Slave Lake Regional Timber Harvest Planning and Operating Ground Rules

2016

Slave Lake Regional Timber Harvest Planning and Operating Ground Rules

West Fraser Mills Ltd.

Tolko Industries Ltd.

Vanderwell Contractors (1971) Ltd.

ALBERTA AGRICULTURE and FORESTRY

ENDORSEMENTS

The Slave Lake Regional Timber Harvest Planning and Operating Ground Rules, having been prepared in accordance with Section 16 (2) of FMAs 0600043, 9700036, 0200039, 9700033 and Section 11 (2) of FMA 9000028, and hereby endorsed this 3rd day of October, 2016. The Executive Director of Forest Management Branch has determined these ground rules will apply to all operations within the aforementioned FMAs as well as FMU S10, S16, and SO2.

Alberta Plywood, Slave Lake Pulp, and High Prairie Forest Products - Divisions of West Fraser Mills Ltd.

Per: Original Signed

_____

_____
(print name)

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

Per: Original Signed

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_____
(print name)

_____
(title)

Tolko Industries Ltd.

Per: Original Signed

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(print name)

Vanderwell Contractors (1971) Ltd.

Per: Original Signed

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(print name)

Slave Lake Regional Ground Rules
Revisions from 2015 to 2016
(Effective Date: September 1, 2016)

2016 Revisions

Ground Rule Number	2015 Version of the Ground Rule	2016 Version of the Ground Rule
General	**Some edits were made outside of the joint reviews in 2016, 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 OGR's, but rather to provide clarification. These changes are not documented in this table.**	
3.3.3	**The GDP shall describe volume supply by area, road standards and construction schedule for Department License of Occupation (DLO) roads, 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 agree in writing to the GDP before it will be approved. It is expected that there will be substantial discussion to resolve significant issues with Alberta before the FHP is submitted. It is the responsibility of the operator to ensure that an over-cut exceeding that allowed in their tenure document is not exceeded (see section 5.1.1).**	**The GDP shall describe volume supply by area, road standards and construction schedule for Department License of Occupation (DLO) roads, 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 the responsibility of the operator to ensure that an over-cut (that exceeds their allowable cut in the tenure document) is not proposed (see section 5.1.1).**
3.4.1 c)	**the harvest area (ha) does not exceed 100% of the total area in the SHS by compartment per decade as tracked in the GDP; and**	**the harvest area (ha) does not exceed 100% of the total area in the SHS by stratum by compartment per decade as tracked in the GDP; and**
3.5.3	**New**	**The AOP and FHP will be submitted as two separate documents.**
4.0 Utilization Discussion	**Deletion –** SHS area removed from the active landbase for at least one rotation. Only deletions of 1 ha and greater will be classified as variance and reported in the FHP and GDP.	**Deletion –** SHS area removed from the active landbase for at least one rotation. Only deletions of 2 ha and greater will be classified as variance and reported in the FHP and GDP.
4.0 Utilization Discussion	Only deferrals of 1 ha and greater will be classified as variance and reported in the FHP and GDP.	Only deferrals of 2 ha and greater will be classified as variance and reported in the FHP and GDP.
4.2.5	**Trees or logs of 19 cm diameter or less, containing soft rot, may be bucked at 0.61 meter intervals to 100 percent clear face. For greater than 19 cm in size, the normal bucking rules shall apply.**	**Deleted**

7.2.3	**Direct distance to wildlife hiding cover should not exceed 200 m. In some large blocks this may not be achievable.**	**Direct distance to wildlife hiding cover should not exceed 200 m.**
7.3.5 l)	**New**	**location of decked volume.**
8.3.3	**Site preparation equipment shall be cleaned and free of restricted and noxious weed seed or plant parts before entry into the working area or before mobilizing between projects according to Directive 2001-06.**	**Site preparation equipment shall be cleaned and free of noxious and prohibited noxious weed seed or plant parts before entry into the working area or before mobilizing between projects according to Directive 2001-06.**

Table of Contents

Slave Lake Regional 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 Forest Management Plan (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.

Delegated Authority (Alberta) 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.

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

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

PURPOSE

A statement of what the topic is designed to accomplish.

DISCUSSION

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

GROUND RULES

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

3.0 OPERATIONAL PLANNING

3.1 PLANNING PROCESS

PURPOSE

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

DISCUSSION

The planning process includes five main components:

1. **Approved Forest Management Plan (FMP)**
   - **Spatial Harvest Sequence (SHS) for first two 10-year periods;**
   - **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 CA 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 can be submitted together at the same time, or as individual submissions on a schedule approved by Alberta:**
   a) operating schedule and timber production;
   b) applicable FHPs;
   c) GDP;
   d) CAs 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 variance of >20% of the SHS/compartment/decade as determined by the Delegated Authority and the manager of Forest Management Branch (FMB)). 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 of the area on which a CA is required and the requirements of the CA after consultation with the forest disposition holder.

3.2.2 If a CA is required, the operator must receive Alberta's approval of the CA prior to the approval of an 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.

3.3 GENERAL DEVELOPMENT PLAN (GDP)

PURPOSE

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

- **guide the integration of activities;**
- **schedule timber disposition administration activities;**
- **predict cut control status;**
- **co-ordinate the development and reclamation of roads.**

DISCUSSION

The primary components of the GDP include a forecast of the areas scheduled for harvest for a five year period and a summary of variance from the SHS for existing FHPs or long-term access plans outlined in the FMP. The GDP must also include the current status and forecast of the respective annual allowable cuts (AACs) and cut control period for each of the operators within

the planning area. This could be either a joint submission by all operators or separate submissions containing consistent information between operators.

In addition to outlining the projected wood supply forecast, the GDP shall also include details regarding road requirements and fish and wildlife issues within the planning area. It is expected that there will be substantial discussion on significant issues with Alberta before the FHP is submitted. Consultation of the GDP is a requirement under Alberta's Indigenous Consultation Policy and Guidelines..

GROUND RULES

3.2.5 The GDP submission date is by July 1 of each year unless otherwise approved by Alberta. Alberta shall respond within 30 days. The GDP shall be approved subject to an appraisal by Alberta.

3.2.6 The GDP shall contain a summary of variance from the harvest sequence and long-term road plan in the FMP. Variances must be approved by Alberta (see section 4.1). Where the FHP is providing the summary required in the GDP, no reporting in the GDP is required.

3.2.7 The GDP shall describe volume supply by area, road standards and construction schedule for Department License of Occupation (DLO) roads, 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 the responsibility of the operator to ensure that an over-cut (that exceeds their allowable cut in the tenure document) is not proposed (see section 5.1.1).

3.2.8 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.

3.2.9 The GDP consists of the following:

1. **Schedules with the following information:**
   - **a) the areas to be harvested by quadrant for 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 noted that are to be monitored, and all outstanding and anticipated reclamation work related to DLO road and stream crossings;**
   - **e) proposed and actual volumes in satellite yards as per Directive 2016-01;**
2. **A map (of appropriate scale) that shows 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 as per Directive 2016-01;**
   - **d) the timber dispositions to be operated;**
   - **e) the general location of routes, public lands dispositions and facilities where reclamation work is scheduled and where roads and watercourse crossings are reclaimed (see 3.3.5 1. d) above).**

3. **Watercourse crossing monitoring program as per 11.4.26.**

3.4 FOREST HARVEST PLAN (FHP)

PURPOSE:

To describe the laid out harvest and road design

DISCUSSION

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

FHPs are approved through acceptance and will be considered approved on the date Alberta acknowledges receipt of the work. Alberta shall notify the organization by acknowledging receipt within 5 working days of submission. The notification date will be documented by Alberta as the start date for FHP approval. Alberta shall periodically check the work and supporting documentation to verify its accuracy.

GROUND RULES

3.4.1 An FHP shall be approved by acceptance if:

- **a) validated by a regulated forestry professional (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 by stratum by compartment per decade as tracked in the GDP; and**
- **d) it adheres to all ground rules as per the FHP checklist (see Appendix 5).**
  - **All deviations to the ground rules will be identified and provided by the company. Acceptance or appraisal of the plan will be based on the magnitude of the deviations.**

Where the FHP does not meet one or more of the above standards, the FHP shall undergo a full review by Alberta. Variances from the SHS shall be reported annually in the FHP in a format acceptable to Alberta (see section 4.1.1).

3.4.2 If a CA was completed, the FHP shall undergo a full Alberta referral and review 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 an RFP. Validation means that, the operating ground rules (OGRs) were followed, the SHS was followed or variances identified, and all affected operators have agreed 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. Where affected companies have jointly validated the checklist this will constitute agreement of the operators (see section 5.1.1).

3.4.5 Maps shall accurately show the following information:

- **a) the approved forest inventory;**
- **b) approved SHS and variances from the SHS;**
- **c) all DLO roads accessing harvest areas and harvest area boundaries for all timber operators;**

d) **all Class IV inter block roads and their associated crossing location;**

e) **current dispositions and reserves (e.g., protective notations (PNTs), registered trapline boundaries (may be shown in table), Alberta permanent sample plot (PSP) locations);**

f) **identified watercourses, springs, water source and seepage areas;**

g) **road corridors and DLO numbers (may be in table format in 3.4.6) and differentiate class I, II and III from class IV for both existing and proposed roads. Locations of access control measures;**

h) **company current information on previously harvested areas, existing trails, seismic lines, power lines, pipelines and access routes;**

i) **location of proximal structure retention.**

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

a) **opening number, laid out area (ha), and coniferous and deciduous volume for each proposed harvest area;**

b) **summary table of variances from the SHS by harvest area for each FHP (see section 4.1);**

c) **digital shape files (or other digital format approved by Alberta) for all laid out harvest area boundaries;**

d) **potentially affected stakeholders and dispositions (e.g., registered fur management area (RFMA), guide outfitters, PNT, forest grazing lease (FGL), consultative notation (CNT), departmental reservation (DRS), other timber dispositions);**

e) **description of how the CA is addressed in the FHP;**

f) **list of watercourse crossing locations for inter block roads. In block crossing location shall be included;**

g) **access control methods employed when required on DLO roads;**

h) **description and location of sensitive wildlife sites and applicable zones as per section 7.7;**

i) **method for tracking proximal retention areas and associated volume(s).**

3.4.7 **The company shall follow existing integrated landscape management (ILM) or access development strategies when developing DLO roads. Alberta may approve deviations from these strategies after discussions with the company.**

3.4.8 **Individual block maps or shape files shall be provided depicting all blocks, watercourses, crossings and buffers. The following information shall be mapped and/or described for each affected block by:**

a) **layout bordering and encompassing riparian management zones when different than the standards in section 6.0;**

b) **watercourse classification and protective buffer;**

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

d) **identification of understorey (see section 7.5);**

e) **harvest area-specific structure retention and woody debris management strategies;**

f) **tactics to address forest health issues;**

g) **protection of roadside vegetation - applicable or not, and how to be done;**

h) **strategies to address sight distance concerns with an attempt to maintain sight distance of 400 m or less from Class I, II or III roads;**

i) **important wildlife sites as defined in section 7.7.7 (this information shall be made available for resource planning purposes only through Fish and Wildlife);**

j) **historical site considerations;**

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

- **identified unstable areas, water-source areas, springs or seepages;**

- **steep or sustained slopes or grades (>30%);**
- **unfrozen operating conditions.**

3.4.9 Detailed block plans (DBP) are required when there is higher than average potential for environmental damage. Circumstances that merit DBPs are:

a) areas of steep topography requiring specific road location and construction or specialized harvesting equipment;

b) unstable slopes are generally to be avoided but if this is not possible it is necessary to plan operations carefully to minimize impacts;

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

d) harvest areas that contain or border sensitive wildlife or fisheries areas;

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

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

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

h) when harvesting is used as a tool to control insects (excluding mountain pine beetle (MPB)) and disease infestations;

The detailed block plan (DBP) shall include a map of appropriate scale to the issue(s) and describe how the concern will be addressed in operations. DBPs are not submitted to Alberta but must be available upon request.

