Alberta timber harvest planning and operating ground rules

Alberta

Timber Harvest Planning and Operating Ground Rules | Forestry, Parks and Tourism

Alberta Timber Harvest Planning and Operating Ground Rules

Pursuant to *s* 2.1 of the *Forests Act RSA 2000 c F-22*, Ministerial Order 015/2021 Delegation of Authority, and *s* 100 (2) of the *Timber Management Regulation AR 60/1973,* I, Ken Greenway, Executive Director Forest Stewardship and Trade Branch, hereby approve the Alberta Timber Harvesting Planning and Operating Ground Rules as the rules respecting harvesting and reforestation operations.

This Timber Harvest and Planning and Operating Ground Rules contains administrative updates and replaces the Alberta Timber Harvest Planning and Operating Ground Rules Framework for Renewal posted and effective May 1, 2022. This Timber Harvest and Planning and Operating Ground Rules is effective until superseded or replaced.

DATED at the City of Edmonton, in the Province of Alberta, this 19th day of December, 2022.

<Original signed and dated by>

Ken Greenway, PhD, RPF
Executive Director
Forest Stewardship and Trade Branch

Preamble

The *Forests Act*[1] provides for and defines the powers of the Lieutenant Governor and Minister with respect to establishing regulations related to forestry in Alberta. The *Forests Act* provides for the establishment of forest management units as a mechanism for allocation and disposal of timber and specifies the method of disposal of Crown timber through forest management agreements, quota certificates and timber permits. The *Forests Act* was proclaimed in 1973 and was most recently amended on November 1, 2022. The *Forests Act* gives authority for the regulation of the management of all forest-based values, while providing for the sustainability of Alberta's forests. Alberta defines sustainability as "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."

The *Timber Harvest Planning and Operating Ground Rules* is a reference manual that provides regulatory guidance and direction to be used by timber harvest planners, forest operators and other forestry professionals involved in implementing forest management plans.

[1] https://open.alberta.ca/publications/f22

Contents

List of Tables

List of Figures

List of Acronyms

AAC	Annual Allowable Cut
AFMPS	Alberta Forest Management Planning Standard
ALSA	Alberta Land Stewardship Act
AOP	Annual Operating Plan
ARIS	Alberta Regeneration Information System
ATV	All-Terrain Vehicle
AVI	Alberta Vegetation Inventory
AWCS	Alberta Wetland Classification System
CA	Compartment Assessment
DBH	Diameter at Breast Height
DFA	Defined Forest Area
DLO	Department License of Occupation
FGR	FMP-specific Ground Rule
FMA	Forest Management Agreement
FMP	Forest Management Plan
FMU	Forest Management Unit
FMWSI	Forest Management Wetland Stewardship Initiative
FWIMT	Fish and Wildlife Internet Mapping Tool
FOMP	Forest Operations Monitoring Program
GDP	General Development Plan
GPS	Global Positioning System
GRS	Geotextile Reinforced Structure
GTA	Grazing Timber Agreement
ID	Identification
KWBZ	Key Wildlife Biodiversity Zone
LOC	License of Occupation
OGR	Operating Ground Rule
PGR	Provincial Ground Rule
PSP	Permanent Sample Plot
RFMA	Registered Fur Management Area
ROW	Right-of-Way
RPF	Registered Professional Forester
RPFT	Registered Professional Forest Technologist
RSA	Reforestation Standard of Alberta
SFM	Sustainable Forest Management
SHS	Spatial Harvest Sequence
SSR	Stand Structure Retention
TFA	Temporary Field Authorization
THPS	Timber Harvest Planning Standards
TMR	Timber Management Regulation
VOIT	Values, Objectives, Indicators and Targets

Introduction

Ground rules are the standards used in planning, conducting and monitoring forest management activities and include:

- timber harvest planning requirements – requirements for the development of operational plans;
- operating ground rules – rules that govern timber operations and road work; and
- reporting requirements – requirements for monitoring and reporting to the Department, the progress, results and effects of forest management activities.

The Timber Harvest Planning and Operating Ground Rules define the practices used in planning and conducting timber harvest operations that constitute the methods used to implement decisions made in the forest management plan (FMP) and any applicable Alberta Land Stewardship Act (ALSA)[2] regional plans. In the event that these strategic plans do not exist, the ground rules shall establish practices that are followed relative to forest management operations and activities. While adherence to the listed Ground Rules is an expectation, there are any number of circumstances where a deviation from a rule may be deemed necessary by a timber disposition holder while planning or conducting operations. As such, requests to deviate from any of the listed Ground Rules may be possible but these requests are subject to a review and an approval decision by Alberta to ensure that the likely outcomes do not compromise our sustainability objectives.

Timber Harvest Planning and Operating Ground Rules (OGRs) provide a minimum standard that applies to all timber disposition holders operating on Crown land in Alberta. OGRs ensure that timber disposition holders are meeting the same expectations for common components of FMPs.

These standardized provincial OGRs replace existing ground rules regardless of where the timber disposition holder is in the FMP planning cycle.

It is acknowledged that all forest management units (FMUs) in the province are somewhat dissimilar in both physical and non-physical attributes and as such, a standardized approach is not applicable or possible. The Department recognizes that timber disposition holders must be able to implement customized strategies that are unique to their specific forest management agreement (FMA) or approved in the FMP. FMP-specific addendums are supplemental to the OGRs and will be negotiated with the applicable FMA holder where additional ground rules are needed to address specific strategies in an FMP or unique physical or non-physical landscape attributes. These are meant to be a small list related to specific FMP requirements and not a preferred deviation or exceptions from the provincial OGRs. Some rules in addendums will supersede standardized rule set.

The Department will undertake regular reviews of all ground rules to ensure continuing linkages to the latest legislation and advancements in scientific and operational practices.

Where *Alberta Land Stewardship Act* (ALSA) regional or sub-regional plans are approved, the regulations subsequently created will contain non-negotiable rules. These rules will supersede any similar rules existing in either the Provincial Standard OGR or the Specific Addendums.

