (roads), appropriate activity timing and by reviewing and acting upon management options (i.e. access management, abandonment, reclamation) for existing routes.

In the event the company needs to conduct operations later into the winter due to the number of blocks, late freeze up, etc., the company will propose mitigative measures that may include a harvest progression strategy, access management, concentration of contractors etc.

GROUND RULES

7.7.2 Woodland Caribou

Planning

7.7.2.1 If specifically requested by Alberta, and if not addressed in the approved FMP and SHS strategies, a CA must be completed that addresses the following issues:

- **a. provide an agreed upon habitat supply forecast including the amount, type, and spatial arrangement of caribou habitat;**
- **b. the location of all proposed harvest areas;**
- **c. options for partial harvest systems;**
- **d. the amount, alignment, standard (road type) and longevity (tenure) of all access roads;**
- **e. use of, and improvements to existing access roads;**
- **f. access road reclamation plan and schedule, which shall also consider options for reforestation of roads. This shall take into account reclamation options for existing "traditional" access routes;**
- **g. measures to achieve public and industrial access management (caribou awareness signage, access closures);**
- **h. operating schedule (road construction, harvesting, silviculture);**
- **i. protection of key caribou habitat features (as identified by Alberta and company);**
- **j. terrestrial lichen management strategies (in relation to both harvesting system and silviculture prescription);**
- **k. proposed summer operations.**
- **l. Staff/contractor awareness initiatives regarding caribou zone plan prescriptions.**

If not addressed in the approved FMP and SHS strategies, THE COMPANY SHALL FOLLOW 7.7.2.3 – 7.7.2.8.

7.7.2.2 Silvicultural prescriptions shall strive to limit non-coniferous shrub and tree regeneration in habitats dominated by coniferous species prior to harvest, and where regeneration to coniferous-dominant stands is planned.

7.7.2.3 A sufficient amount of habitat (considering both habitat quality and effectiveness) must be maintained at all times within the caribou ranges. This will be defined by Alberta through recovery planning processes.

7.7.2.4 Harvesting operations shall be "concentrated" spatially within caribou range. Priority will be given to harvest of old reserve blocks within former two or three-pass harvest footprint areas prior to new harvest areas being opened up.

7.7.2.5 Within areas of former 2-pass harvest footprint, special consideration must occur during the CA if green-up requirements have not been met or if the resulting post-harvest opening size will exceed 1000 hectares. Special planning and operational tactics shall be defined to address potential watershed and reforestation concerns. This could include providing supporting documentation and applying innovative techniques to promote snow catch and reduce impacts of wind exposure.

7.7.2.6 New harvest areas in caribou ranges shall be no larger than 1000 hectares, or as defined by regional caribou Recovery Plans.

7.7.2.7 Structure must be left within harvest areas situated in caribou range, and shall form part of the 1000 hectare maximum area of harvest. Retention patches shall be used in large harvest areas to protect areas of concentrated

terrestrial lichen growth, and reduce, watershed, aesthetic, and wildlife related concerns.

7.7.2.8 Harvest area boundaries shall be based upon natural stand edges, breaks in topography, and other natural features.

7.7.2.9 During layout operators should identify areas of concentrated terrestrial lichen growth (where terrestrial lichens are the predominant ground cover) within proposed harvest areas must be delineated in the FHP. DHAPs which identify protection measures must be provided to the operator for these areas. Structure retention in harvest areas within the Caribou range should focus on these lichen areas. Alberta may request a review of these plans at any time.

7.7.2.10 Winter operations are preferred to protect existing terrestrial lichen growth within harvest areas, and to retain lichen propagules.

7.7.2.11 Operations in Caribou Zone shall be based on early in/early out philosophy. Summer forest operations, with the exception of planting, shall not occur prior to July 15.

7.7.2.12 Forest operators shall have an approved Caribou Protection Plan prior to approval of the AOP. This plan may be submitted along with the GDP.

Grizzly Bear

DISCUSSION

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 that makes scientific recommendations to Canada. A provincial grizzly bear recovery process has been initiated which may have implications for timber harvest and access development 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 (CA) level.

Timber harvesting, as well as creating and maintaining access routes promote vegetation forage supplies which can have negative effects on grizzly bear populations through increased mortality rates, sensory disturbance and altering normal grizzly travel patterns. 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 critical grizzly bear habitat and by using grizzly bear habitat maps in planning new access). The following ground rules apply to designated core and secondary Grizzly Bear range as delineated by Alberta.

GROUND RULES

7.7.3 Grizzly Bear

Planning

7.7.3.1 If specifically requested by Alberta, a CA must be completed that addresses the following issues within identified grizzly bear areas:

- **(a) provide an agreed upon habitat effectiveness (including mortality risk) supply forecast including the amount, type, and spatial arrangement of Grizzly habitat (completion of this forecast is subject to more technical direction from Alberta);**
- **(b) the location of all proposed harvest areas;**
- **(c) the amount, alignment, standard (road type) and longevity (tenure) of all access roads;**
- **(d) use of and improvements to existing access roads;**
- **(e) access road reclamation plan and schedule, which will also consider options for reforestation of roads. This shall take into account options for existing "traditional" access routes;**
- **(f) effective measures to achieve public and industrial "highway vehicle" access management;**
- **(g) general operating schedule (road construction, harvesting, silviculture);**
- **(h) protection of key grizzly bear habitat features (as identified by Alberta and company);**
- **(i) proposed summer operations.**
- **(j) bear attractant management practices, encounter prevention and staff/contractor training in Alberta BearSmart strategies.**

7.7.3.2 Companies shall minimize the amount, class, and tenure of roads in identified core and secondary grizzly bear habitat.

7.7.3.3 Summer roads should attempt to avoid riparian corridors. Those routes that lie within riparian corridors shall minimize the ROW width and reduce vehicle speeds through construction standards and company operating procedures.

7.7.3.4 Roads, skid trails, landings and campsites shall be located where they avoid natural meadows, beaver dam, and den locations.