3.4.10 Where a temporary field authority (TFA) is required to open access for the layout of harvest areas, this access shall be incorporated into the road system of the FHP.

3.5 ANNUAL OPERATING PLAN (AOP)

PURPOSE

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

DISCUSSION

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

a) operating schedule and timber production - appraised – Alberta has 30 days to respond
b) applicable FHPs - accepted
c) CAs (if applicable) - appraised
d) reforestation program - accepted
e) fire control plan - accepted
f) road plan - accepted
g) GDP - appraised

Refer to Appendix 1 of Annex 4 for RFP validation requirements.

For timber permit operators and small quota holders who harvest less than 30,000 m^3 annually, Alberta has alternate AOP submission requirements.[1]

[1] TM118 form

GROUND RULES

3.5.1 The AOP submission date is July 1 of each year unless otherwise approved by Alberta. Alberta shall respond within 30 days. The AOP shall be appraised by Alberta in accordance to the AOP checklist (see appendix 5), with approval subject to the outcome of the appraisal.

3.5.2 The operating schedule and timber production, reforestation program, fire control plan, and road plan, are submitted as in 3.5.1 above, unless otherwise agreed to by Alberta. The schedule for submitting any necessary CA, GDP and FHPs may be different.

3.5.3 The AOP and FHP will be submitted as two separate documents.

3.5.3.1 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) the map(s) referred to in 3.4.5 above;**
- **b) administrative and timber production information:**
  - **I. name of disposition holder(s);**
  - **II. number of the disposition(s);**
  - **III. date of submission and effective period;**
  - **IV. location of mill where timber will be manufactured or processed, unless alternative reporting has been approved;**
  - **V. where all volumes (deciduous and coniferous) will be charged (quota, deciduous timber allocation, forest management agreement (FMA), commercial timber permit(CTP));**
  - **VI. proposed harvest volume to be harvested by timber disposition;**
  - **VII. community timber program operators shall include all road use agreements;**
  - **VIII. scaling methodology (e.g., weigh scale, other arrangements, (not necessary if otherwise submitted));**
  - **IX. utilization standards;**
  - **X. date of contact with stakeholders and outstanding issues and where applicable any changes to the FHP due to public concerns; and**
  - **XI. annual update of the progress of each FHP.**
- **c) operating schedule – a table which outlines:**
  - **I. list of harvest areas proposed for harvest (including opening number, area, season of harvest and volume by conifer or deciduous with totals);**
  - **II. list of non- DLO roads and watercourse crossings proposed for construction and reclamation (this may be part of the GDP or FHP). This excludes in-block roads and crossings;**
  - **III. declaration of outstanding operational items, or an agreement with Alberta on reporting of outstanding operational items (e.g., debris disposal, road reclamation etc.);**
- **d) annual reforestation program (see section 8.2);**
- **e) fire control plan which covers suppression equipment;**
- **f) if not previously submitted, block roads and crossings shall be submitted in a digital format acceptable to Alberta during the implementation of the plan; and**

g) GDP and CA if applicable.

3.5.5 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., land status automated system (LSAS)) 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 feedback and/or approval of the AOP amendment within three working days of the submission. Any changes that could adversely affect buffers established for the protection of riparian areas, wildlife sites, historical 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)
a.	For blocks >10 ha, final area must be ≤5% larger due to additions; for blocks <10 ha, final area must be ≤10% larger due to additions.	For blocks >10 ha, area added increases final block size >5%; for blocks <10 ha, area added increases final block size >10 %.
b.	Any deletion to the approved AOP harvest area boundary.	Deletion exceeds variance tolerance as per 3.4.1.
c.	Equipment access or exterior block roads moved to existing access or conventional seismic lines where re-growth is less than 3 m.	Equipment access or exterior block roads moved to existing access or conventional seismic lines where re-growth is greater than 3 m.
d.	Exterior block roads requiring the development of new right-of-way (ROW) clearing moved up to 150 m	Exterior block roads requiring the development of new right-of-way (ROW) clearing moved more than 150 m
e.	N/A	Total soil disturbance exceeds 5% block area as per OGR 9.0.3 and no AOP approval or commitment to reclaim exists.
f.	Added crossings on ephemeral or intermittent watercourse.	Added crossings on watercourses with higher classification than intermittent.
g.	Change in scheduled harvest season of harvest area and associated roads.	Change in scheduled harvest season affects wildlife zone timing restriction.

3.5.5.1. Any amendments resulting in variances from the approved SHS must be categorized and reported as per 4.1.1. This ground rule does not apply to CTPs and deciduous timber permits (DTPs). All additions to a harvest area must be within the company's disposition and landbase.

3.6 SALVAGE PLANNING

PURPOSE

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

DISCUSSION

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

Salvage planning shall not be used when:

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

Salvage planning does not confer rights to the planner to ignore other values, or the inherent value of a natural disturbance. It does allow for consideration of all values and for prompt, qualified, professional opinion to drive the process. See Directive 2007-01 for further direction on Salvage Planning.

GROUND RULES

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

3.6.2 An 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 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 FHP 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. Variance from the SHS will not allow the FMP to realize its objectives and forecasted outcomes. Operational variance is unavoidable but must be effectively managed.

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 Variance Table 1 and Variance Table 2 as they monitor the operational implementation of their plans against the SHS. The format of the tables may be changed based on discussions between the area and the company as required fields may vary regionally.

Definitions:
Deletion – SHS area removed from the active landbase for at least one rotation. Only deletions of 2 ha and greater will be classified as variance and reported in the FHP and GDP. Examples of deletions include watercourse buffers, protected areas, inoperable ground, unmerchantable stand, land use deletion, and other.

Deferred – SHS area deferred from harvest until after the 10 year SHS timeframe. These stands can still be harvested in the future and can only be treated as a deferral if there are other similar stands in the area to return to harvest during the next planning cycle. Only deferrals of 2 ha and greater will be classified as variance and reported in the FHP and GDP.

Variance – Is any deletion or deferral from the SHS to the laid out harvest design as shown in the FHP (area is not harvested yet). Where the area tracked as variance in Variance Table 1 has changed by more than 5% after harvesting is complete, an update to variance shall be provided in the next submission of Variance Table 2 (see 4.1.3 below).

Total SHS Area – Is defined as the total SHS area within the FHP.

SHS Planned Area – Is the total area of the SHS laid out in the FHP.

Actual Harvested Area – Is the as-built harvested area in the FHP.

Additions – Area not part of the 10 year SHS that is added to the FHP harvest area. Area can only be added to the SHS polygon during layout when an equal or greater amount has been deleted and tracked as variance. The sum of total area to be harvested and total area already harvested can not exceed 100 percent of the SHS area/subunit without moving to appraisal of the FHP. Only additions of 2 ha or greater will be reported in the tables below. Where the area tracked as additions in Variance Table 1 has changed by more than five percent after harvesting is complete, an update to additions shall be provided in the next submission of Variance Table 2 (see 4.1.3. below).

Total FHP Area – Is *SHS Planned Area + Actual Harvested Area*.

Stratum – Is the yield stratum used in the FMP timber supply analysis.

Subunit or Compartment – Operational subunits of a forest management unit (FMU) delineated by environmental, operational or watershed characteristics.

GROUND RULES

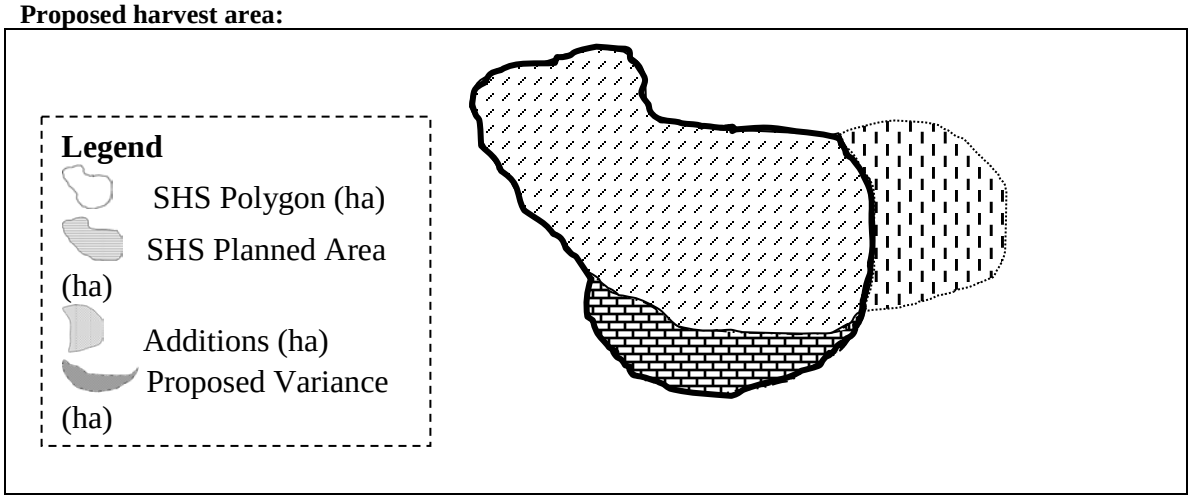
4.1.1 Companies shall submit a map to show the comparison of the SHS to the laid out FHP highlighting all variance and additions >2 ha.