[2] https://open.alberta.ca/publications/a26p8

Forest management planning process

Forest management has both a planning and operational component, each with their own products. Once operational plans have been approved, timber operations can commence and monitored.

Strategic planning

Forest management plans

FMPs. are a requirement of a FMA. They represent the highest level of operational planning (strategic) undertaken by a timber disposition holder. The FMP demonstrates the commitment of the Forest Management Agreement holder to the practices and principles of sustainable forest management (SFM), to the degree in which that FMA holder has control. The FMP focuses on the forest management activities of the FMA holder and embedded timber disposition that achieves and integrates the environmental, social, economic and cultural values across the defined forest area (DFA).

The key outputs of the FMP are:

- the spatial harvest sequence (SHS) which identifies the areas to be harvested by decade for the next 20 years; and
- the reforestation strategy table which identifies the post-harvest treatments.

Adherence to the approved SHS and reforestation strategy table is imperative to achieving the predicted future forest as set out in the FMP. The future forest condition, while dependent on many factors, is strongly influenced by harvest patterns, intensity and schedules.

Compartment assessment

A compartment assessment (CA) may be required when:

- information or major issues are identified that in the Department's opinion, have not been addressed in the FMP;
- the SHS is deemed by the Department to be inappropriate due to a significant change in the circumstances since the approval of the FMP; or
- the timber disposition holder identifies a shift in a management intent or potential variance outside of acceptable tolerances. The timber disposition holder may request to submit a CA for review to inform operational planning.

Operational planning

The operational planning process consists of the general development plans (GDPs), annual operating plans (AOPs) and the reforestation program, with each plan outlining the methods in the implementation of the approved FMP.

General Development Plan

The GDP is a component of the Annual Operating Plan and provides a comprehensive description of a forest disposition holder's proposed harvest operations (Standard and/or Non-Standard schedule), and road building. The GDP guides integration with other timber disposition holders and defines where forestry operations will occur to assist in communication to the public, interested parties and Indigenous consultation. The primary components of a GDP are the spatially delineated SHS (including a spatial submission) that clearly show and document the assessed harvest areas, access roads, associated watercourse and waterbody crossings, and variance from the SHS for up to the next five years.

Annual operating plan

The AOP provides a comprehensive description and operating schedule of a timber disposition holder's proposed activities for the current or upcoming year. The operating schedule is a subset of the activities in the approved GDP.

Reforestation Program

Although the reforestation program is a component of the AOP, it is treated as a separate submission and approved separately. The reforestation program describes proposed silviculture activities in alignment with the approved FMP and GDP.

The reforestation program contains a silviculture treatment schedule detailing planned silviculture activities for the upcoming season.

Authorizations and legislation

Approval of operational plans by the Department, specifically by Forestry Division or as amended from time to time, does not imply authorization under other provincial legislation and policy. It is the responsibility of the timber disposition holder to understand the regulatory requirements of other applicable legislation, seek advice from the appropriate regulatory agency and obtain any other necessary approvals or permits.

Approval of operational plans by the Department does not imply authorization under federal legislation and policy which include, but not limited to, the federal *Fisheries Act*[3], *Species at Risk Act*[4] and *Migratory Birds Convention Act, 1994*[5]. It is the responsibility of the timber disposition holder to understand the regulatory requirements of federal legislation, seek advice from the appropriate federal agencies (e.g. Department of Fisheries and Oceans, Environment Canada) and obtain any other necessary approvals or permits.

Authorization of the AOP is not authorization of the AOP verification of compliance with the OGR nor does it constitute waiver or exemption from the OGRs unless specifically requested, reviewed and approved,

This Agreement inures to the benefit of and is binding upon the Crown and His heirs, successors and assigns, and the Company and its successors and assigns.

Validation

The Department relies on the competence and professionalism of forest management professionals to apply sound forestry principles and practices. The Department requires submissions to be validated by a regulated forestry professional as described in Annex 2 of the Alberta Forest Management Planning Standard (AFMPS)[6].

Organization of this manual

Ground rules are separated into topics and all ground rules are presented in the same format which includes the following parts:

Purpose – a statement of what the topic is designed to accomplish.

Discussion –background information, research knowledge and reasons for the identified topic. The discussion shall focus on why a ground rules is necessary. (Alternative actions or solutions could also be discussed here.)

Best management practices – proactive and voluntary practical methods or practices used during forest management to achieve results related to sustainable forest management. Best management practices are provided to identify good planning techniques and procedures that will reduce undesirable impacts of forest management activities on Crown land and its competing resources.

Ground Rules – the regulatory requirements presented as definitive statements of the results to be achieved and a clear indication of what is expected. Ground rules as much as possible are:

- relevant;

[3] https://laws-lois.justice.gc.ca/eng/acts/f-14/

[4] https://laws.justice.gc.ca/eng/acts/S-15.3/

[5] https://laws-lois.justice.gc.ca/eng/acts/M-7.01/page-1.html

[6] https://open.alberta.ca/dataset/1f6f64f1-d530-4a50-b50e-a981168bf9cf/resource/5006c175-8db5-4e91-b45b-9df28809479d/download/3491799-2006-forest-management-planning-standard.pdf

- practical;
- based on scientific evidence, traditional knowledge and collective experience;
- flexible and applicable in a variety of ecological conditions;
- measureable;
- clearly presented for consistent interpretation and application;
- supported by technical terminology and definitions; and
- achievable.

1. Timber Harvest Planning Requirements

1.1 General Requirements

PURPOSE

To describe the planning requirements that apply to all types of operational plans.

DISCUSSION

All timber disposition holders are required to develop and submit the necessary operational plans for their planned activities within the appropriate time frame. Each type of operational plan contains:

- a standard schedule of planned activities;
- a non-standard schedule of planned activities; or
- both a standard and non-standard schedule(s) of planned activities.