7.7.3.5 New road applications in identified core and secondary grizzly bear range shall be planned to include a mortality risk-assessment on route alternatives, and a schedule of reclamation and/or deactivation to minimize the establishment of long-term permanent access.

7.7.3.6 Known or discovered den sites shall be buffered from harvest area boundaries with a minimum of 100 m. Ideally these will be incorporated into variable-retention patch design and watercourse buffers wherever possible to further assist screening.

7.7.3.7 Retention design should be used in harvest areas to provide hiding cover and connectivity to forest patches within core and secondary grizzly habitat. Screening cover for line-of-sight along block perimeter roads may be of particular value as well.

7.7.3.8 Summer harvesting areas shall preferentially be located outside of designated core or secondary grizzly range. Where unavoidable, access

restrictions will be required for summer operations until the access is reclaimed.

Trumpeter Swan

DISCUSSION

The FHP 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. A provincial trumpeter swan recovery process has been initiated which may have implications for timber harvest in Alberta.

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 and regular foraging locations;
b) avoidance of industrial sensory 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

7.7.4 Trumpeter Swan

7.7.4.1 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.

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

7.7.4.3 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 through use of variable-

retention design. 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.

7.7.4.4 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 FHP 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, and travel corridors for landscape-scale habitat connectivity. 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 during seasons of negative or vulnerable animal energy balance. 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.

Outside ungulate winter range, a number of areas of upland (Upland Special Habitat areas or Special Access zones) have been identified and mapped on provincial land use referral maps. They too have been deemed important by Alberta as secondary habitat areas for ungulates, although they are not tied to any particular season of vulnerability.

The Landscape Analysis Tool (LAT) spatially identifies specific habitat locations that industry within Alberta operate within. Specific operating rules relative to these specialized habitat areas are provided in the ground rules. The FMP and SHS shall provide direction on the location/adjacency of harvest areas and retention areas, and on rate of harvest.

Habitat effectiveness, including maintenance of thermal cover, foraging areas, connectivity for animal dispersal 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 too less favourable habitat. This becomes an increasingly significant factor as winter progresses. In both types of ungulate habitat, 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.

GROUND RULES

7.7.5 Key Wildlife and Biodiversity Zone

7.7.5.1 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 LFD land use referral maps). Access development will strive to minimize new human infrastructure.

7.7.5.2 The alignment and standard of new long-term and permanent access roads must be identified and agreed upon within the long-term access plan. New long-term and permanent access roads shall not be developed below the valley "breaks" of rivers, except in isolated cases for river crossings.

7.7.5.3 Any proposed new crossings of rivers and dominant creeks must be identified and agreed upon within the Access Management Plan; new permanent crossings shall be avoided.

7.7.5.4 Where possible all access roads shall avoid known key ungulate habitat features.

7.7.5.5 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.

7.7.5.6 Unless otherwise agreed to in the AOP, timber operations within Key Wildlife and Biodiversity Zones should be conducted outside of the period Jan. 15 to April 30 to prevent sensory disturbance and stressors during this key vulnerable period. No activity timing restrictions apply to upland ungulate habitat designated as Special Access Zones.

7.7.5.7 Stand tending activities (mechanical or herbicide) may occur in this zone and shall remove competing vegetative growth that interferes with conifer seedling survival and establishment or free to grow standards. Effect on browse will be minimized understanding that stand tending activities will be authorized where required to meet legislated reforestation requirements Wildlife browse shall be maintained whenever it does not interfere with reforestation objectives

7.7.5.8 Mechanical stand tending activities shall only remove competing vegetative growth that interferes with establishment and performance standards in order to maintain browse availability.

Other Species

DISCUSSION

A number of other unique habitat features associated with sensitive species or their vulnerabilities are becoming noteworthy in recent years. In some cases understanding of their biology or ecology is limited for areas of Alberta.

Certain habitat features of selected wildlife species require maintenance of undisturbed condition, e.g., breeding or denning locations, and riparian areas. Species occupying those features require protection of specific sites in order to complete all or part of their life cycles and/or may require consideration of avoiding impact to vulnerable periods of life-cycle. In all cases, it is desirable that mitigation strategies and practices be guided by best available science. Yet the protection of many of these types of features is not readily possible at a strategic level since their detection is problematic both under remote-sensing as well as by ground-detection methods (e.g. toad hibernacula, bat hibernacula trees, snake hibernacula). Where they are known or newly discovered, the deployment of variable retention patches represents a viable protection practice in some circumstances. Since the presence of these features cannot be discerned however using aerial photography during post-harvest retention accounting, that retention will count toward structural retention targets.

GROUND RULES

7.7.6 Other Species

7.7.6.1 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 protection techniques as those sites previously identified in planning. In the event that a sensitive site not previously identified during layout is found during harvest activities it shall be identified on the self-reporting form and protected as appropriate and feasible.

7.7.6.2 Sensitive sites listed below shall be protected by retention of an undisturbed, forested buffer from the edge of the opening associated with these sites or from the centre of sites without openings, or by other management techniques as described. Buffer widths or other measures and duration shall be agreed to in the FHP and shown on the block map as no- harvest zones but the details tracked internally. The FHP map won't show these details since map products are subject to broader public disclosure and associated risk to sensitive feature disturbance.

Sensitive Sites, Species and Feature Protection

Breeding Sites and Hibernacula of Sensitive Amphibians (e.g. Salamanders, Toads, Frogs) -Deploy variable-retention to protect vernal pools (ephemeral wetlands), squirrel midden caches, notable accumulations of downed deadwood, and intersecting tributary convergence points of multiple watercourses. This recognizes the value of both wetland and upland special features to these species. Standard watercourse and waterbody buffers provide additional mitigation value for species dispersal and general riparian habitat protection.

Raptor Nest Tree -Unoccupied nests (year-round) will require a 30m radius buffer. Occupied raptor nests will be given a 100m buffer unless otherwise approved by Alberta, and consultation with Alberta Area Biologist in the event of a listed at-risk species. Activity timing restrictions may also be necessary during active nesting period for sites containing identified at-risk raptors. Nest buffers will also be incorporated into variable-retention patches and watercourse buffers wherever possible.