4.1.2 Variance shall be reported by stratum for each FHP. The table shall be submitted in the FHP and include the minimum information as per Variance Table 1, or as otherwise approved by Alberta.

Variance Table 1 FHP 1

Stratum	Total SHS Area (ha)	SHS Planned Area (ha)	Variance (ha)	Total Unplanned SHS Area Within Compartment (ha)	Additions (ha)	Total FHP Area (ha)
Stratum 1						
Stratum 2						
Stratum 3						
Stratum 4						
Sub-Total						
Total (%)						

Proposed harvest area:



4.1.3 ***Variance*** **from the SHS shall be monitored and reported by subunit or compartment. The cumulative variance for all FHPs shall be reported by subunit and reported. The table shall include information as per Variance Table 2, or as otherwise approved by Alberta. Alberta will appraise any plan exceeding 20%** ***Variance*** **to determine the need for a CA per section 3.2**

Variance Table 2 Subunit or Compartment 1

	Total SHS Area (ha)	SHS Planned Area Remaining (ha)	Actual Harvested Area (ha)	Variance		Total Unplanned SHS Area Within Compartment(ha)	Additions (ha)	Total FHP Area (ha)
				(ha)	(%)			
FHP 1								
FHP 2								
FHP 3								
FHP 4								
Sub-Total								
Total (%)								

Note 1: Information in the grey boxes is to be used to assess compliance to 3.4.1.

Note 2: Information carried down from Variance Table 1 into Variance Table 2 may change after harvest where changes to the FHP block exceed five percent.
Note 3: Information will be reported in the next FMP net landbase document.

4.1.4 Additions shall be monitored annually and summarized by area/stratum/subunit and reported as per the tables above. 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.

4.1.5 Justification shall be provided in the FHP (block comments) for all deferred stands. The company shall provide a breakdown of variance summarizing permanent deletions from the FMP net landbase.

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
15/10 Utilization

- Merchantable Tree: one that has a minimum diameter of 15 cm outside bark at stump height (30 cm) and a usable length of 4.88 m to a 10 cm diameter (inside bark).
- Merchantable Piece: one that is 2.44 m (plus 5 cm trim allowance) or longer, with a 10 cm (inside bark) small end, where rot content or form does not render it unusable.

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 4.88 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.

13/7 Utilization

- Merchantable Tree: one that has a minimum diameter of 13 cm outside bark at stump height (30 cm) and a usable length of 4.88 m to a 7 cm top diameter (inside bark).
- Merchantable Piece: one that is 2.44 m (plus 5 cm trim allowance) or longer, with a 7 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 stump diameter of 15 cm outside bark and a merchantable length of 4.88 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 Company processing practices cannot make an unmerchantable piece from a merchantable tree or merchantable piece.

4.2.3 Coniferous and deciduous log butts or large ends exhibiting advanced decay greater than 50 percent in area of the cut surface (basal area) may be bucked at 0.61 m intervals or less to 50 percent sound wood. For circumstances such as over mature pine and aspen, the company may request in writing to the area office to buck at a greater interval.

4.2.4 Maximum stump height when measured from ground level shall be no more than 30 cm or that used in the timber supply analysis for the FMP (e.g., 15 cm.). Exceptions may be approved in the FHP (e.g., to delineate harvest areas, create rub posts for understorey protection). Where stumps are left to delineate areas (e.g., harvest areas, or to delineate poorly defined watercourses) they should be at approximately 30 m apart and no higher than 2 m.

4.2.5 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 of this annex apply.

4.2.6 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. Volume from merchantable trees and/or pieces (as defined in 4.2.1 and 4.2.2) used must be reported appropriately to Alberta if not addressed in an approved FMP. This also applies to operations in non-FMA FMU.

4.2.7 Company specific variances to utilization may be requested through FMB to address exceptional circumstances. A copy of this will also be sent to the applicable office.

5.0 INTEGRATION WITH OTHER USERS

5.1 DECIDUOUS/CONIFEROUS INTEGRATION

PURPOSE

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

DISCUSSION

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

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

GROUND RULES

5.1.1 All operators with timber dispositions in an area covered by an 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 Delegated Authority 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 area manager.

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

5.2 FOREST RECREATION AND TOURISM

PURPOSE

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

DISCUSSION

Forest management activities can impact recreational opportunities. Potential exists for increased public awareness and for increased recreational opportunities through co-ordination with forest management practices. The FMP 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.

5.3 TRAPPING

PURPOSE

To avoid damage to the infrastructure associated with RFMAs 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 before 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, access, 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.

5.3.2 At least ten days prior to commencing operations, the forest operator shall notify the trapper, preferably by personal contact that timber operations are beginning in the RFMA.

5.4 RANGE MANAGEMENT

PURPOSE

To integrate forest and range management operations.

DISCUSSION

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

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

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

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

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

GROUND RULE

5.5.1 Highly Sensitive areas shall be assessed and tactics shall be 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.

GROUND RULES

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

5.6.2 Historical resource records are confidential and shall not be shared with the public.

5.6.3 If a previously unknown historical resource is discovered during road building, harvesting, or silviculture operations, the operations that may directly affect the historical resource shall cease and Alberta Culture and Community Spirit 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;**
- **preventing 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 provide a source of food and nutrients for aquatic organisms. Riparian areas also provide habitats supporting a high diversity of wildlife species and other terrestrial biota, and provide corridors that can link different landscape and habitat features.

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

GROUND RULES

6.0.1 Watercourses shall be classified according to Table 1, Watercourse Classification. In the event the channel classification is not distinctly evident, the width shall be determined by the average of measurements taken at 50 m intervals at representative points of undisturbed stream channel over the length of the watercourse bordering the block.

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

6.0.2 Where an approved FMP does not provide an estimate of water yield, the following applies:

- **watersheds shall not be unduly affected by large harvest areas or harvesting large amounts of timber in a watershed unless otherwise approved in the FMP;**
- **predicted average annual water yield increases should not exceed 15 percent within third-order streams;**

- **companies will report the increase in water yield annually in a mutually agreeable format.**

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

6.0.4 **Riparian protection areas shall be established as in Table 2, 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.**

6.0.5 **All unmapped or incorrectly classified watercourses encountered during operations shall be given the appropriate protection as described in Table 2.**

6.0.6 **Unless otherwise approved in an FMP, variances from the standards in Table 2 must demonstrate that aquatic and terrestrial objectives are met. Any such proposals shall undergo a full review by Alberta prior to being considered for approval.**

6.0.7 **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.**

6.0.8 **Equipment shall cross watercourses only at approved crossings.**

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

6.0.10 **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.**

6.0.11 **Beaver ponds shall have a minimum buffer of 20 m or a buffer for the same classification as the watercourse flowing out of the pond, whichever is larger, as measured at a representative width within 50 m of the dam.**

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

Table 1.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 5 m	Resident and migratory fish populations; Important over wintering, feeding and rearing habitat; Important wildlife feeding/travel corridors	Water quality often reflects all upstream land use impacts and natural processes; Primarily sedimentation of stream channels; Loss of wildlife habitat, restriction of movement
Small Permanent	Usually solid although are sometimes broken heavy lines	Permanent streams; Often small valley bottoms; Bench floodplain) development	All year but may freeze completely in the winter or dry up during periods of drought. Some are 'transitional' to intermittent and dry up during drought	Banks and channel well-defined; Channel width from greater than 0.7 m to 5 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
Transitional Watercourse	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	Transitional streams channel widths are between .4 and 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

Continued…

Table 1.Watercourse Classification

Watercourse Classification					Fisheries/Wildlife Values	Potential Impacts
Type	**Mapping Designation**	**Physical Description**	**Portion of Year Water Flows**	**Channel Development**		
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	Not normally mapped	Often a vegetated draw	Flows only during or immediately after rainfall or snowmelt	Little or no channel development; Flow area is usually vegetated	Siltation may impact fish habitat downstream	Sedimentation downstream due to ground disturbance
Water-Source Areas	To be identified during layout	Areas with saturated soils, surface flow or seepages contributing directly to stream flow	All year May or may not freeze in winter	No channel development, but may be pronounced vegetation changes	Year-round springs provide potential value to fall spawning fish; Potential high-use areas terrestrial wildlife	Disturbance may cause downstream sedimentation; Interruption of winter flow may disrupt fish egg incubation; Loss of mineral licks
Lakes	Solid outline a water body Reserved areas noted on referral map	Large water collection areas 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 2.Standards and Guidelines for Operating Beside Watercourses

Watercourse Classification	Roads, Landings, Decking and Bared Areas	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. Any existing roads may be maintained at present classification standards. Any proposed watercourse crossings within 2 km upstream must be specifically approved in the AOP	No disturbance or removal of timber within 100 m of the high water mark; 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. Any existing roads may be maintained at present classification standards. Any watercourse crossings within 500 m upstream must be 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 10m 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; 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, which ever 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.	Where removal of timber within 30 m is approved, no machinery is permitted within 20 m of the high water mark;
Transitional Watercourse	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, which ever 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.	Where removal of timber within 10 m is approved, no machinery is permitted within 5 m of the high water mark;

Continued…

Table 2.Standards and Guidelines for Operating Beside Watercourses

Watercourse Classification	Roads, Landings, Decking and Bared Areas	Watercourse Protection Areas	Operating Conditions Within Riparian Areas and Water Source Areas Where Operations are Approved	
			Tree Felling	Equipment Operation
Intermittent	Not permitted within 30 m of the high water mark or water source areas within the riparian management zone unless specifically approved in the AOP.	Buffer of brush and lesser vegetation to be left undisturbed along the channel; Width of buffer shall vary according to soils, topographical breaks, water source areas and fisheries values.	Trees shall be felled so they do not enter watercourses, unless otherwise approved by Alberta. Should slash or debris enter the watercourse, immediate removal is required without the machine entering the watercourse.	Heavy equipment may operate within 20 m only during frozen or dry periods; No skidding through watercourse except on snow/ice bridge or logfill; Crossings to be removed on completion of operations; 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 restrictions apply on Class “A” and “B” waterbody tributaries; Skidding shall only be during dry or frozen conditions; Temporary crossings to be removed on completion of operations; On Class “A” and “B” waterbody tributaries, special crossing structures that do not cause stream siltation may be required.
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 100 m zone, no timber shall be removed within 30 m 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 unless approved by Alberta.

Continued…

Table 2.Standards and Guidelines for Operating Beside Watercourses

Watercourse Classification	Roads, Landings, Decking and Bared Areas	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 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 may be operated during frozen periods; No soil caps or depositing of soil permitted on roads in water source areas, unless a separation layer is incorporated or the road is designed to provide adequate surface and sub-surface drainage away from the road bed; Where a separation layer is used, the soil cap shall e 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 Inventory (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.