Planned activities in a standard schedule meet all the ground rules associated with the plan type and activity. A non-standard operational plan submission (GDP, AOP or reforestation program) is one where the timber disposition holder requests a deviation to the operating ground rules associated with the plan and activity or have planned operations for which ground rules are not yet established or where no guidance from the FMP exists. Timber disposition holders preparing non-standard operational plans are advised to communicate with the Department regularly and effectively to minimize confusion over the standards of expected work.

Operational Plan Approval

The approval phase begins when a timber disposition holder submits an operational plan to the Department. Upon receipt, the submission will undergo validation to ensure technical and administrative completeness and:

- If incomplete, the Department will reject the submission and notify the timber disposition holder;
- If complete, the Department will
    - approve standard schedules within five days[7]; and
    - appraise non-standard schedules within 10 days for those deviations minor in nature, and within 21 days for those deviations with added complexity.

Operational plan amendments are subject to this approval process and complete amendments will be appraised within 10 days.

GROUND RULES

1.1.1 All operational plans shall meet the following requirements:

a) Align with approved strategic plans which include the FMP and CA, if applicable.

b) Be consistent with all applicable ALSA regional or sub-regional plans.

1.1.2 The operational plan including the relevant declaration and any amendments shall be validated by a regulated forestry professional.

1.1.3 Submit spatial data in accordance with the standards and specification outlined in the spatial requirements described in the forestry directives, as amended from time to time.

[7] Days in the Timber Harvest Planning and Operating Ground Rules shall mean business days unless otherwise specified.

1.2 General development plan

PURPOSE

To provide a projection of timber operations to:

- Assess and schedule harvest areas from the approved SHS.
- Assess and identify temporary forestry roads and associated watercourse and waterbody crossings.
- Guide the integration of forest management activities with other users.
- Communicate projected forest management activities to the public and interest groups.

DISCUSSION

The GDP gives a comprehensive description of a timber disposition holder's proposed timber operations for up to five years, and may include proposed temporary camps (<12 months) and temporary log storage sites. The GDP provides the operational link to the SHS and commitments of the FMP and is a tool for communicating where forestry operations will occur. It is at this stage that the approved SHS is refined to meet the operational requirements of the operator and additional details regarding the location of structures and facilities are provided. The GDP assists the timber disposition holder in the integration of timber operations with other timber disposition holders and forest resource users, and ensures that issues and concerns are identified and addressed early in the planning process to an appropriate level of detail.

The GDP is the stage in operational planning in which Indigenous consultation is conducted. The regulatory requirements for Indigenous consultation are outlined in government policies including but are not limited to as amended from time to time:

- The Government of Alberta's Policy on Consultation with First Nations on Land and Natural Resource Management, 2013[8].
- The Government of Alberta's Guidelines on Consultation with First Nations on Land and Natural Resources Management, 2014[9].
- The Government of Alberta's Policy on Consultation with Metis Settlements on Land and Natural Resource Management, 2015[10].
- The Government of Alberta's Guidelines on Consultation with Metis Settlements on Land and Natural Resource Management, 2016[11].

These documents provide direction on the Indigenous consultation processes. A determination of adequacy by the Department is required prior to submission of a GDP.

GROUND RULES

1.2.1 The GDP must be submitted on or before June 1 or a time approved by the Department in writing.

1.2.2 The GDP shall contain a schedule with the following information for each compartment:

a) Date of submission;
b) Timber disposition(s) for which the plan applies;
c) Harvest areas from the SHS including opening number, field ID number, area to be harvested in hectares and expected volume by Base 2 strata (coniferous or deciduous);
d) Temporary forestry roads (access roads);
e) Department License of Occupation (DLO) roads;

[8] https://open.alberta.ca/publications/6713979

[9] https://open.alberta.ca/publications/3775118-2014

[10] https://open.alberta.ca/publications/policy-on-consultation-with-metis-settlements-2015

[11] https://open.alberta.ca/publications/guidelines-on-consultation-with-metis-settlements-2016

f) Water crossing type and locations;
g) Potentially affected dispositions, reservations and interested parties;
h) A list of potentially affected stakeholders;
i) Summary of the SHS variance for the current SHS decade as described in ground rule 1.2.4.

1.2.3 The GDP shall include the adequacy determination from Indigenous consultation obtained prior to GDP submission.

1.2.4 A summary of variance from the current period of the approved SHS will be:

a) reported by approved strata, and shall include the minimum information as per Table 1 below using methodology as described in AF-FDP-2017 – Forest Management Planning Standard Interpretive Bulletin;
b) monitored and reported by compartment by period by strata; and
c) calculated using the following:

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

Table 1. SHS Assessment (Variance Reporting)

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

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

1.2.5 In addition to the general requirements, a **standard schedule** includes by compartment:

a) adherence to all the operating ground rules;
b) where SHS variance (additions %) is less than 20 per cent of the area sequenced in the SHS by compartment by period, by Base 2 strata – deciduous or coniferous;
c) where the total harvest area measured in hectares (ha) does not exceed 100 per cent of the total area in the SHS or strata description table by compartment per period;
d) where the area of substantial additions does not exceed the sum of the area in substantial deletions and deferrals;
e) where the additions from the non-contributing land base are less than five per cent of the compartment area total by Base 2 strata;
f) affected dispositions, reservations and notations have been addressed and mitigated.

1.2.6 In addition to the general requirements, a **non-standard schedule** includes by compartment:

a) one or more of 1.2.5 are not met;
b) Additions that fall outside of the parameters of 1.3.8;
c) Supplemental information shall be provided:

i. Indicating any deviations from the specified requirement in the OGRs;
ii. Rationale for the proposed deviation, and proposed mitigation of any elevated risk;
iii. Alignment with the approved FMP (i.e. for addition of harvest areas not within the contributing landbase evaluation of why and the potential impacts to VOITs);

1.2.7 Amendment to the approved GDP will be submitted to the Department when:

a) Additional harvest openings and associated activities, temporary access roads and their associated watercourse crossings not previously approved in the GDP will be considered an amendment and shall be submitted to the Department. Amendment submission requirements will be outlined in the Amendment form.