Special water-habitat features (miscellaneous species values):
i) -Natural springs -20 m undisturbed-vegetation buffer.

ii) -Beaver ponds with no outflow channel -20 m undisturbed-vegetation buffer
iii) -Vernal pools (ephemeral wetlands, pocket wetlands) - Variable-retention deployed on the perimeter will assist to preserve unique hydrology from the effects of wind-accelerated evaporation on these unique micro-sites for the benefit of a variety of species.
iv) -Intersecting tributary convergence points of multiple watercourses Variable-retention deployed at these locations will assist to protect important concentration points of upper watershed features and biodiversity hotspots for a variety of species.

7.7.6.3 In the event that site-specific buffers or other management techniques described above are not agreed to in the FMP and FHP by individual companies operating on DMI tenures, the following buffer widths shall apply pending further clarity from evolving research:

Sensitive Site	**Width of Forested Buffer**
Breeding Sites and Hibernacula of Species At Risk e.g. 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
Natural Springs and Beaver Ponds with no Outflow Channel	20 m-vegetated
Vernal Pools	Variable Retention
Other confirmed den sites	20 m

8.0 SILVICULTURE

PURPOSE

To plan and implement silvicultural 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 silvicultural process includes:

- site assessment (pre or post harvest) based on ecosite classification;
- a table or 'matrix' of silviculture treatments or tactics for specific strata;
- developing 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.

GROUND RULES

8.1 OPERATIONS

8.1.1 Reforestation of balsam fir as an acceptable species can only be done when fir is part of the AAC.

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.

8.1.5 Harvest areas (openings) shall be clearly identified. e.g. maps, spatial files, or delineation on the ground through visual markings. **Where stumps are left to delineate areas (e.g. harvest areas) they shall be approximately 30 m apart and no higher than 2 m, see 4.2.4.**

8.1.6 The 'Alberta Forest Genetic Resource Management and Conservation 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.

8.1.7 Where requested by Alberta, the company shall submit a map or shape files showing where genetically improved stock is deployed.

8.1.8 Site preparation and other silviculture activities must follow the same AOP conditions and ground rule standards which apply to timber operations (i.e. stream crossing requirements, watercourse buffers, and tree/understorey retention).

8.1.9 Pesticide use shall be performed in accordance with the Alberta Herbicide Reference Manual.

8.1.10 Site preparation equipment shall be cleaned and free of noxious or prohibited noxious weed seed or plant parts before entry into the working area or before mobilizing between projects according to Directive 2001-06 Directive for Weed Management.

8.1.11 Planting boxes shall be disposed of within 24 months of logging (skid clearance) and 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.

9.0 SOILS

PURPOSE

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

- **Minimize soil disturbance and maintain soil properties,**
- **Minimize the potential for soil erosion,**
- **Prevent soil, logging debris and deleterious substances from entering watercourses, and**
- **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 are 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 or when the soils are very dry and they may not freeze at all. 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.

Dispersed chipper debris piles are an output of the DMI operations. These piles when created in accordance with the debris disposal directive 2007-02, and when dispersed throughout the block, have been shown through current research to not affect reforestation success. For this reason, the piles are not included with the disturbance allowances in 9.3.

GROUND RULES

Pre-harvest planning

9.1 Areas susceptible to rutting, puddling or compaction shall be avoided when planning temporary roads, decks, landings and skidding patterns.

9.2 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., harvest areas with predominantly imperfectly-poorly drained soils).

Harvesting

9.3 The total area covered by within block temporary roads, bared landing areas and displaced soil created by timber harvesting operations shall not exceed five percent of each harvest area without prior approval of Alberta or that allowed in 3.5.5.

9.4 Operations shall not occur during heavy rainfall or when soil conditions are above field capacity (saturated).

9.5 Minimize the machine traffic on sensitive areas, depending on soil susceptibility to disturbance according to the results of a hand test (see figure 1).

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

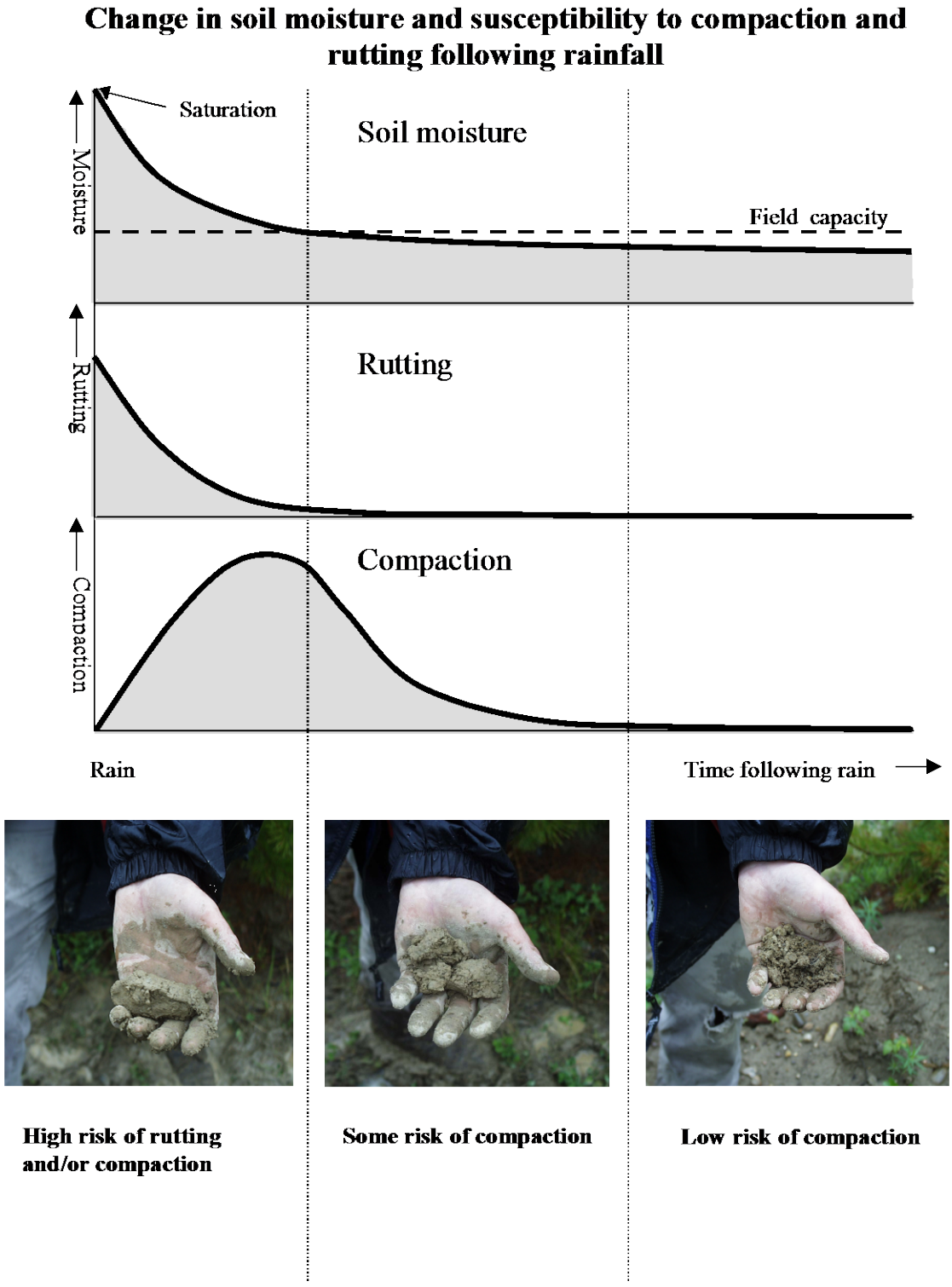
9.7 Temporary road construction methods shall retain organic matter for redistribution during reclamation to reduce erosion and maintain nutrients.