GROUND RULES

7.2.1 Line of sight shall be minimized where harvest areas are adjacent to accessible permanent Class I, II or III roads. Targets for the limits of sight distance shall be 400 m, but may be exceeded if justified in FHP.

7.2.2 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. Where existing road is used for decking the vegetation may not be protected.

7.2.3 Direct distance to wildlife hiding cover should not exceed 200 m.

7.2.4 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.

7.2.5 Alberta PSPs and PNTs 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 protection of the blue painted buffer found on all Alberta PSP's.

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;**
- **to minimize the risk of wildfires, and to improve fire suppression capability.**

DISCUSSION

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

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

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

Acceptable methods of reducing slash hazards are defined in Forest Protection Branch policy Debris Disposal Requirement for Logging Operations (see Appendix 2).

GROUND RULES

7.3.1 Slash accumulations resulting from timber harvesting, road, and campsite construction shall be disposed of within 24 months 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 .

7.3.3 Burning operations shall :

a) not be conducted during the fire season, unless otherwise approved in the Fire Control Plan in the AOP;
b) require a post burning survey to ensure all holdover fires are extinguished.
c) have 80 percent of the pile consumed with attempts to burn all piles.

7.3.4 The FHP shall comply with direction provided in Community Firesmart Plans.

7.3.5 The fire control plan of the AOP shall contain the following:

a) duty roster;
b) list of company woodlands personnel and their fire control training;
c) key company contacts;
d) heavy equipment resource list;
e) small hand tool resource list and their location;
f) company communication system and numbers and call-signs;
g) fire prevention policies;
h) fire prevention strategies;
i) fire prevention priorities (high values at risk);
j) fire operations schedule (i.e., harvesting and silviculture activities within the fire season);
k) identification of barriers to fire spread; and
l) location of decked volume.

7.4 STRUCTURE RETENTION

PURPOSE

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

DISCUSSION

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

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

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

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

These ground rules describe the average number of patches per hectare of residual material that will be left within harvested areas of a landscape unit for those where this is not defined in an FMP. There may be zero patches of residual structure in any particular harvest area as long as the amount identified in the TSA is met across the landscape over time.

Current information suggests that ecological benefits are directly proportional to the amount of structure retention; ecological benefits increase with greater levels of structure retention. Larger patches of residual structure generally have more benefits than smaller patches (lower blowdown probability, interior forest characteristics, hiding and thermal cover) and patches generally have more benefit than individual stems.

GROUND RULES

FMU S16, FMA0600043 (S17) and FMA9000028 (S20)

7.4.1 A minimum of 1 percent (1%) representative merchantable coniferous and deciduous volume shall be retained at a landscape level as per the management plan.

7.4.2 Not all harvest areas shall require structure retention.

7.4.3 Buffers left on sensitive sites as per 7.7.6 can be included as structure retention.

7.4.4 Blocks greater than 100 ha shall have increased structure while smaller blocks will have less.

7.4.5 Areas of non-merchantable timber or shrub areas greater than 1 ha shall be left.

7.4.6 For FMU S16, S17 and S20 structure retention shall be monitored and reported by the company utilizing the process from the approved FMP.

7.4.7 The companies shall provide the volume retained from their operations to the affected company.

7.4.8 Stand structure monitoring results will also be collected by the FMA holder for all operators in the FMA, tracked annually and reported every five years in the FMA stewardship report.

Vanderwell (FMA9700036)

7.4.9 Residual structure shall be retained in harvest areas during harvest and silviculture operations (including salvage operations) according to the FMP regarding the amount of structure, size of patches, species, composition, and distribution.

7.4.10 Single tree or patch retention shall be applied to a minimum level of three percent (3%) of the scheduled harvest area within each compartment with a range of 2 – 5 percent of the scheduled harvest area across each operating area. Structure does not have to be present in every harvest area but must achieve the above percentages within each compartment.

Tolko Industries (High Prairie)/High Prairie Forest Products (FMA0200039); Tolko Industries (High Prairie) (FMA9700033)

7.4.11 Structure containing dead and live trees, representative of the pre-harvest stand condition including species, tree size, condition and distribution shall be retained on the harvest areas.

7.4.12 Single tree or patch retention shall be applied to a minimum level of one percent (1%) of the scheduled harvest area within each compartment up to an average level of three percent (3%) of the scheduled harvest area across each operating area. Structure does not have to be present in every harvest area but must achieve the above percentages within each compartment.

7.4.13 Single tree retention shall be applied by leaving approximately eight (8) stems per hectare on the harvest area. Less than eight (8) stems may be achieved in areas scheduled for aerial herbicide application as long as the compartment average is eight stems/ha.

7.4.14 Small clump retention shall be applied to the landbase by leaving small groups of trees. These shall be left in proximity to features such as understorey protection, dens, nests, mineral licks and watercourse buffers to maximize its benefit to wildlife.

7.4.15 Green island retention shall be left in harvest areas greater than one hundred (100) hectares in size. The islands shall be identified in the FHP and a detailed harvest area plan done for the block.

All Companies

7.4.16 Residual structure shall be retained in harvest areas during harvest and silviculture operations (including salvage operations) according to the FMP regarding the amount of structure, size of patches, species, composition, and distribution. Variation to this may be approved by Alberta for salvage of Mountain Pine Beetle.

7.4.17 Forest operators shall retain structure in the following manner:

- **a) merchantable structure retention shall be retained in the form of patches rather than individual trees.;**
- **b) where possible, non-merchantable patches will be incorporated within the harvest area boundary;**
- **c) leave as many individual stems of non-merchantable trees, shrubs and snags as operationally and silviculturally feasible**
  - **I. leaning snags or trees of non-merchantable species that are greater than 6 m in height that create a safety hazard may be felled to create safe working conditions;**
  - **II. snags within 40 m of roads, camps, landings, fence lines, power lines and machine maintenance areas may be felled to create safe working conditions.**

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

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

7.4.19 Proximal retention can be utilized for wind firming stands, protection of understorey or for defined purposes/values (TLU, sensitive sites, etc.) and must be identified in the FHP. Proximal retention can be considered provided:

- **a) area of retention touches the boundary;**
- **b) retention area cannot make up more than 30% of the total retention target per FMU level by quadrant;**
- **c) retention area must be excluded from being sequenced for at least thirty (30) years from the skid clearance of the associated opening; and**
- **d) all other applicable retention requirements apply as per section 7.4.**

7.4.20 The company shall measure, report and charge structure retention to the appropriate disposition in a manner acceptable to Alberta.

7.5 UNDERSTOREY PROTECTION

PURPOSE

To protect coniferous understorey during timber harvesting and reforestation operations.

DISCUSSION

The main objective of this ground rule is to protect coniferous understories (understorey) that will contribute to future forest values. Understorey protection must be practiced in all stand types containing white spruce understorey, and balsam fir where approved by Alberta. Techniques will vary depending on whether the stand is defined as coniferous or deciduous landbase (see Annex 1, Appendix D for the assignment of understorey stands to coniferous and deciduous landbases).

Two understorey protection techniques are considered:

- **Avoidance –** Used in the deciduous landbase, in white spruce overstory with a white spruce understorey, and low density stands and/or highly aggregated (clumped) understorey distribution. Wind buffering tactics and pre-planning not specifically required.
- **Protection** – Used in the coniferous landbase. 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:** coniferous or deciduous
2. **Understorey Characteristics**: species, 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

All Companies

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

7.5.2 Understorey discovered in the field, but not previously identified shall be protected.

7.5.3 Pre-harvest acceptable stems are two metres or more in height, are within 75 percent of the average understorey stand height, have 50 percent or more live crown, are of good health and vigour, and are crop trees as defined by the Reforestation Standard of Alberta (RSA).

7.5.4 Post-harvest acceptable stems have 50 percent or more live crown and less than 25 percent 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 percent of the bole circumference, and are crop trees as defined by the Reforestation Standard of Alberta.

7.5.5 'Protection' techniques involve comprehensive pre-planned strip harvest pattern, controlled random skidding (for clumped understorey distribution), wind buffering

tactics such as aspen retention. 'Avoidance' techniques are used for stands with low density and/or highly aggregated (clumped) understorey distribution. Wind buffering not specifically pre-planned.

7.5.6 Monitoring of understorey protection success shall be done by the companies in a manner acceptable to Alberta.

Vanderwell (FMA9700036)

7.5.7 A minimum of one half (50%) of the total number of acceptable stems (pre-harvest) in an understorey shall be retained without harvest damage. Blocks with avoidance techniques and low density evenly spaced understorey may achieve less than 50% protection. These blocks must be identified in the FHP before approval will be given.

7.6 FISHERIES AND THE AQUATIC ENVIRONMENT

PURPOSE

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

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

DISCUSSION

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

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

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

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

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

GROUND RULES

Slave Lake Regional Operating 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 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 from time to time;**
- **maintain the effective habitats for ungulates in river valley environments.**

GROUND RULES

7.7.1 Woodland Caribou, Grizzly Bear, and Ungulate Habitat in River Valleys

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 facilitates 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.

b) Summer harvesting areas shall preferentially be located outside of caribou and grizzly range as well as outside of ungulate habitat in river valleys, or as an alternative, in proximity to previously existing all-weather access roads to assist in reducing the need for new summer access routes.

7.7.1.5 Except where identified and agreed upon within the FHP, temporary access roads are preferred.

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 berm, etc.).

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 in Alberta. Woodland caribou range is delineated on provincial land use referral maps.

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 are of primary concern.

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

GROUND RULES

7.7.2 Woodland Caribou

Planning

7.7.2.1 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;

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.

If not addressed in the approved FMP strategies and associated SHS, THE COMPANY SHALL FOLLOW 7.7.2.2 – 7.7.2.7.

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. Silvicultural prescriptions shall strive to protect existing terrestrial lichens, and facilitate terrestrial lichen regeneration (see section 8.0 for silvicultural prescription requirements).

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. The FMP shall provide direction of the amount, configuration and location/adjacency of harvest areas and older seral stage retention areas, and on rate of harvest.

7.7.2.4 Harvesting operations shall be "concentrated" spatially within caribou range. Provided green-up requirements are met (unless otherwise approved by Alberta), reserve harvest area harvesting within previously existing two or three-pass harvest designs within caribou range shall occur prior to new harvest areas being opened up.

7.7.2.5 In reserve harvest areas, 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.

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 Areas of concentrated terrestrial lichen growth (where terrestrial lichens are the predominant ground cover) within proposed harvest areas must be delineated in the FHP. DBPs 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.