1.3 Annual operating plan

PURPOSE

To authorize annually a timber disposition holder's forest management activities.

DISCUSSION

The approval of an AOP authorizes the timber disposition holder to proceed with the proposed forest management activities which include:

- timber harvesting;
- temporary road construction and maintenance;
- water crossing construction and maintenance;
- temporary camp construction;
- temporary log storage; and
- reclamation of previously constructed operationally disturbed areas.

The AOP provides a comprehensive description of a timber disposition holder's planned activities within the current or upcoming timber year. The AOP is the stage of the operational planning process in which harvest areas and temporary roads approved in the GDP are further refined to meet all required expectations and are ready to operate.

It is recognized that there may be unforeseen circumstances that are beyond the control of the timber disposition holder and will necessitate a change in harvest scheduling, including but not limited to: wildfire and other natural disasters; non-frozen or saturated soil conditions; late freeze-up; and/or early or unexpected thawing conditions. Generally, the ability for flexibility to account for these circumstances is built into the operational planning process.

GROUND RULES

1.3.1 The AOP shall be submitted on or before:

a) March 1, if operations are to commence between May 1 and October 31;

b) September 1 if operations are to commence between November 1 and April 30[t]; or

c) a time approved by the Department in writing.

1.3.2 The AOP shall contain the following:

a) name of the timber disposition holder;
b) number of the timber disposition;
c) submission date;
d) planned deciduous and coniferous harvest volume by timber disposition; and
e) identification of timber disposition(s) where deciduous and coniferous volumes will be charged and utilized.

1.3.3 The AOP shall include an operating schedule with the following information:

a) list of harvest areas (including opening number and field ID number) planned for harvest from the approved GDP and where Indigenous consultation has been deemed adequate;
b) where applicable, list of planned harvest areas where dues relief may be requested for marginal stand as defined in the TMR[12] s. 81.1(a);
c) list of planned harvest areas with outstanding obligations (eg. log hauling, debris disposal);
d) list of temporary access roads and water crossings planned for construction, maintenance, reclamation or remediation;

[12] https://open.alberta.ca/publications/1973_060

e) location of harvest roads and water crossings within harvest areas planned for construction, maintenance, reclamation or remediation;

f) where applicable, list of planned harvest areas and temporary harvest roads within key wildlife biodiversity zones (KWBZs); and

g) list of planned temporary (<12 months) camps and temporary log storage yards.

1.3.4 In addition to the general requirements, a **standard schedule** must include those compartments, which:

a) harvest area has been approved in the GDP,

b) SHS variance (additions %) shall be less than 20 per cent of the area sequenced in the SHS by compartment by period, by Base 2 strata – deciduous and coniferous;

c) the harvest area (ha) does not exceed 100 per cent of the total area in the SHS or FMP yield strata description table by compartment per period;

d) adherence to all the operating ground rules;

e) affected dispositions have no conflicts and conditions of the disposition has been observed; and

f) meets the requirements of 1.3.8 and/or 1.3.9.

1.3.5 In addition to the general requirements, a **non-standard schedule must** include those compartments, which:

a) variance is greater than 20 per cent of the area sequenced in the SHS by FMP yield strata by compartment by period by Base 2 strata – deciduous and coniferous;
b) the harvest area (ha) exceeds 100 per cent of the total area in the SHS or strata description table by compartment per period;
c) deviates from an operating ground rule;
d) does not meet the requirements of 1.3.8 and/or 1.3.9; and
e) detailed supplemental plan is required due to special circumstances.

1.3.6 For non-standard submissions, supplemental information is required:

a) indicating the deviation from the specified requirement or operating ground rules;

b) rationale for the deviation, and mitigation of any increased risk; and

c) alignment with the approved FMP (i.e., for addition of harvest areas not within the contributing landbase, evaluation of why and the potential impacts to VOITs).

1.3.7 GTAs will form part of the timber disposition holder's AOP and will be included in the AOP submission, where applicable.

1.3.8 Harvest area boundary allowance

Additions to the approved harvest areas boundaries may deviate from the approved GDP planned boundaries, or during operations, subject to the following:

a) the area of the deviation does not exceed:

i. two hectares or 5 per cent for harvest areas greater than 10 ha, whichever is greater ;or
ii. 10 per cent for harvest areas less than or equal to 10 hectares.

b) the deviations are not continuous around the perimeter of the approved harvest area boundary;
c) any resulting variances from the approved SHS shall be categorized (AF-FDP-2017 – Forest Management Planning Standard Interpretive Bulletin) and reported in the Stewardship Report;
d) provide notification in accordance with Section 3 (Monitoring and Reporting).

1.3.9 Access and harvest road location deviation

1.3.9.1 Access roads and crossings may deviate, without additional approval, from the approved GDP, or during operations, subject to the following:

a) The centerline of an access road shall not deviate more than 150 metres, unless,

i. The centerline will utilize an existing and or new linear disturbance where there are no restrictions. For seismic lines to be considered "existing" forested re-growth is less than three metres.

b) New crossings needed prior to AOP submission required on intermittent or higher order watercourses shall be submitted as non-standard schedule;
c) New previously unapproved crossings required after AOP approval on intermittent or higher order watercourses found to be required by the timber disposition holder during timber operations will require an AOP amendment;
d) Any intermittent or higher order watercourse crossings moved more than 150m shall be submitted as non-standard schedule;
e) Intermittent or higher order watercourse crossings found during timber operations that require movement by more than 150m will require an AOP amendment.
f) Notification in accordance with Section 3 (Monitoring and Reporting.) shall be required for:

ii. any new access road crossings required on ephemeral watercourses;
iii. any access road crossings on ephemeral watercourses moved more than 150m from the approved location.
iv. any access roads moved more than 15m (ROW) but less than 150m from the approved location.
v. any crossing type changes allowed as per Tables 9 or 10 due to a watercourse or waterbody classification change.
vi. Any crossings no longer required

1.3.9.2 Harvest roads and crossings may deviate, without additional approval, from the approved AOP subject to the following:

a) Notification in accordance with Section 3 (Monitoring and Reporting.) shall be required for any new water crossings required or deviations to planned water crossings required on harvest roads.