Post-harvest reclamation/reforestation

9.8 Site preparation creating linear disturbance patterns shall be oriented to minimize erosion and to ensure sediment is not directly entering watercourses.

9.9 Roads within harvest areas that are no longer required shall be reclaimed and reforested. Treatments acceptable to Alberta are required on compacted soils. Acceptable treatments may be decompaction if required, roll back of debris, and planting. Decompaction will not be required for operations between Nov 1 and March 31 unless specifically requested by Alberta.

Figure 2.Soil degradation 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;
c) detracting from landscape aesthetics.

The following ground rules do not supersede the management strategies of species of special management concern. Alberta will provide direction where insects or disease concerns overlap with strategies for species of special management concern.

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.

Any wildlife tree patches shall consist of non-pine species where possible. For other pests, contact Alberta.

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 Any infestation of Rank 1 agents and all data must be reported to Alberta immediately.

10.1.5 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, restricted, and noxious weeds, in the Green Area.

DISCUSSION

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

Under Alberta legislation, the occupant (or owner if there is no occupant) must control all noxious weeds and destroy all prohibited noxious weeds.

GROUND RULES

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

10.2.2 Forest operators shall have an approved weed management plan prior to approval of the AOP. This plan may be submitted along with the GDP.

10.2.3 Native plant revegetation guidelines shall be used when determining proper seed mixes to use for reclamation.

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. All AOP non DLO roads need to be reclaimed as soon as timber operations are complete to mitigate impacts on streams through sedimentation and on habitat through fragmentation. Weather, ground conditions and large volume planning units may impact a company's ability to complete timber operations and reclaim the road system as per 11.1.2 and 11.2.3.1. Alberta will consider these factors when reviewing AOPs and issuing approvals.

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 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	8–12 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.	Concurrent with construction with 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 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.	Concurrent with construction with 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.

Table 5. Road Classification and Design (continued)

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					
Class III Tertiary Permanent Frozen or Dry Weather Up to 20 Years	Phased planning approach must be followed if road is to be used for more than two 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.	Concurrent with construction with 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 Frozen 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		As per 11.3.2.5.	As per FHP.	Partial disposal. Mechanical or manual cutting of slash and debris to reduce fire hazard to acceptable levels.	Concurrent with construction with 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.

[1] For Department License of Occupation (DLO) roads, actual specifications and/or requirements may be different in approved Disposition document.

Table 5A - Road Classification for the Caribou Area

All other criteria from Table 5 apply to the roads in Table 5A

Road Description and Tenure	Season Of Operation	Clearing Width	Road Surface	Grade Description
Class 4F Temporary – up to three years	Frozen Ground (some roads or sections thereof may be accessible during dry periods	Target = 10 m, with variable allowance for terrain conditions, to a maximum of 20 m	8 m maximum	Target = no grade, recognizing some grade (maximum 0.5 m) may be required on a site specific basis depending on terrain conditions. Ground disturbance to be minimized.
Class 3D/F Up to 20 years DLO Required if > than 3 years	Dry or Frozen Ground	Target = 15 m, with variable allowance for terrain conditions, to a maximum of 20 m	Target 6 m, to a maximum of 8 m for (one way traffic) Target 7 m, to a maximum 8 m (for two way traffic)	Target = grade to be minimized, recognizing some grade (range 0 to 0.5 m) may be used depending on site specific terrain conditions.
Class 2D/F 5 – 20 years DLO Required	Dry or Frozen Ground	Target = 20 m, with variable allowance for terrain conditions, to a maximum of 30 m	8 m	Target = no grade to 0.5 m, maximum 1 m, depending on site specific terrain conditions.

11.2 ROAD PLANNING AND DESIGN

PURPOSE

To outline the plan to construct, maintain and reclaim roads.

DISCUSSION

The impacts of roads are 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.

Long term road corridor plans shall be developed in the FMP that meet the requirements of Phase 1 corridor plans as identified below in section 11.2.2 (see Annex 1 section 5.8.7.1). All road construction, maintenance and reclamation shall be directed by strategies outlined in the FMP.

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.