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

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

7.7.2.11 While maintaining safety, class roads within caribou zones shall have narrower and more temporary road surfaces than those built to road standards outlined in Table 3. Table 3A provides guidance towards achieving these objectives. The goal is for development of frozen ground access to minimize grade development.

7.7.2.12 Summer harvesting areas shall preferentially be located outside of caribou range or if within caribou range, be located in proximity to previously existing all-weather access roads to assist in reducing the need for new summer access routes.

7.7.2.13 An approved caribou protection plan is required prior to harvesting within the caribou zone.

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. The Federal Species at Risk Act (SARA) shall apply to grizzly bears in Alberta. A provincial grizzly bear recovery process has been initiated which may have implications for timber harvest in Alberta.

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

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

Creating and maintaining access routes have negative effects on grizzly bear populations through increased mortality rates, disturbance and displacement. These negative effects shall be managed by minimizing the amount, tenure and class of new access roads, and by reviewing and acting upon management options (i.e., access management, reclamation strategies for existing routes, avoiding or minimizing access development in critical grizzly bear habitat and by using grizzly bear habitat maps in planning new access).

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) berry crop management strategies (in relation to both harvesting system and silvicultural prescription);**
- **j) proposed summer operations.**

7.7.3.3 Summer roads and crossings 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 grizzly bear range shall be planned to include 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.

7.7.3.7 Retention areas should be used in harvest areas to provide hiding cover and connectivity to forest patches.

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" 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;

b) avoidance of industrial disturbance to trumpeter swans during nesting and rearing of cygnets; and

c) minimize the access created near swan lakes to reduce the potential for secondary disturbance of trumpeter swans from recreational use.

During the breeding season (April 1 to September 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 September 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. 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 Zones

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. Traditional, high use and high quality winter ranges have been identified and mapped on the Wildlife Sensitivity Maps on the basis of several decades of winter aerial population surveys, supplemented by habitat assessments using aerial photo interpretation and ground surveys.

Key ungulate winter ranges play a disproportionately large role, given their localized size and distribution, in maintaining the overall productivity of regional ungulate populations. These ranges ensure that a significant proportion of the breeding population survives to the next year.

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

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 (Landscape Analysis Tool (LAT)). 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 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 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 should be conducted outside of the period Jan. 15 to April 30.

7.7.5.7 Mechanical thinning and/or selective use of ground or aerial herbicide as approved by Alberta may occur within this zone.

7.7.5.8 In order to maintain browse availability, mechanical stand tending activities shall only remove competing vegetative growth that interferes with the Reforestation Standard of Alberta (RSA) targets

Arctic Grayling

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.

Arctic Grayling are classified as a "Species of Special Concern" under the Alberta Wildlife Act. One of the greatest contributing factors threatening arctic grayling related to the forest industry is the density of linear features (e.g., Class I-IV roads, skid trails, and all preexisting access). Development of the FHP must focus on ensuring that best management practices related to construction, maintenance and reclamation of roads is in place, with the primary intent being the protection of fish habitat and productivity. This is achieved through the maintenance of natural hydrologic processes, avoiding erosion, and increasing protection of streams where risks to grayling are identified. The completion of the Alberta Fish Sustainability Index for arctic grayling (ARGR) in 2014 indicates that this species has seen large declines in abundance and distribution throughout the province, disappearing from much of its historical range.

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, connectivity, productivity and access of arctic grayling to the spawning, rearing, feeding and over wintering habitat within the watershed;

b) protection of water quality and quantity metrics that provide a key component of the habitat that supports native fish species within watersheds (e.g. temperature, dissolved oxygen content, natural sediment, avoidance of anthropogenic sedimentation and productivity) to ensure the continued occupancy and use of historical watersheds by arctic grayling; and

c) minimize the industrial footprint and density of linear features intersecting watercourses within arctic grayling watersheds to reduce the potential for secondary disturbance and mortality of arctic grayling from recreational use.

7.7.6 Arctic Grayling

Locations of existing arctic grayling can be identified using the Fisheries and Wildlife Management Information System (FWMIS), and the associated Fish and Wildlife Internet Mapping Tool (FWMIT). Within these identified areas:

7.7.6.1 Operational planning by the company should incorporate the use of Alberta's Wet Areas Mapping tool to identify areas that are sensitive to disturbance. Field confirmation of these sites including depth to water, potential disruption of groundwater flows, and areas at high risk of erosion in wet or riparian areas can be a useful tool in determining road and crossing location.

7.7.6.2 Detailed block plans (DBP) for operations shall be submitted.

7.7.6.3 Unless otherwise approved, all operations should occur outside the restricted activity period (RAP) of April 16 to July 15. Early winter operations are preferred; and during dry or frozen conditions are best.

7.7.6.4 Where crossing of wet areas cannot be avoided, the operator shall ensure that the forest floor remains intact ensuring that normal ground water flows are maintained after reclamation.

7.7.6.5 Site preparation activities within 100 meters of watercourses must minimize soil disturbance to prevent input of sedimentation.

Other Species

DISCUSSION

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

7.7.7 Other Species

7.7.7.1 Sensitive sites listed below shall be protected by retention of an undisturbed, forested buffer (or other management technique) from the edge of the opening associated with these sites, or from the centre of sites without openings. Both Alberta and the forest operator shall make a reasonable effort to identify sensitive sites in the FHP. Sites discovered in the field shall receive the same buffer as those sites previously identified in planning. Buffer widths and duration shall be agreed to in the FHP. Mineral licks with a drainage leading to them may be buffered with a 50 m buffer on the lick and a 20 m buffer on the drainage.

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

Sensitive Site	Radius of Forested Buffer
Breeding Sites and Hibernacula of Species At Risk Salamanders, Amphibians and Reptiles	100 m
Bat Hibernacula	100 m
Colonial Bird Nesting Area	100 m
Sandhill Crane Nesting Area	100 m
Wolverine Den	100 m
Mineral Licks	100 m
Raptor Nest Tree	100 m
Natural Springs and Beaver Ponds with no outflow channel	20 m-vegetated
Grizzly Bear Den	100 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 AOP 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 PLANNING

8.1.1 The conditions outlined by Alberta must be met prior to planning reforestation of balsam fir or alpine fir as an acceptable species. See Directive 2001-01 or successors.

8.1.2 Block boundary bordering previously harvested areas shall avoid damaging regeneration.

8.1.3 Reforestation timelines prescribed by Alberta shall begin at the start of the timber year following the end of the timber year when the harvest area has received skid clearance from Alberta, or from a company representative pursuant to a self-inspection agreement between the company and Alberta.

8.1.4 Reforestation prescriptions shall be based on site assessments (pre or post-harvest) that include considerations specific to the site (e.g., Ecosite Field Guide for Alberta).

8.1.5 The Alberta Forest Genetics Resource Management Standards (FGRMS) shall be adhered to in all silviculture planning and operations. The standards specify rules for seed and vegetative material collection, registration, storage, handling, and testing for improved stock.

8.1.5.1 Notification shall be provided on the AOP checklist that FGRMS section 11.2 has been met.

8.2 REFORESTATION PROGRAM

8.2.1 The reforestation program shall be submitted:

a) before March 1 for silviculture operations commencing between May 1 and October 31;
b) before September 1 for silviculture operations commencing between November 1 and April 30; or
c) as otherwise specified in an FMA, or at a time agreed to by Alberta.

8.2.2 Harvest areas (openings) shall be clearly identified (e.g., maps, spatial files, or delineation on the ground through visual markings).

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

a) silviculture prescription;
b) proposed silviculture treatment schedule;
c) maps as requested by Alberta; and
d) proposed blocks for declaration in lieu of survey and re-treatment.

a. Silviculture Prescription

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

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

Commercial thinning proposals shall be submitted for approval as part of the AOP unless otherwise agreed by Alberta, in accordance with Alberta's requirements.

b. Proposed Silviculture Treatment Schedule

The Silviculture Treatment Schedule shall contain the following information:

- disposition;
- unit/compartment;
- block and opening number;
- a list of harvest areas and the estimated area (ha) to be treated;
- the reforestation strata standard for each harvest area (see below for more detail);
- season or date of activity – summer vs. winter.

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

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

Should the proposed reforestation activities for a harvest area change after AOP approval, the following items require an amendment to the AOP:

- changing to a treatment not approved in the silviculture strategy table for the specific strata;
- additional harvest areas to be treated by any means of treatment;
- the remaining changes require notification to Alberta through Alberta Regeneration Information System (ARIS) reporting.

If a harvest area is declared sensitive, the forest operator shall provide additional information beyond the strategic and tactical levels (see section 3.4.10). 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 down hill 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.

Sample Silviculture Treatment Schedule

Opening Number (ARIS)	**Harvest Area (ha)**	**Preliminary Strata Declaration**	**Activity**	**Activity Area (ha)**	**Season**	**Comment**
5201011233A	10	C	Mounding	4	Winter	

c. <u>Map</u>

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

I. all harvest areas to be treated, and all roads and stream crossings to be constructed or used (designating their season of use);
II. the reforestation map shall include all harvest areas from integrated operations.

d. A listing of harvest areas where a declaration is proposed in lieu of a survey for areas not likely to meet regeneration standards and harvest areas where re-treatment is proposed.

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

See Section 12.0 REPORTING for reforestation activity reporting requirements.

8.3 SILVICULTURE OPERATIONS

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

8.3.2 Herbicide, pesticide and fungicide use shall be performed in accordance with Alberta requirements.

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

8.3.4 Planting boxes shall be disposed of within 24 months of logging (skid clearance). Boxes may be securely placed within existing debris piles for disposal by burning or removed and landfilled. 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 condition 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 the potential for soil erosion;**
- **prevent soil, logging debris and deleterious substances from entering watercourses;**
- **ensure that the capability of the site to support healthy forest tree growth is maintained.**

DISCUSSION

Minimizing soil displacement, compaction and rutting/puddling during road construction, harvesting, and silvicultural operations are primary concerns. Soils are most at risk of compaction and rutting/puddling when the soil is moist or wet, with the more poorly drained soils remaining wetter longer. The soils are equally at risk in the winter months if they are wet and the soil has not frozen, which is a common occurrence. Rehabilitation of compacted soil in harvest areas (off – road) is seldom an option because they are generally wet and additional machine traffic will often cause more soil damage. Therefore, protection of soil is best achieved in choice of equipment, staff training and advanced planning of operations. In terms of advanced planning, it is

recommended that a pre-harvest site assessment include the evaluation of soil drainage class across the harvest area delineating sensitive areas with imperfectly and poorly drained soils. Management of field operations shall involve operating on soils when they are as dry as possible. The weather and percentage of sensitive areas in the harvest area shall be taken into account when scheduling areas for harvesting. Following a long dry period in summer, the sensitive sites shall be scheduled accordingly.