1.3.10 Harvest area boundaries - Prior to harvesting and in accordance with the approved AOP, the timber disposition holder shall:

a) delineate the entire harvest boundary using ribbon, Global Positioning System (GPS) or other spatial delineation techniques;
b) delineate areas that will be excluded from harvesting using ribbon, GPS or other spatial delineation techniques.

1.3.11 Prior to road construction and in accordance with the approved AOP, the timber disposition holder shall delineate the centerline of all approved temporary harvest roads using ribbon, GPS or other spatial delineation techniques.

1.3.12 Any operational changes proposed to an AOP not listed in 1.3.8 or 1.3.9 shall be treated as an amendment and require approval of the Department prior to implementation (with review and decision within 10 business days as the service standard).

1.3.13 The timber disposition holder shall provide to the Department the spatial file for internal harvest roads and watercourse/waterbody crossings.

1.3.14 Any harvest areas proposing commercial thinning, partial harvesting or pre-commercial harvest systems shall be submitted as a non-standard.

1.3.15 During operational implementation of timber activities:

a) Features (other than watercourses or waterbodies) identified during the planning phase may no longer be applicable. In this instance, no amendment or notification is required. (e.g., raptor nest identified during AOP submission and no longer exists);
b) Previously unidentified features may be encountered. If found, the encountered features shall be addressed as per the operating ground rules and notification provided. No amendment is required if implemented as per the operating ground rules.

1.4 Reforestation Program

PURPOSE

To plan silviculture activities that result in the desired future forest and reforested stands that meet approved regeneration standards.

DISCUSSION

A reforestation program is required by the Department under Timber Management Regulation[13]. The reforestation program is a component of the annual operating plan and contains reforestation prescriptions by strata and a schedule of treatments for the upcoming year. The proposed reforestation program provides a link between silviculture 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 greater probability of success in meeting growth and yield strata targets, for height, stocking, density and ultimately, strata volumes.

The use of domestic sheep and/or goats for managing vegetation within harvest areas is an applicable silviculture prescription. The approval to utilize domestic sheep for managing vegetation is contingent on maintaining the health and welfare of the domestic animals and on not creating risk to wild sheep and goats.

BEST MANAGEMENT PRACTICES

Pre- or post-harvest site assessment considering ecosite classification may be useful in determining the appropriate silviculture activities in individual harvest areas.

GROUND RULES

1.4.1 Reforestation timelines prescribed by the Department shall begin at the start of the timber year following the end of the timber year when the harvest area has been declared as skid cleared by the timber disposition holder.

1.4.2 The proposed reforestation program must be submitted on or before:

a) March 1 if reforestation is to commence between May 1 and October 31,

b) September 1 if reforestation is to commence between November 1 and April 30 or,

c) a time approved by the Department in writing.

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

a) Silviculture prescription;
b) Proposed silviculture treatment schedule;
c) List of harvest areas, watercourse crossings and access;
d) Proposed harvest areas for declaration in lieu of survey and retreatment;
e) Location of temporary (<12 months) planting camps;
f) Spatial locations that identify access roads and crossings to be constructed or utilized

1.4.3.1 Any additions or changes to reforestation program submitted as per 1.4.3 shall be treated as an amendment and require approval of the Department prior to implementation (with review and decision within 10 business days as the service standard). Amendment submission requirements are outlined in Amendment form.

1.4.4 The forest management plan contains a reforestation strategy table for prescriptions specific to different forest strata. Deviations from the reforestation strategy table in the approved in the FMP will be outlined and rationale submitted.

[13] https://open.alberta.ca/publications/1973_060

1.4.5 The silviculture treatment schedule shall contain the following information:

a) Opening number and field ID number;
b) A list of harvest areas and the estimated area (ha) to be treated; and
c) The reforestation strata standard for each harvest area.

1.4.6 The following proposed reforestation activities for each harvest area shall be listed:

a) Site preparation – mechanical or chemical
b) Planting – primary species and density range
c) Seeding – species
d) Leave for natural – species
e) Manual tending – type (cleaning vs spacing or combination)
f) Vegetation management using domestic sheep
g) 'Let it grow' as a retreatment strategy
h) Genetic improved (Stream 2) seed use. Company will provide a map or spatial data (if requested) with breeding zone and possible harvest areas where genetic stock may be planted. Notification of actual genetic stock planting locations by opening number to Area prior to planting or as agreed to with the Department

1.4.7 In addition to the general requirements, a **standard schedule** must meet the following criteria, otherwise planned silviculture activities must be included on a non-standard schedule:

a) Proposed silviculture activities as shown in 1.4.3 for all harvest areas do not deviate from the approved FMP reforestation strategy table; and
b) Adherence to all the operating ground rules.

1.4.8 In addition to the general requirements, a **non-standard schedule** must meet the following criteria:

a) Proposed silviculture activities for any harvest areas deviate from the approved FMP reforestation strategy table; and
b) Deviates from an operating ground rule.

1.4.9 For non-standard submissions supplemental information is required:

a) Indicating the deviation from the specified requirement or operating ground rules;
b) Rationale for the deviation, and mitigation of any increased risk;
c) Alignment with the approved FMP (i.e., for addition of harvest areas not within the contributing landbase, evaluation of why and the potential impacts to VOITs).

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

a) Harvest areas where 'let it grow' is the retreatment strategy will require survey information supporting re-treatment rationale;
b) May be submitted for review and approval at any time throughout the year for approval to ensure timeliness of treatments.