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 use and reclamation plan along with a 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 including un-reclaimed non-DLO roads;**
- **other existing roads if the digital information is available;**
- **proposed forest operator corridors, including corridors approved in the FHP;**
- **access control points – See section 11.5 Access Control.**

11.2.2 Phased Planning Process

Phase 1: Corridor Planning

11.2.2.1 Forest operators with overlapping tenures shall consult each other to ensure consistency in their corridor planning.

11.2.2.2 Forest operators shall advise other industrial operators of their road plans and strive to integrate road access with those operators.

11.2.3 Temporary Roads: Class III and Class IV (with a lifespan up to three years from start of construction).

11.2.3.1 These roads shall be built as per the approved AOP. Only roads with FHP approvals shall be included in the AOP submission. Any road exceeding the timeline in 11.1.2 shall be put under DLO or reclaimed during that timber year.

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, 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:

a) unstable soils, water source areas, springs and seepage areas;
b) creating disturbed, compacted or bared soils that exceed the amount specified in section 9.3 and 3.5.5 d.

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, Decking and Chipping 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. Where available, Wet Areas Mapping will help with identifying these areas.

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 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 by 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.

11.3.2.8 Active long-term roads shall be properly maintained to reduce wheel or track ruts, and to minimize watercourse sedimentation from erosion and traffic during adverse weather.

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 km 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. Alberta shall be notified on the next block report of all cuts where sedimentation risk or slope instability is created.

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 he 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;**
- **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 during the following growing period. 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, as per section 11.2.3.1 shall be reclaimed, have crossings removed, and their condition monitored until they are considered satisfactorily stabilized (see 11.3.4.7).

11.3.4.2 Certified weed free seed 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.

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.

Seasonal 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 will not be required for operations between Nov 1 and March 31 unless specifically requested by Alberta.

b) Removing all watercourse crossing and drainage structures and reclaiming stream banks and approaches; (see section 11.4.27)

c) Cross-ditching (if required), rolling back topsoil (including slash and logging debris) and re-vegetating a minimum of 80% crown coverage of bared surface areas. Rollback is used to achieve access control objectives, minimize erosion on bared areas as well as addressing reforestation objectives on roads.

d) Reforesting disturbed areas inside harvest areas and where mutually agreed to, outside of the harvest area.

e) Using rollback to establish access closures where required. Areas only accessible during frozen conditions may have different treatments than those accessible year round.

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 is 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 7.6.2 and 7.6.3 for additional information on the implications of the Federal Fisheries Act.

GROUND RULES

11.4.1 Table 6 – lists acceptable crossing structures identified for a particular stream classification.

Table 6.Acceptable Crossing Structures

Stream Classification	Acceptable Structure	
	Non-Frozen	Frozen
Ephemeral	Log Fill	Log Fill
	Culvert	Snow Fill
	Bridge	Culvert
	Low-Profile Crossing	Bridge
		Low-Profile Crossing
Intermittent	Modified Log Fill	Log Fill
	Log Fill	Snow Fill
	Culvert	Culvert
	Bridge	Bridge
		Low-Profile Crossing
Transitional Small Permanent	Modified Log Fill	Log Fill
	Culvert	Snow Fill
	Bridge	Culvert
		Bridge
Small Permanent	Modified Log Fill	Log Fill
	Culvert	Snow Fill
	Bridge	Culvert
		Bridge
Large Permanent	Bridge	Bridge

- **Unless previously identified in the AOP, notification of crossing type to Alberta is required on the first operations report after installation. Any change within a category only requires notification to Alberta.**
- **Modified log fill can be used on streams less than 1.5 m wide. It consists of a pipe supported by logs and constructed as defined in 11.4.20.**
- **Low profile crossings are used where bank protection is achieved through simple freezing in during frozen conditions or levelling the road in non-frozen conditions.**

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.

11.4.4 Watercourse crossings shall:

a) minimize erosion and sedimentation;
b) maintain fish passage where fish may be present;
c) have no direct drainage from either the road surface or ditches; and
d) have erosion control structures during construction.

The following are best practices for location of watercourse crossings;
e) have stable approaches;
f) be at right angles to the watercourse;
g) be at locations where the channels are well defined, unobstructed and straight;
h) be at a narrow point along the watercourse; and

i) allow room for direct gentle approaches.

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 designed for a minimum of 1:25 year flood levels with the exception of temporary frozen crossings that are removed before break-up.

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 Upstream 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, matting, or 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, steel culverts may be permitted where they will not restrict upstream passage of fish (see table 6 for more information on watercourse crossings).

11.4.18 Culverts for all classes of streams must be designed, 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 (see table 6).

11.4.19 Properly constructed logfills (see 11.4.20 below) on temporary roads may be used as per table 6. As soon as the temporary road is abandoned, logfills shall be removed with the objective of minimizing any sediment from entering the watercourse. Logfills installed during frozen periods shall be removed before the spring thaw. A bottom layer of logs may be left in place when removing the logfill to provide for non-frozen crossing of ephemeral watercourses.

11.4.20 A properly constructed logfill has all of the following:

- **a) flow and fish passage are maintained;**
- **b) 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;**
- **c) logs delimbed and bucked to at least 1.5 m longer than the grade fill at each end;**
- **d) logs covered by a layer of suitable material that separates the soil from the logs, which shall permit total removal of the soil cap; and**
- **e) provisions have been made to allow for easy removal that does not disturb the banks or watercourse.**

11.4.21 In 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.

11.4.22 A native timber bridge may be used on watercourses as per table 6 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 and hauling is complete; and**
- **h) the remainder of the structure is removed as soon as harvest and hauling 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.**

11.4.23 Snow-fills may be used on watercourses as per table 6 during frozen conditions provided that all of the following requirements are met:

- **a) sufficient clean snow exists to fill creek channel;**
- **b) bank integrity is maintained;**
- **c) any soil cap installed over the snow is removed prior to break-up;**
- **d) measures are in place to prevent soil or other debris from entering stream channel or ice surface; and**
- **e) stream flows are not impeded.**

11.4.24 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;**
- **e) no alterations to streambed or bank are required; and**

11.4.25 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.