GROUND RULES

Pre-harvest planning

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

9.0.2 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).

Harvesting

9.0.3 The total area covered by temporary roads, rutting, 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.

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

9.0.5 Minimize the machine traffic on sensitive areas, depending on soil susceptibility to disturbance.

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

9.0.7 Erosion and soil disturbance must be limited, with effort made to retain organic matter and soil nutrients.

Post-harvest reclamation/reforestation

9.0.8 Site preparation creating linear disturbance patterns shall be oriented to minimize channelling of water downslope and to ensure sediment is not directly entering watercourses.

9.0.9 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.

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.

Documents concerning Mountain Pine Beetle can be found on the Alberta Sustainable Resource Development website.

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, Dwarf mistletoe infected stands must be surveyed using an acceptable rating system (e.g., Hawksworth system).

10.2 WEED MANAGEMENT

PURPOSE

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

DISCUSSION

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

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

GROUND RULES

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

11.0 ROADS

11.1 ROAD CLASSIFICATION

PURPOSE

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

DISCUSSION

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

GROUND RULES

11.1.1 The operator shall utilize the classification system described in Table 3 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 3.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.	Progressive reclamation concurrent with construction. Cross drains and ditch blocks dictated by slope and soil conditions. Drainage water to be diverted off the ROW in as short a distance as possible.
Class II Secondary Permanent All Weather or Dry Weather 5 – 20 + years	Identified in higher-order plans (i.e., long term access plans). DLO required. Detailed design plan: through route selection process a need for detail shall be assessed, i.e. need for cross-sectional profiles based on sensitive area identification.	Centre line marked. Side ribbons may be required for DLO roads and sensitive sites.	20–30 m	5 – 10 m	Location identified prior to construction (EFR) or as per submitted TFA.	As per TM Regulations and EFR under DLO	Total disposal. Stripping and fine debris to be retained for erosion control by spreading on cuts and fills and any other critical area.	Progressive reclamation concurrent with construction. Cross drains and ditch blocks dictated by slope and soil conditions. Drainage water to be diverted off the ROW in as short a distance as possible.

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

Table 3A - Road Classification for the Caribou Area

All other criteria from Table 3 apply to the roads in Table 3A

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 0.5m) 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.

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

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.

Safety needs to be addressed throughout the road planning process.

GROUND RULES

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

Road Planning

11.2.1.1 Forest operators shall annually submit a road 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 lifespans 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. Upon request, within 90 days of construction, as-built road plans shall be submitted to Alberta by the forest operator in a format acceptable to Alberta.

11.2.3.2 The forest company shall submit a table or report tracking the status of all their unreclaimed non- DLO roads over two years old. These roads shall be reclaimed as soon as timber operations are complete or within three years of construction. This may be submitted as part of the Road Plan in the AOP or GDP by map or in a table.

11.3 ROAD CONSTRUCTION, MAINTENANCE AND RECLAMATION

PURPOSE

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

Discussion:

Existing access (e.g., seismic lines, trails, and existing roads) shall be used as a priority wherever practical and feasible.

GROUND RULES

11.3.1 General

11.3.1.1 Road ROWs shall be cleared according to standards established in Table 3, and any additional conditions approved in the FHP.

11.3.1.2 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 9.0.3 – Soils

11.3.1.3 Temporary road construction activities that are required outside an approved ROW can be considered incidental to construction and will be approved as part of the AOP provided the following is met:

a) Be immediately adjacent to AOP approved disposition (temporary road and associated ROW only);
b) Be reclaimed or reforested in the same fashion as the adjacent AOP approved disposition (if applicable);
c) Be without conflict of existing dispositions and/or adjacent land uses; AND
d) Be an activity type and within the parameters as described below:

- **Log Decks or Decking Areas:**
  - **i. ≤ 0.18 hectares in size;**
  - **ii. Located on average ≥400 metres apart**

- **Bank Stabilization:**
    i. **Related to hill cuts impacted during construction;**

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

11.3.2 Construction

11.3.2.1 Roads, skid trails and landings shall be placed in locations and constructed so that soil erosion, damage to streambeds and sedimentation of watercourses are minimized.

11.3.2.2 On those parts of the ROW not used for grade construction, disturbance to the duff and organic soil shall be minimized to reduce damage to the roots of bordering trees and to provide a protective soil cover.

11.3.2.3 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 Alberta through an appropriate land use disposition before they are developed.

11.3.2.6 All sand and gravel pits off the ROW must be authorized under an appropriate disposition.

11.3.2.7 Removal of sand and gravel from within the channel or floodplain of any watercourse is prohibited.

11.3.3 Erosion Control/Prevention

11.3.3.1 Erosion control shall be implemented as per Table 3.

11.3.3.2 Initial erosion control measures shall be concurrent with grade construction. Preferably, no more than a 2 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.

11.3.3.4 Ditch backslopes shall have a regular profile from the top of the cut to the bottom with no hanging banks or vertical cuts.

11.3.3.5 Water from roads, ditches and bared soil surfaces shall not be permitted to drain directly into watercourses. Where vegetated buffers alone do not retard water and sediment movement effectively, appropriate obstructions (e.g., logs, rocks, mounds) or sediment control structures shall be installed

to dissipate the flow of water and capture sediment prior to entering the watercourse.

11.3.3.6 Cross-drainage culverts and other drainage devices shall be installed as road sub-grade construction progresses. Cross-drainage structures shall:

- **a) reduce water movement along ditches;**
- **b) divert water from the ROW into the surrounding vegetation directly as possible;**
- **c) provide cross movement for water from seeps and springs;**
- **d) be installed with adequate spillways or downspouts where they drain onto unstable or bare soil.**

11.3.3.7 Re-vegetation shall be completed concurrent with operations or as soon as soil conditions permit. Existing ditch vegetation shall be protected during road maintenance wherever possible and re-established where necessary.

11.3.3.8 A portion of the debris from clearing and strippings from road and landing construction shall be retained and used for re-vegetation and erosion control on disturbed areas.

11.3.4 Reclamation

11.3.4.1 Roads not under DLO that are no longer required shall be reclaimed, have crossings removed, and their condition monitored until they are considered satisfactorily stabilized (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: Decompaction is not normally required where operations were under frozen conditions.

a) **decompacting, and returning them to an acceptable landform;**

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

c) **cross-ditching, rolling back topsoil (including slash and logging debris) and re-vegetating a minimum of 80% crown coverage of erodible bared surface areas;**

d) **reforesting disturbed areas inside harvest areas and where mutually agreed to, outside of the harvest area;**

e) **establishing access closures where required.**

11.4 WATERCOURSE CROSSINGS

PURPOSE

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

DISCUSSION

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

The planning of watercourse crossings must consider tenure, user integration, timing constraints, existing plans and assessments, and pertinent policy and legislation. Watercourse crossings shall

be designed, installed, maintained and deactivated in accordance with all applicable policy and legislation.

GROUND RULES

11.4.1 The company shall require approval for any crossing structure not listed in table 4 for the appropriate watercourse type.

Table 4.Acceptable Crossing Structures

Stream Classification	Acceptable Structure	
	Non-Frozen	Frozen
Ephemeral	Log Fill	Log Fill
	Culvert	Snow Fill
	Bridge	Culvert
		Bridge
Intermittent	Modified Log Fill	Log Fill
	Log Fill	Snow Fill
	Culvert	Culvert
	Bridge	Bridge
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 11.4.21.**

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 Unless otherwise approved, watercourse crossings shall:

a) maintain flow
b) minimize erosion and sedimentation;
c) have stable approaches;
d) be at right angles to the watercourse;
e) be at locations where the channels are well defined, unobstructed and straight;
f) be at a narrow point along the watercourse;
g) allow room for direct gentle approaches;

h) have no direct drainage from either the road surface or ditches; and
i) have erosion control structures during construction.

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 winter 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 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 passage of fish (see table 4 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 4).

11.4.19 Properly constructed logfills (see 11.4.21 below) on temporary roads may be used as per table 4. 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 summer crossing of ephemeral watercourses.

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.

11.4.21 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 do not disturb the banks or watercourse.**

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

11.4.23 A native timber bridge may be used on watercourses as per table 4 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.**

11.4.24 Snow-fills may be used on watercourses as per table 4 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.**

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

- **a) no capping material is used on the bridge;**
- **b) winter stream flows are not impeded;**
- **c) approaches of snow and ice constructed of sufficient thickness to protect the stream bank;**
- **d) appropriate ice thickness exists to bear necessary load requirements;**
- **e) no alterations to streambed or bank are required; and**
- **f) they are not on that portion of the Athabasca River between the East boundary of Twp 60-Rge 17-W5 and the North boundary of Twp 64-Rge 3-W5.**

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

11.4.27 Watercourse crossings that are no longer required shall be reclaimed 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 GDP or FHP shall describe specific access control measures (see section 3.3 or 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.

11.6 CAMPS AND FACILITIES

PURPOSE

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

DISCUSSION

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

Some of the best practices for camps and facilities include:

- place sites out of visual and auditory range from mineral licks and key wildlife areas or use a default of one kilometre;
- safe camp locations are a priority. Therefore, an evaluation of all potential risks shall be conducted prior to selecting a final camp location;
- camps and fuel storage sites shall be identified in the annual fire control plan when proposed locations are known;
- camps shall be kept clean. Proper mechanisms for the disposal of hazardous and non-hazardous waste shall be implemented;
- camp food and garbage storage shall minimize the potential for problems with wildlife. 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 (i.e., Public Health Act – *Work Camp Regulation*.).

11.6.3 Where feasible, forest operators shall establish temporary camps and/or other facilities within either new harvest areas or existing clearings (i.e., gravel and borrow pits).

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

12.0 REPORTING

PURPOSE

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

DISCUSSION

Silviculture and harvest operations reporting and monitoring are necessary to ensure legislated requirements are met in all treatment areas. Ground rules governing operations reporting are required to ensure consistency among forest operators. The intent of activity reporting is to communicate that a given activity has occurred, where it occurred and when it occurred. This information shall also be used for annual and stewardship reports and shall be RFP validated as per Appendix 1 of Annex 4.

GROUND RULES

SILVICULTURE AND HARVEST ACTIVITY REPORTING

12.0.1 Forest operators who conduct silviculture work on their disposition shall report the details of all work completed in the previous year annually into ARIS no later than May 15. The required information is outlined in the ARIS Industry Operations Manual. Information shall be submitted in accordance with all requirements of the manual and associated policy directives.