2. Provincial Operational Ground Rules

Provincial operational ground rules provide direction for all on-the-ground forest management activities.

2.1 Harvest Area Design

PURPOSE

To plan a harvest area design that maintains biodiversity and ecosystem function where a SHS does not exist.

DISCUSSION

A harvest area design is required if no SHS exists upon which to develop GDPs and AOPs, typically in an FMU that does not have an approved FMP. A harvest area design identifies the areas to be harvested in operational plans.

Considerations of a harvest area design include but are not limited to:

- merchantability and timber condition;
- reforestation;
- understory management;
- structure retention;
- access;
- biodiversity;
- wildlife habitat;
- species of management concern;
- protection of aquatic and riparian areas;
- forest health damaging agents;
- range management;
- other forest users; and
- visual quality objectives.

The use of Alberta Vegetation Inventory (AVI) polygon boundaries in harvest area design will help to plan variability in creating natural landscapes. Creating variability in natural landscapes is important because element amounts vary between landscapes, and the requirements of biota also vary.

The consideration of wildlife movement corridors in harvest area design ensures that animals with large home ranges find passage between and within managed landscapes. Visual barriers that limit line of sight along roads also benefit wildlife.

BEST MANAGEMENT PRACTICES

The following information may be useful when developing a harvest area design:

- AVI;
- wet areas mapping;
- derived ecosite phase;
- Fish and Wildlife Internet Mapping Tool[14] (FWIMT)
- topography;
- location of roads, pipelines and power lines; and
- watercourses and waterbodies.

[14] https://maps.alberta.ca/FWIMT_Pub/?TermsOfUseRequired=true&Viewer=FWIMT_Pub

Line of sight should be minimized where harvest areas are adjacent to accessible permanent roads. Roadside vegetation should be maintained to provide a visual barrier from permanent roads. The number of access points into the harvest area from permanent roads should be minimized.

GROUND RULES

For FMUs without an approved SHS:

2.1.1 The timber disposition holder shall work with the local forest area office to develop a harvest area design.

2.1.2 The timber disposition holder shall verify the species and merchantability in the harvest area design.

2.1.3 The size and distribution of harvest areas in the harvest area design shall be representative of the range of existing stand polygon sizes within each compartment.

2.1.4 Irregular or natural boundaries when not limited by fence lines or existing boundaries shall be employed in harvest area design.

2.1.5 Alberta permanent sample plots (PSPs) shall be protected by the retention of the plot buffer. Harvest area design should minimize blowdown within PSPs.

2.2 Visual Impacts

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:

a) Identifying the location of forest landscapes and other areas of high visual and scenic value, and setting objectives for their management;
b) Addressing visual quality issues in the FMP.
c) Addressing areas considered highly sensitive, which are considered highly sensitive are those:
    i. within, adjacent to or viewed from recreational sites and tourist developments;
    ii. seen from elevated viewpoints;
    iii. 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;
    iv. adjacent to primary and secondary highways in Alberta.

BEST MANAGEMENT PRACTICES

Tactics to reduce the impacts of forest management activities 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;
- utilization of vegetative buffers; and
- utilization of natural topography.

2.3 Tree Utilization

PURPOSE

To utilize all merchantable trees and pieces in a merchantable stand as defined by the forest tenure document and the FMP.

DISCUSSION

Tree utilization assumptions in the FMP must be followed so that sustainability is not negatively affected. Timber disposition holder processing practices cannot create an unmerchantable piece from a merchantable tree or merchantable piece.

GROUND RULES

2.3.1 Coniferous and deciduous log butts or large ends exhibiting advanced decay greater than 50 per cent in area of the cut surface (basal area) may be bucked at 0.61 meter intervals or less to 50 per cent sound wood.

2.4 Visual Markers – Stub Trees

PURPOSE

To protect an attribute of special concern by establishing an identifiable marker that will be visible post-harvest.

DISCUSSION

Visual markers such as stub trees create a visible delineation between the harvest area and a specific attribute of special concern. Stub trees can be used by machine operators to ensure safe operation near pipelines and water and as rub posts when implementing an understory protection strategy.

GROUND RULES

2.4.1 Stub trees will be at a height that clearly demonstrates their intended use, are cut above the maximum stump height stated in tenure document and are clearly visible to both inspectors and machine operators. Stub trees can be used to delineate the harvest area from attributes of special concern. Stub trees can be used as rub posts as part of the understory protection strategy.

2.5 Understory Management

PURPOSE

To protect understory of non-merchantable size during timber operations.

DISCUSSION

It is imperative to protect deciduous and coniferous understories of non-merchantable size that will contribute to the future forest condition. The primary intent of understory management is the maintenance of acceptable species as per the FMP approval decision. Understory management needs to be practiced in all stand types and techniques will vary depending on the management objectives.

Understory management objectives can be categorized as:

- **Protection** –pre-planning is specifically required.
- **Avoidance** – Used in all other stands not identified as understory management strategy harvest areas. Pre-planning not specifically required.

GROUND RULES

2.5.1 Unless where specifically approved in an operational plan, all operations in all landbases must avoid excessive damage to deciduous and coniferous understory of non-merchantable size and of an acceptable species as determined by the FMP.

2.6 Structure Retention

PURPOSE

To maintain pre-disturbance legacies of snags and live residual trees within harvest units, informed by natural disturbance patterns for biota that depend on these structures following natural disturbances or to create temporary refuges for forest biota to re-colonize harvest areas.

To provide wildlife thermal and hiding cover within harvest areas and maintain or improve wildlife travel corridors within large harvest areas.

DISCUSSION

In the AFMPS, stand structure retention (SSR) is one of two indicators supporting Objective 1.1.2.1 to "Retain stand level structure". The SSR objective contributes to the value of local/stand scale biodiversity, which in turn contributes to the ecosystem diversity element of Criterion 1, Biological Diversity, established by the Canadian Council of Forest Ministers in defining SFM. SSR contributes to the 'coarse filter' approach to conserving biological diversity and manages a broad range of habitats necessary to maintain the natural diversity of species, ecosystems, and ecosystem processes.