11.4.26 Watercourse crossings that are no longer required shall be reclaimed with the objective of minimizing any sediment from entering the watercourse. Their condition shall be monitored annually until they are satisfactorily stabilized meeting the following requirements:

- **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, Alberta shall consult with the forest operator 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 (eg, critical wintering habitat, Trumpeter Swan Lakes) 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;
- Temporary fuel storage sites shall not be located within 100 m of any flowing watercourse; and
- Camp food and garbage storage shall minimize the potential for problems with wildlife. Recommend following the Bear Smart guidelines for specific mitigation relating to bears. 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 (ie. 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 (ie. gravel and borrow pits).

11.6.4 Temporary fuel storage sites shall not be located within 100 m of any flowing watercourse.

12.0 SILVICULTURE AND HARVEST ACTIVITY 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.

GROUND RULES

SILVICULTURE AND HARVEST ACTIVITY REPORTING

12.1 Alberta may require additional reporting for forest management activities such as thinning, herbicide, pesticide spraying, or fertilization as per Alberta requirements.

12.2 Companies harvesting more than 30,000 m^3/year shall have self-reporting 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 bi-weekly.

12.3 As built plan (includes digital shape files or other approved digital format of harvest boundaries, road location, road percentages, and added watercourse crossings) from the previous year's harvest shall be submitted as per Directive 2015-02. The as built shall include opening number, block number, block area, skid clearance date and any amendments made during operations. The as-built plan shall be submitted annually with the GDP submission; or if the company is submitting the as-built plan in conjunction with the Final Cutblock Digital data submission, the plan is to be submitted no later than August 31 of the timber year immediately following the skid clearance date of the blocks.

Appendix 1 - Glossary

Alberta	The Department of Agriculture and Forestry 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.
Approval Review Committee	Committee comprised of senior Alberta staff that provides recommendations to the Executive Director of Forest Management Branch regarding DFMPs.
Armillaria root rot	*Armillaria* spp.
As built harvest area map	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
A-spatial Proxy	A non-spatial representation of a forest management activity that has real elements of space and time.
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
Atropellis canker	*Atropellis piniphila*
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.
Barriers to fire spread	Those biophysical landscape features that either do not burn, or at certain times of the fire season are "fire resistant." Some of the features that do not burn include water, rock, cultivated fields, improved roads (with a grade). (Stegehuis)
Biological diversity (biodiversity)	The variety, distribution and abundance of different plants, animals and microorganisms, the ecological functions and processes they perform, and the genetic diversity they contain at local, regional or landscape levels of analysis. Biodiversity has five principal components: (1) genetic diversity (the genetic complement of all living things); (2) taxonomic diversity (the variety of organisms); (3) ecosystem diversity (the three-dimensional structures on the earth's surface, including the organisms themselves); (4) functions or ecological services (what organisms and ecosystems do for each other, their immediate surroundings and for the ecosphere as a whole, i.e. processes and connectedness through time and space); and (5) the abiotic matrix within which the above exists, with each being interdependent on the continued existence of the other. [Dunster]
Borrow pit	A small quarry or excavation, which provides material for use in the construction project. [Revised from Dunster]
Buck	To cut a felled or downed tree into shorter lengths.
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]
Clearcutting	A regeneration system where all or most of the merchantable trees in a defined area are harvested in one cutting with reproduction obtained through artificial or natural means.
Coarse filter management	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]
Corrective Actions	May include one or more of the following: - Direct that the work be corrected and re-submitted; - Carry-out an appropriate enforcement response; - Refer the matter to the Complaints Director of the appropriate College to investigate the complaint.
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.

Culmination age	The age at which the stand, for the stated diameter limit and utilization standard, achieves its maximum average rate of volume production (the Mean Annual Increment, or MAI is maximized.
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.
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.
Detailed forest management plan (DFMP)	A long-term plan used to outline higher-level management objectives, sustainability and timber production assumptions for a Forest Management Agreement (FMA).
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.
Downed woody debris	Woody material >1cm 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.
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	- taking and documenting steps to ensure that the desired outcome is achieved or that the chances of a negative consequence or outcome is minimized. - ensuring completeness, correctness, consistency and repeatability. - demonstrating how conclusions were reached. - 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. - keeping and maintaining appropriate files and filing systems as well as document retention policies and practices.
Duff layer	The organic horizons of the soil profile (LFH). Commonly referred to as the forest floor.
Dwarf mistletoe	*Arceuthobium americanum Nutt.*
Early in/Early out	A philosophy and practice of ensuring that all activities associated with timber harvesting are completed by mid-winter. Companies plan activities to start immediately on freeze up, e.g. having blocks laid out or well sites surveyed before freeze up, then freezing in access lines as soon as possible. All activities should be concluded by late January with no disturbances in mid

	and late winter.
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]
Embedded operators	Includes quota holders, permittees and other industrial operators with dispositions located within a Forest Management Agreement Area.
Enhanced Forest Management (EFM)	Enhanced forest management is defined as improvements in growth projections that result from thinning, fertilizing, tree improvement or drainage.
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.
Even-aged stands	A stand of trees in which the age differences among trees are small, usually less than 10 to 20 years, or 30% of the rotation age in stands more than 100 years old. Even-aged stands result from disturbances occurring at one point in time, such as wildfires, a clearcut, a seed tree cut, or a shelterwood cut or coppicing. [Dunster]
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.
Fire hazard evaluation	A conversion of forest inventory classifications to fire behaviour prediction fuel typing (AVI2FBP), crown fire threshold modeling (CROSUM) and determination of head fire intensity percentiles (spring, summer and fall).
Fire risk occurrence	Location of person-caused and lightning fires in relation to the fire hazard evaluation. It is used to represent “fire danger” in a spatial context.
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]
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)	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: 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. 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.