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

12.0.3 Companies harvesting more than 30,000 m^3/yr shall have self-inspection agreements in place and shall carry out periodic inspections of active timber operations and report the information to Alberta in a format acceptable to Alberta. Reports based on the 2006-04 directive shall be submitted to Alberta once per month or at agreed to intervals.

12.0.4 As built plan (includes digital shape files (or other digital format as approved by Alberta) of harvest boundaries, road location, road percentages, and added watercourse crossing location and type) from the previous year's harvest shall be submitted at a time agreed to by Alberta. The as built shall include opening number, block number, block area, skid clearance date and any amendments made as per section 3.5.5.

Appendix 1-Role of Regulated Forestry Professionals (RFP)[2] in Forest Management

The Alberta Government is committed to sustainable management of forests on public land to provide benefits and opportunities for Albertans. Alberta relies on the professional integrity of RFPs to enhance the effectiveness of forest resource management planning, implementation and harvest activity, while recognizing the interdisciplinary nature of forest management planning.

Alberta requires a RFP to submit the components of forest management plans, annual operating plans and harvest activity reporting, as identified in this annex, for approval.

1.0 Validation by a RFP

RFPs shall validate their submitted work by one of the following methods:

i. signing using their professional title and registration number;
ii. stamping and signing using the seal provided by a *College*; or
iii. using other mechanisms approved by Alberta.

1.1 Significance of RFP Validation

RFP *validation* provides assurance to Alberta that work is *accurate* and has been prepared with *due diligence*. Government RFPs shall review *validated work* by conducting a reasonable assessment for accuracy and shall take appropriate *corrective actions* where *validated work* is not *accurate*.

The documentation required to demonstrate *due diligence* is viewed as a significant source for validating accuracy. Alberta will not accept inadequate documentation and may refer such occurrences to the Complaints Director of the appropriate *College*.

1.2 Approval of Validated Work

Alberta's approval does not transfer the accountability for the plan or its implementation from the Organization or the submitting RFP to Alberta or its staff. Government RFPs who review submissions are accountable for their reviews and any direction provided to the Organization. *Approval* of *validated work* shall be addressed as described below.

1.2.1 Appraisal

Work with far-reaching and significant potential effect if inaccurate (such as but not limited to timber supply analysis, GDP). *Validation* of this type of work demonstrates confidence the work is *accurate*; however, due to its potential significance, it is both necessary and important to examine the work carefully. Approval shall be granted after the work has been reviewed by appropriate RFPs to assess accuracy. The timeline for this shall be established by Alberta and will vary depending on the nature of the *validated work*. Those preparing work for appraisal are advised to communicate with the reviewing government RFPs regularly and effectively to minimize confusion over the standards expected of the work.

1.2.2 Acceptance

Work with a more limited potential effect (such as, but not limited to silviculture reports, operations inspections). The work is considered approved on the date Alberta acknowledges receipt of the work. Alberta shall notify the organization by acknowledging receipt within 5 working days of submission. The notification date will be documented by Alberta as the start date for FHP approval. Alberta shall periodically check the work and supporting documentation to verify its accuracy.

2.0 Work Validated by a RFP

All entities that conduct timber harvesting or silvicultural activities on public land, except those harvesting less than 30,000 m^3 annually from public land, must validate the items described below (the list of work to be validated may be amended from time to time by Alberta to adapt to change).

2.1 Forest Management Plans

The entire *forest management plan* shall be approved through an appraisal and must be validated by the senior RFP responsible for its preparation.

The following components must be validated by the RFP most directly responsible for their preparation. An RFP validated checklist describing the extent of compliance with applicable standards for each component shall be included with each submission:

i. yield projections and all associated data and analyses – for appraisal;
ii. vegetation inventory data – for appraisal;
iii. landbase description (analysis and report) – for appraisal;
iv. silviculture strategies (refer to Annex 1, standard 5.5 on managed assumptions)– for appraisal;
v. forecasting (timber supply analysis) – for appraisal;
vi. harvest planning (*spatial harvest sequence*) - for appraisal;
vii. monitoring reports - annual - for acceptance; stewardship – for appraisal.

2.2 Annual Operating Plans[2]

The minimum *validation* requirements are as follows:

i. General Development Plan – for appraisal
ii. Compartment Assessments - for appraisal
iii. Final Harvest Plan – for acceptance
iv. Road Plan and Fire Control Plan – for acceptance
v. Reforestation Program – for acceptance[3]

2.3 Harvesting and Reforestation Activities

Accurate and timely submission of timber production and sales information is important and must be validated. The activities related to reporting timber production and sales must be approved by the senior RFP responsible for the submission.

The following components of timber production and sales must be validated by the RFP directly responsible for their preparation:

i. scaling populations (TM262) – for appraisal;
ii. timber production audits – for acceptance;
iii. letters of understanding – for appraisal;
iv. statutory declarations of production – for appraisal;
v. harvest tenure standings – for acceptance;
vi. timber production reporting – for appraisal;
vii. silviculture information - regeneration surveys, ARIS submissions and silviculture operations reports, regeneration strata balance/swap/trade summaries – for acceptance;
viii. field operations inspection reports – for acceptance;
ix. herbicide reports – for acceptance.

[1] AOPs are approved subject to an appraisal by Alberta. Where a compartment assessment has been completed the CA, FHP and AOP shall be appraised by Alberta.
[1] Where thinning plans, herbicide plans, and reforestation prescriptions vary from FMP silviculture strategies the silviculture program shall be appraised by Alberta.

[2] AOPs are approved subject to a review by Alberta. Where a compartment assessment has been completed the CA, FHP and AOP shall be appraised by Alberta.
[3] Where thinning plans, herbicide plans, and reforestation prescriptions vary from FMP silviculture strategies the silviculture program shall be appraised by Alberta.

Appendix 2-Debris Disposal Policy

BRANCH: WILDFIRE MANAGEMENT SECTION: WILDFIRE PREVENTION	MARCH 15, 2010

DEBRIS MANAGEMENT STANDARDS FOR TIMBER HARVEST OPERATIONS

1. AUTHORITY

- Alberta Sustainable Resource Development (SRD)

2. PURPOSE

- To provide standards for debris management in timber harvesting operations in compliance with the *Forest and Prairie Protection Act* (FPPA) and the *Forests Act.* Compliance will reduce the threat of wildfire to communities and other values within the Forest Protection Area.

3. POLICY

- The FPPA defines debris management standards for debris produced from timber harvest operations. Timber and reforestation activities must comply with the FPPA and the *Forests Act.* The standards will be enforced.

- The *Debris Management Standards for Timber Harvest Operations* policy is effective March 1, 2010 and may be revised. In addition to the management of debris through disposal, this policy also applies to debris retained for reforestation, wildlife habitat or other landscape management objectives.

4. APPLICATION AND IMPLEMENTATION OF THE DEBRIS MANAGEMENT STANDARDS

- Debris management strategies must be linked to landscape objectives and must not conflict with the FPPA. The loss of productive land base resulting from timber harvest operations (debris piles, roads, landings) within the harvest area must not exceed the specifications outlined in applicable Operating Ground Rules. (As per the Timber Management Regulations of the *Forests Act.*)

A. Level II Mountain Pine Beetle Control Debris Management Standards

The standards specified under sections B, C, D and the FPPA apply.

B. FireSmart Debris Management Standards

During harvest operations, there is a need to manage debris to minimize the risk of wildfire to communities or other values at risk. In order to minimize this risk, the following standards shall be applied:

I. Within the FireSmart Community Zone (Generally a 10 kilometre buffer of the community's development centre.), debris management strategies, for any purpose, must not include the retention of debris piles for reforestation, wildlife habitat or other landscape management objectives.

II. Outside of the FireSmart Community Zone, debris pile retention for reforestation, wildlife habitat or other landscape management objectives may be considered an acceptable debris management strategy. Retention is subject to SRD Forestry Program Manager approval through the Annual Operating Plan and in accordance with the standards described herein.

C. Wildlife Habitat and Biodiversity Debris Management Standards

Debris piles that are retained in the harvest area outside the FireSmart Community Zone for wildlife habitat or landscape biodiversity objectives must adhere to the following guidelines:

I. If the strategy involves random scattered piles throughout the harvest area, the following standards apply:
- Height of piles must not exceed 2 metres
- Base diameter of piles must be no greater than 3 metres
- Distance between piles must be no less than 25 metres
- Distance from block edge must be no less than 25 metres

II. If the strategy involves random scattered piles made up of chip residue from chipping operations throughout the harvest area, the following apply:
- Height of piles must not exceed 2 metres
- Base diameter of piles must be no greater than 3 metres
- Distance between piles must be no less than 15 metres
- Distance from block edge must be no less than 25 metres

III. If the strategy involves piling of debris at roadside, piles must meet the following standards:
- Piles can only be left along roads scheduled for reclamation and abandonment following the completion of reforestation (i.e. scarification, planting)
- Piles must be compacted to a maximum of 2 metres in height, 3 metres in width, 12 metres in length and perpendicular to the road
- A group of piles may consist of a maximum of 5 piles with a spacing of 6 metres of slash free area between each pile within the group
- Pile groups must be separated by a 50 metre slash free spacing

D. Reforestation Debris Management Standards

Debris piles or windrows created from reforestation operations must adhere to the following specifications:

I. If the strategy results in debris piles, the following standards apply:
- Height of piles must not exceed 2 metres
- Base diameter of piles must be no greater than 3 metres
- Distance between piles must be no less than 25 metres
- Distance from block edge must be no less than 25 metres

II. If the strategy results in windrows (large logs, humus, and duff), the following standards apply:
- Windrows must not be greater than 2 metres in height
- Windrows must not be greater than 3 metres in width
- Windrows must not exceed an average of 75 metres in length and must have slash free

spacing of 8 metres

- Distance from block edge must be no less than 25 metres

E. Enforcement / Approval

SRD will serve as the "one window" for industry contact and approval and will complete field inspections as required.

Debris piles to be disposed of must be in conjunction with the terms of these standards and the two year timeline set out in the FPPA. SRD will issue an "Order to Reduce or Remove a Fire Hazard" when debris piles have not been properly disposed of in accordance with this Policy and the Annual Operating Plan approved by the department.

Forest Industry may apply to SRD for a one-year extension where drought conditions have prevented them from completing disposal through burning operations. The SRD Forestry Program Manager must approve the extension.

Where debris disposal by burning is the strategy, Industry must report all burning locations to SRD one month before the start of the fire season.