SSR is a stand level indicator and relates only to residual structure within harvest areas.

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.

BEST MANAGEMENT PRACTICES

SSR maintains pre-disturbance legacies as close as possible to natural disturbance patterns within each area by providing the following:

- structural complexity and old growth attributes;
- snag recruitment in the short and long-term as some of these trees die throughout the rotation (i.e. a continuum of deadwood structure);
- temporary refuge and habitat for some biota associated with naturally disturbed habitat;
- the opportunity for wildlife thermal protection, travel corridors, hiding and line of sight cover;
- variability of shapes, sizes, amounts and forms of retention across the landscape to contribute towards emulating natural disturbance; and
- visual quality within an area.

Leave larger patches rather than multiple smaller patches to increase wind firmness and ecological integrity.

GROUND RULES

For FMUs without an approved FMP or an FMP without a structure retention strategy:

2.6.1 The spatial arrangement of structure retention has the desired outcome that the structure retention within each area is clearly internal to any observer and meeting the objective of structure. Retention meeting the targets in 2.6.3 can be described by the following internal categories (Figure 1):

a) island retention– undisturbed patch within the harvest unit boundary but not connected to the edge.
b) dispersed retention - single tree or clumps.
c) peninsular retention – patch attached to the outer boundary edge with length to width ratio of 2.5 or greater.
d) tree screens - patch along the harvest area side of the road flagged in to harvest boundary.

e) single point areas or patches buffered for sensitive ecological or wildlife habitat, e.g. mineral licks, nests, dens).

f) Area added to any required waterbody or watercourse buffers inside the outer harvest boundary. Operational buffers on shallow open water or semi-permanent marsh will count fully. Note: Areas within OGR required waterbody or watercourse buffers do not count towards the targets.

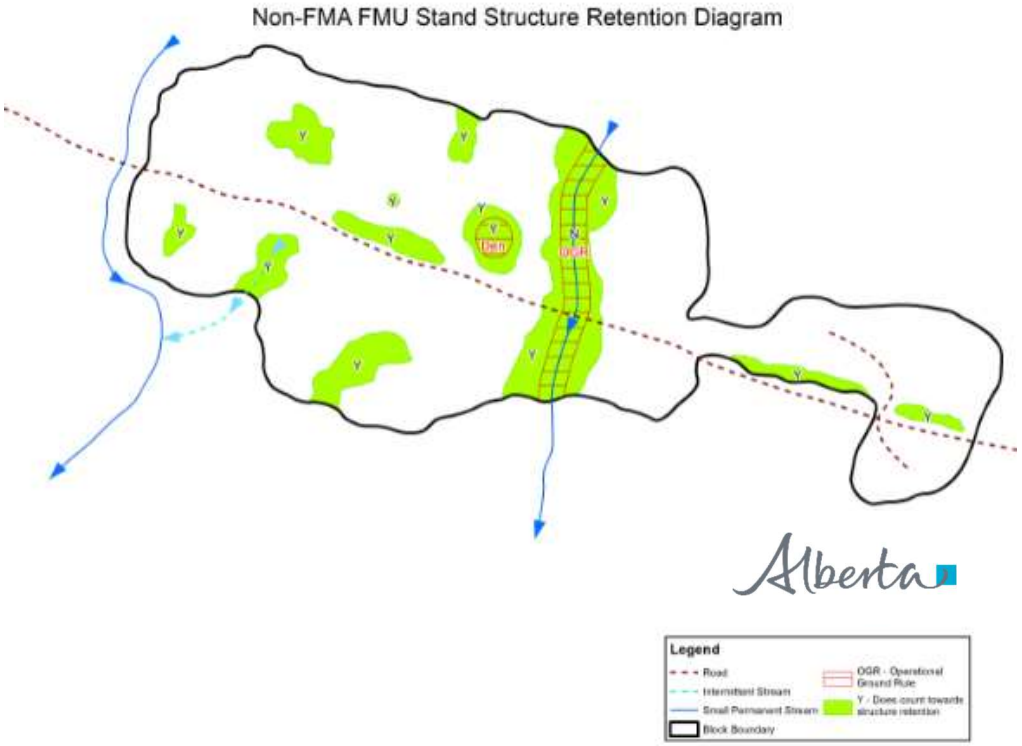


Figure 1. Non-FMA FMU stand structure retention diagram

Y indicates areas that would count towards SSR targets

N indicates areas that would not count towards SSR targets.

The thick black line is the ribboned outer harvest area boundary.

2.6.2 A minimum of 3-5 per cent dispersed and island retention shall be left within all individual harvest areas, with the following exceptions:

a) harvest areas greater than 75 hectares in size require a minimum of five per cent dispersed and island retention; and

b) individual harvest areas less than five hectares in size do not require retention but is desired when operationally feasible.

2.6.3 Dispersed and island retention must collectively total a minimum of three per cent of the total area harvested in each compartment over a five year period. Dispersed retention may not exceed one per cent of the total area harvested.

2.6.4 Dispersed retention shall be converted to an area using the following formula. The number of live trees should be determined following site preparation treatments.

$$Area = \frac{\frac{number\ of\ live\ trees}{piece\ size}}{average\ volume\ per\ hectare}$$

e.g. number of live trees = 54
piece size = number of trees in 1 cubic meter net merchantable volume = 3 trees/m³
average volume per hectare = 180 m³/ha
Area = (54 trees/3 trees/m³) / (180 m³/ha) = 0.1 ha of structure retention

2.6.5 Structure retention shall be within the contributing landbase and reflective of the pre-harvest stand condition of the area including representation of the species and size of the trees removed during harvest.

2.6.6 Structure retention shall not be solely made up of unmapped patches of steep slopes or unproductive or un-merchantable trees that if greater than the minimum polygon size in the AVI would have been removed from the contributing landbase (e.g. larch or black spruce).