Forest Management Plan	Generic term for Preliminary Forest Management Plans, Detailed Forest Management Plans, Forest Management Unit Plans, General Development Plans, Annual Operating Plans.
Forest Management Unit (FMU)	An administrative unit of forest land designated by the Minister, as authorized under Section 14(1) of the *Forests Act*.
Forest officer	An employee of Alberta appointed in accordance with the Public Service Act who represents the Minister in the administration of the Forests Act, the Timber Management Regulation, the Public Lands Act, and the Forest and Prairie Protection Act and Regulations on public forested lands.
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	*Malacosoma disstria*
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	The genetic variability within a population or a species; the number and relative abundance of alleles. Genetic diversity can be assessed at three levels: 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).
Green-up period	The time needed to re-establish vegetation after a disturbance. Specific green-up periods may be established to satisfy visual objectives or hydrological requirements, or as a means of ensuring re-establishment of vegetation (for silviculture, wildlife habitat or hydrological reasons) before adjacent stands can be harvested.
Ground Rules	Standards for operational planning and field practices that must be measurable and auditable and based forest management plan objectives.
Growing Stock	The sum (by number, basal area or volume) of trees in a forest or a specified part of it.
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 area form	A map and harvest area comments for each laid-out harvest area.
Hiding cover	See *"sight distance."*
High-water mark	Stream course water levels corresponding to the top of the unvegetated channel or lakeshore.
Historical resource	Any work of nature or man that is primarily of value for its paleontological, archaeological, prehistoric, historic, cultural, natural, scientific or aesthetic interest, including, but not limited to, the structure or object and its surrounding site.
Interpretive Bulletin	Document issued from time to time by Alberta describing protocols, standards, methods or other applicable to forest management planning.
Harvest area aesthetics	Overall quality of operations in respect to the real or imagined effect on visual quality and/or the environment within a particular harvest area.
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.
Inoperable	Classification of a forest site based on the potential to harvest timber on that site, as affected by physiographic characteristics, moisture regime and harvesting equipment/technology.
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 management (IRM)	IRM is an interdisciplinary and comprehensive approach to decision making for the management of natural resources. IRM integrates decisions, legislation, policies, programs and activities across sectors to gain the best overall long-term benefits for society and to minimize conflicts. This approach recognizes that the use of a resource for one purpose can affect both the use of a resource for other purposes and the management and use of other resources. IRM is based on: Co-operation, communication, co-ordination and the comprehensive consideration of all resource values. This philosophy is centered on the belief that efforts to manage natural resources will be more successful if they are co-ordinated at all levels within government; and Appropriate consultation before action. Those who are significantly affected by a decision should have the opportunity to participate in the decision making process.
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.
Interests	The wants, needs, concerns and desires of each party that provide motivation to be concerned about an issue or topic.
Interior forest conditions	The environmental conditions typical of the central or interior part of a habitat patch. They are usually relatively stable and are not influenced by the changing climatic conditions and other variables (noise, wind, sunlight, temperature, moisture) associated with edge conditions. [Dunster]
Issue	The topic to be discussed. The problem to be solved. The theme of the discussion.
Jack pine budworm	*Choristoneura pinus*
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/marking of both harvest area boundaries and roads on the ground. Examples of delineation/marking 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.
Landscape fire assessment	Information on the effects of fire which may be used to influence forest management strategies and tactics over a landscape. The wildfire threat component of the landscape fire assessment handles the negative aspects of fire, and fire regime analysis handles the positive attributes. Both "wildfire threat" and "fire regime" need to be considered in order to provide a balanced "landscape fire assessment." [Stegehuis]
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.
Letter(s) of Understanding	An agreement(s) signed between the Organization and the Crown outlining commitments and timelines for each party on future timber production audits as referenced in the “Timber Audit Framework.”
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.
Logging slash	The unusable trees, shrubs or portions thereof that result after tree felling, skidding and processing at the harvest site.
Machine-free zone	The area protected from machinery which would cause soil damage.
Mass-wasting	Movement of large masses of land, soil or regolith (i.e., slumping, landslides, rock slides and massive undercut erosion).

Mature stands	Stands that have reached rotation age or have a decreasing growth rate.
Mean Annual Increment	**T**he average annual increase in volume of individual trees or stands up to the specified point in time. The MAI changes with different growth phases in a tree's life, being highest in the middle years and then slowly decreasing with age. The point at which the MAI peaks is commonly used to identify the biological maturity of the stand and its readiness for harvesting.
Maximum Mean Annual Increment	The volume available at the culmination of mean annual increment. The volume/ha described by the point on a volume/ha:age graph where the curve of mean annual increment crosses the curve of the current annual increment (CAI).
Mixedwood forest	A forest type in which the softwood component is between 20% and 80% by crown closure.
Model	An idealized representation of reality developed to describe, analyse or understand the behaviour of some aspect of this reality. A mathematical representation of relationships under study. The quest to find a subset of variables and a function between them that predicts one or more dependent variables.
Mountain pine beetle	*Dendroctonus ponderosae*
Noxious Weed	A plant designated under the Weed Regulation (AR 171/2001) 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 reserve	An area permanently excluded from harvesting in the DFMP.
Permanent roads	Roads that will be in use for more than five years.
Permanent sample plots (PSP)	A fixed or variable area plot established for (forest) sampling and measurement purposes, and designed for remeasurement.
Phase III forest inventory	A provincial forest inventory of the forested lands of Alberta.
Planning Horizon	The length of time over which a series of defined management actions occur. For the purposes of modeling, usually equivalent to two full rotations.
Precautionary AAC	A level of harvest set that minimizes the risk of negatively impacting forest resources from an inadequately justified management assumption or in the absence of a comprehensive DFMP for the DFA.
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.
Preliminary Forest Management Plan	A plan submitted by FMA holders within 12 months of signing a new agreement (includes a major revision to an existing agreement). It establishes an interim harvest level and cut sequence complete with justifications. This plan is the basis for harvest authorization until replaced by the Detailed Forest Management Plan.
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.
Quadratic Diameter	The diameter of the tree with average basal area for a given stand.
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.