F. Review Process

Research will be carried out by FP Innovations to assess the threat of wildfire associated with debris resulting from timber harvest operations. If findings indicate that standards within this policy directive are not sufficient to support wildfire hazard reduction, the standards and policy will be modified.

G. Cross Reference

Forest and Prairie Protection Act
Forest and Prairie Protection Regulations, Part I and Part II

H. Contact

Hugh Boyd, Director
Wildfire Prevention Section
780-427-7811

DATE:	APPROVED BY:
	_____ Bruce Mayer, Executive Director, Wildfire Management Branch

Appendix 3-GLOSSARY

Alberta	The Department of Sustainable Resource Development, including the Public Lands and Forests Division, Fish and Wildlife Division, and Forest Protection Division or as amended from time to time.
Alberta Vegetation Inventory (AVI)	An inventory of vegetation and forest stands including non vegetated areas.
Analysis	A detailed examination of a body of data, a series of decisions, or the implications of one or more policies, and a determination of what this examination reveals about the nature, function and/or relationships in effect.
Annual allowable cut (AAC)	The volume of timber that can be harvested under sustained-yield management in any one year, as stipulated in the pertinent approved forest management plan. In Alberta it is the quadrant cut divided by the number of years in that quadrant, usually five.
Annual Operating Plan (AOP)	A plan prepared and submitted by the forest operator each year, which provides the authorization to harvest. An AOP is a requirement of the Timber Management Regulation. (See section B 1.4)
Approval	Issued by Alberta. Approval Decision is prepared outlining significant items considered in plan approval and outlining conditions to be met within specified time periods by the Organization or a decision made by Alberta on an AOP.
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	Government personnel located at the Regional or Area level charged with supervision of all forest management activities in a defined Region or Area. It can also mean someone who is authorized to approve an AOP.
Deleterious material	Section 34(1) of the Fisheries Act defines "deleterious substance" as: (a) any substance that, if added to water, would degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water, or (b) any water that contains a substance in such quantity or concentration, or that has been so treated, processed or changed, by heat or other means, from a natural state that it would, if added to any other water, degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water.
Department Licence of Occupation	A disposition issued by Alberta authorizing occupation of a linear corridor, often for an access road.
Desired Future Forest	A spatially explicit projected range of conditions of the forest landscape 100+ years into the future. The range of forest conditions defines the goal towards which forest management will be directed. It is our best guess today on the arrangement of forest age classes, roads and habitats that will provide for a set of objectives and desired outcomes that have been identified for the area.
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 palaeontological, 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.
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*
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 patch of residual trees	A 0.2 to 2 ha patch of undisturbed canopy forest surrounded by harvested area. At least half of the trees in the patch should be large residual trees.
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.”
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 overstory 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.
Small patch of residual trees	A patch of less than 0.2 ha of undisturbed canopy forest surrounded by harvested area. The patch must be composed of at least four canopy trees. At least two of the trees in the patch should be large residual trees.
Snag	A dead tree that is taller than 2 m.
Soil 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 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 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.
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. 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
FLUZ	Forest Land Use Zone
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
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

Appendix 4-FHP and AOP CHECKLISTS

Forest Harvest Plan Checklist

Area _____ Disposition Number _____
Company _____ Date Disposition Issued _____
Submission Date _____ Date Disposition Expires _____

APPROVAL ITEM	Yes/No (Company)	INITIAL/DATE (ESRD)
1) Has the FHP been validated by an RFP?		
2) Is the Planned SHS Variance <20% compartment/decade?		
3) Is the sum of proposed area to harvest and previously harvested area (since SHS approval) less than or equal to 100% of the SHS area?		
4) Is a Compartment Assessment required?		
5) Does the FHP adhere to all Ground Rules?		

	Company (Y,N,N/A)	Company Comments (optional)	ESRD (Y,N,N/A)	ESRD Comments (optional)
A. Administrative Considerations				
· Has a copy of the FHP been provided to:				
- Area Planning Forester?				
- Forest Officer?				
- Fish & Wildlife?				
- Other? _____				
· Is the FHP consistent with approved higher order plans (DFMP, SHS, GDP)?				
· Has the required disposition been issued and is active?				
· Is the FHP complete and legible?				
- maps				
- block tables				
- detailed block plans where requested				
- contingency plans				
B. Utilization				
· Has the SHS variance been reported and summarized for the FHP?				
· Does the utilization standard match tenure document?				
· Are the deviations from utilization standards identified, explained and justified (rub posts, high stumps, retention, etc)? If there are no deviations, enter N/A.				
C. Ground Rule Deviations - Complete if answered "NO" to Approval Item #5 (top of page), otherwise enter N/A				
· Have all the blocks containing ground rule deviations been identified?				
· Has an explanation and justification been provided for all ground rule deviations?				
D. Integration with Other Users.				
· If the plan is not integrated, has an explanation and justification been provided?				
· Has the recipient of incidental volumes and chargeability been identified? If there are none, enter N/A.				
· Have all the effected trappers been identified and contacted? If there are none, enter N/A.				
· Have known trapper cabins, trails and other improvements been identified and integrated into the plan? If there are none, enter N/A.				
· Have known recreational groups been identified and contacted where issues have been observed? If there are none, enter N/A.				
· Has a GTA been completed and grazing disposition holders been contacted (Directive 2006-01)? If there are none, enter N/A.				
· Have the required historical resource assessments been completed and, if necessary, integrated into the plan?				
· Have all issues raised by other users or the public regarding this plan been documented? If there are none, enter N/A.				
· Have potential land use conflicts been documented and mitigated (PNT, CNT, road use agreements, etc,)? If there are none, enter N/A.				

E. Access Management (temporary access only)				
· Have access management measures been described and identified (location, timing, signage, etc)? If there are none, enter N/A.				
F. Sensitive Sites				
· Have aesthetic/recreation concerns been addressed? If there are none, enter N/A.				
· Have water source areas been identified and potential impacts mitigated? If there are none, enter N/A.				
G. Road Design				
· Have the location, design and width of temporary road corridors been identified? If there are none, enter N/A.				
· Has a list of watercourse crossings including watercourse classification been provided? If there are none, enter N/A.				
· Have any crossings not exempt under the *Water Act* been identified? If they are all exempt, enter N/A.				
· Have existing access/DLOs which have been integrated into the plan been identified on the map? If there are none, enter N/A.				
H. Wildlife				
· Have wildlife zones within the planning area been identified and incorporated into the plan (as per OGR Section 7.6)? If there are none, enter N/A.				
· Have blocks with timing restrictions been identified? If there are none, enter N/A.				
· Have all known sensitive wildlife sites been addressed (mineral licks, raptor nests, den sites, etc)? If there are none, enter N/A.				
I. Insect, Disease & Fire				
· Does the FHP comply with direction provided in Community Firesmart Plans? If there are no plans, enter N/A.				
· Have known insect and disease infestations been identified and described? If there are none, enter N/A.				
· Have mitigation strategies for infestation, diseases or endangered timber been described? If there are none, enter N/A.				
· Have debris disposal methods been identified?				
J. Silviculture				
· Have any watercourse crossings that will be maintained for silviculture purposes been identified? If there are none, enter N/A.				
· Has a pre-harvest strata declaration been included for each opening?				

-FHP's are approved through acceptance and will be considered approved on the date Alberta acknowledges receipt of the work.
-Alberta shall notify the organization by acknowledging receipt within 5 working days of submission.
-The notification date will be documented by Alberta as the start date for FHP approval.
-Alberta shall periodically check the work and supporting documentation to verify its accuracy.
-At any time, approval can be revoked where Alberta learns the FHP is inaccurate or deficient in content.

Company Validation

Submitting RFP Validation	Company	Date

ESRD Validation

Reviewing RFP Validation	Date

Annual Operating Plan (AOP) Checklist

Area _____
Company _____
Disposition Number _____
Date Disposition Issued _____
Date Disposition Expires _____
Submission Date _____

Volume Summary (m3)	Conifer	Deciduous
Quadrant Allowable Cut		
Quadrant Production to date		
Quadrant Volume Remaining		
Proposed Production (AOP year)		

APPROVAL ITEM	YES/NO (Company)	INITIAL/DATE (ESRD)
Validated by RFP		

	Company (Y,N,N/A)	Company Comments (optional)	ESRD (Y,N,N/A)	ESRD Comments (optional)
Administration				
· Have digital copies of AOP been provided to:				
- Area Planning Forester				
- Forest Officer				
- other				
· Have any FHP conditions been addressed? If there are none, entre N/A.				
· Is the Company requesting dues relief with an explanation and justification?				
· Has an Opening update verification been submitted - all blocks logged in the previous year cross referenced against the ARIS report?				
· Have any amendments to AOP components been submitted and justified (reforestation program, GDP, FHP)				
Operating Schedule (as per section 3.5.4 c)				
· Has a table been submitted for all blocks scheduled for harvest including area & volume by species with totals?				
· Has a list of temporary roads proposed for construction, maintenance & reclamation including watercourse crossings to be built or installed or removed/maintained been provided?				
· Has a declaration of outstanding operational items, or an agreement with Alberta on reporting of outstanding operational items been provided?				
· Have outstanding operations been identified (debris disposal, hauling, clean-up, reclamation, etc)?				
· Are requested amendments to any AOP components explained (reforestation program, road plan, etc)?				
Applicable Forest Harvest Plans (as per section 3.4)				
· Do all blocks included in the AOP have FHP approval?				
Reforestation Program (as per section 8.2)				
· Is the proposed silviculture treatment schedule provided?				
· Are summaries of stratum declarations, stratum changes, final stratum, QAC adjustments provided?				
· Proposed blocks are listed for declaration in lieu of survey & re-treatment				
· Are seed inventories sufficient as per FGRMS manual section 11.2 or otherwise approved by ESRD?				
Wildfire Protection (as per section 7.3)				
· Is the Fire Control Plan complete and provided?				
Road Plan (as per section 11.2)				
· Are all roads scheduled to be built under authority of the AOP planned to have a lifespan of <= 3 years?				
· Is a table tracking the status of all non DLO roads over two years old submitted?				
· Are all required watercourse crossings documented in the monitoring program as per section 11.4.26?				
General Development Plan (as per section 3.3)				
· Has a summary of variance as per section 4.1 been provided?				
· Has a summary of volume supply by area been provided?				
· Has an DLO road construction and reclamation schedule been provided?				
· Has a GDP schedule & map as per section 3.3.5 been provided?				
· Have consultation activities been completed as per the First Nations Consultation Guidelines?				

Company Sign Off

Submitting RFP Validation _____ Company _____ Date _____

ESRD Sign Off

Reviewing RFP Validation _____ Date _____