Recreationalist	A person who participates in outdoor activities in the forest, such as horseback riding, ATV riding, snowmobiling, hiking, cross-country skiing, wilderness area experience, hunting, fishing, berry-picking, wildlife viewing, photography, camping, canoeing, etc.
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.
Restricted Weed	A plant designated under the Weed Regulation (AR 171/2001) of the Weed Control Act.
Review	Acceptance or appraisal conducted by Alberta
Review Team	A group of senior Alberta officials and the Forest Management Planning Forester formed to review detailed forest management plans.
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	(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] (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]
Root collar weevils	*Hylobius* spp.
Rotation	The period of years required to establish and grow even-aged timber crops to a specified condition of maturity.
Ruts	Machine depressions in the soil which are determined by depth and length: 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. Length: 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.
Selection Harvesting	A silvicultural system used to create or maintain uneven aged stands. Usually accomplished through the periodic removal of groups of trees or individual trees, while full residual stand growth rates are maintained and natural regeneration from overstorey trees is encouraged. Not to be confused with selective harvesting, or high-grading, where trees are selected and removed periodically based solely on economic criteria. Selective harvest is not designed to improve the growing conditions of the remaining crop trees as Selection harvest is.
Sensitive or Complex 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.
Sensitive soil site	Any site that may be prone to soil movement, soil erosion, mass wasting or siltation due to steep slopes, wet ground, seepage areas, springs, fine textured soils or soils prone to mass wasting.
Sensitivity Analysis	An analytical procedure in which the value of one or more parameters is varied; the changes that this produces are analysed in a series of iterative evaluations. If a small change in a parameter results in a proportionately larger change in the results, the results are said to be sensitive to the parameter.
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.
Silvicultural systems	Systems that follow accepted silvicultural principles, whereby the tree crops are tended, harvested and replaced to produce a crop of a desired form. This includes even-aged (i.e., clearcutting, shelterwood or seed tree cutting) or uneven-aged (i.e., selection cutting) systems. A planned program of silviculture treatments over the life of a stand, it includes the harvesting and the follow-up tending to the next rotation. [Smith, 1996]
Silvicultural Transitions	Stand type or cover type changes resulting from planned silvicultural practices on the DFA in natural and managed stands (i.e. natural to managed, managed to managed). Changes relate to species and species mixes, densities and growth trajectories from basic or enhanced management.
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.
Slenderness Coefficient	The ratio of height to diameter at breast height. Used to estimate windthrow and breakage potential of a stand.
Snag	A dead tree that is taller than 2 m.
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.
Soil degradation	A reduction in soil quality caused by but not limited to the following conditions: rutting, compaction, puddling or soil displacement.
Soil productivity	The capacity of a soil to provide for growth.
Spacing Factor	Inter-tree distance expressed as a percentage of the stand's top height.
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	*Dendroctonus rufipennis*
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.
Stand Density Management Diagram (SDMD)	A stand model based on data from the –3/2 power law for self-thinning. Illustrates the relationships between diameter and height with stand density over time.
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.
Subgrade	The road base.
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 Crossing	A watercourse crossing referred to in section 9 of the COP that will remain in place for a maximum period of 6 months from the date that the crossing is constructed.
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 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 five 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.
Three-pass harvest	A harvest pattern in which all the available merchantable timber in an area is harvested in three separate passes. Normally it is done over approximately equal areas and in equal volumes.
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.
Tolerance Limits	Acceptable degree of change that can be allowed before corrective action is taken.
Traditional Access	Previously constructed corridor that has been used as a means of access. Any new cut access is considered non-traditional.
Trapper	Holder of a trapping license.
Two-pass harvest	A harvest pattern in which all the merchantable timber in an area is harvested in two harvest passes. Normally, the harvest is done over approximately equal areas and in equal volumes.

Understorey	The trees and other woody species growing under the canopies of larger adjacent trees and other woody growth. [Dunster]
Uneven-aged stand	Stands in which the trees differ markedly in age, usually with a span greater than 20 years.
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. Work is validated once it has been signed. 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.
Viewshed	The visible area, as it appears from one or more viewpoints.
Visual impact analysis (VIA)	Estimates visual impact potential, determines acceptable design and layout, and guides measures to be taken during and upon completion of operations to reduce visual contrast.
Visual quality objectives (VQO)	Broad objectives for visual resource management that set limits considered acceptable to the average viewer, as to the form and scale of visible alteration.
Visual resource assessment (VRA)	A relatively intensive reconnaissance of a landscape or parts of a landscape. A forest management planning framework for assessing Alberta's visual resource base in a consistent and systematic manner. Consists of four planning phases: visual resource inventory, visual quality objectives, visual impact analysis and total resource design.
Visual resource inventory (VRI)	A quick and simple process of recording the expanses of viewable area, noting key features, their prominence and sensitivity in order to better direct proposed harvesting operations in scenic or visually important areas.
Visual Resource Management	A standardized process of identifying and assessing visual values to ensure that proposed industrial developments in visually sensitive areas of Alberta are planned and developed in a consistent manner. The process used is called a Visual Resource Assessment.
Water availability	Availability of water which can be utilized for fire suppression.
Water regime	Timing of water flow.
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	*Endocronartium harknesii*
Wildland Urban Interface Zone	The area where various structures and other human developments meet or are intermingled with the forest and other vegetative fuel types.
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 boundaries	Harvest area boundaries established at locations that are stable and that minimize the potential for timber losses from wind.
Yield Curve	Graphical representation of a yield table.
Yield Table	A summary table showing, for stands (usually even aged) of one or more species on different sites, characteristics at different ages of the stand.
Zone of Imminent Competition Mortality (ZICM)	The density at which mortality occurs due to intra-specific competition.

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
DFMP	Detailed Forest Management Plan
EFM	Enhanced Forest Management
FMA	Forest Management Agreement
FMP	See definitions - Forest Management Plans (generic)
FMU	Forest Management Unit
G&Y	Growth and Yield
GDP	General Development Plan
IRM	Integrated Resource Management
IRP	Integrated Resource Management Plan
MAI_{Max}	Maximum Mean Annual Increment
PCT	Pre-commercial Thinning
PDT	Plan Development Team
PLUZ	Public Land Use Zone
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