2.6.7 Structure retention shall not be sequenced for one forest rotation.

2.6.8 Structure retention shall be retained in patterns and locations that minimize the potential for blowdown.

2.7 Fur management

PURPOSE

To reasonably avoid damage to infrastructure associated with a Registered Fur Management Area (RFMA) and to minimize the disruption of commercial trapping operations.

DISCUSSION

Communication with the senior license holder for the RFMA is a key element in minimizing the impact of forest management activities. Discussions held early in the planning process allow both the senior license holder for the RFMA and the timber disposition holder to work co-operatively with the least amount of disruption to their individual operations.

RFMA boundaries and senior license holder contact information can be found in the Registered Fur Management Area layer (Operational Layers – Fish and Wildlife Administrative Area) in FWIMT.

GROUND RULES

2.7.1 The timber disposition holder shall personally contact or send a registered letter to the senior license holder for the RFMA during the development of the GDP. Cabin locations, active trails and other identified concerns shall be integrated into the operational plan.

2.7.2 The timber dispositions holder shall provide the senior license holder with the approved GDP map showing the planned harvest areas and the RFMA boundary.

2.7.3 At least 14 calendar days prior to commencing operations, the timber disposition holder shall notify the senior license holder for the RFMA preferably by personal contact that timber operations are beginning in the RFMA.

2.7.4 New trails and temporary roads shall be reclaimed and are not to be left unreclaimed to improve access for the purposes of commercial trapping.

2.8 Species of management concern

PURPOSE

To conduct operational 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 other species as determined by Alberta from time to time.
- Maintain the effective habitats for ungulates in river valley environments.

Access management within woodland caribou, grizzly bear, and key wildlife and biodiversity zones

DISCUSSION

Management of access is necessary to mitigate potential impacts to wildlife. In addition to general considerations for planning and timber operations, specific considerations are necessary to minimize disturbance and adverse environmental effects in identified habitat, ranges or special management zones with the goal of maintaining the ecological conditions necessary for naturally sustainable wildlife populations.

BEST MANAGEMENT PRACTICES

To the extent possible, all new access roads should follow existing disturbances, unless doing so will compromise options for subsequent access management. Preference should be given to development and use of roads during a season that reduces negative impacts on wildlife, permits minimization of long-term infrastructure and facilitates reclamation.

Road width and construction grade should be minimized within identified caribou ranges, core grizzly bear access management areas and KWBZs.

It is recognized that in some cases forest management activities will occur throughout the winter season to take advantage of frozen ground access. Frozen ground timber harvesting using frozen ground roads should take precedent over early-in/early-out. Completing activities in ungulate habitat areas early in the winter season remains a management objective.

As an alternative to frozen ground roads, summer roads may be developed and used, subject to the following:

- Preferentially, summer roads should be temporary “dry weather” routes, with use and access subject to favorable ground conditions.
- Summer harvest areas should preferentially be located outside of woodland caribou ranges, grizzly bear access management areas and of KWBZs, or as an alternative, in proximity to existing all-weather access roads to assist in reducing the need for new summer access routes. Summer harvesting in more remote areas could have hauling deferred to take advantage of frozen ground conditions.
- Facilities, camps and other infrastructure should be located outside of woodland caribou ranges, grizzly bear access management areas and KWBZs to minimize disturbance, traffic and risk of human-wildlife conflicts.
- The number of active access roads in grizzly bear access management areas and KWBZs should be minimized.

Stand tending activities (mechanical or chemical) within core grizzly bear access management areas and KWBZs should only remove competing vegetative growth that interferes with Reforestation Standard of Alberta[15] (RSA) standards in order to maintain browse availability.

GROUND RULES

2.8.1 If timber operations cease longer than 14 days, access control shall be in place to limit use by on-highway vehicles at initial access point. Effective forms of public access control for highway vehicles shall be maintained. The need for options to manage off highway vehicle traffic shall be considered in the GDP.

2.8.2 Reclamation techniques used on AOP access routes shall limit on-highway and off-highway vehicle use.

[15] https://open.alberta.ca/publications/7010852

2.8.3 Road right-of-way (ROW) within caribou range, core grizzly bear access management zones and KWBZs shall not exceed 15 meters, allowing up to 20 meters ROW for a maximum of 20 per cent of the road distance for corners etc.

Woodland caribou

DISCUSSION

Woodland caribou is listed as Threatened under Alberta's *Wildlife Act*[16] and the federal *Species at Risk Act*. Both national and provincial woodland caribou recovery processes are ongoing and will have implications for timber harvesting and access development. Sub-regional planning for caribou is, or will be, conducted for all caribou ranges and populations under Alberta's management control. Once in force, strategies specified in sub-regional plans will supersede existing FMP strategies and SHS. Additionally, ground rules may be amended as needed to reflect provisions of the sub-regional plans. At that time, woodland caribou content will move into the applicable FMA-specific addendums. Aggregated harvesting, deferral of harvesting in areas of caribou current occupancy, harvest sequencing and levels, harvest area lockouts, and other tactics are some of the tools that are or will be used to address caribou conservation and recovery.

Industrial activities, including forestry, in caribou ranges can affect caribou populations and habitat directly or indirectly in four main ways:

- Creating and maintaining public access routes.
- Altering natural and human-caused mortality rates on caribou populations (both through access development and habitat changes);
- Altering the amount, quality, and effectiveness of caribou habitat.
- Displacing and causing undue sensory disturbance to individual caribou.

All of these factors are consequential for caribou conservation; however, caribou populations are primarily compromised by predation rates and habitat changes.

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

BEST MANAGEMENT PRACTICES

The following best management practices assist in mitigating impacts to woodland caribou:

- Basing harvest area boundaries upon natural stand edges, breaks in topography, and other natural features.
- Leaving retention patches in harvest areas to protect areas of concentrated terrestrial lichen growth, and reduce watershed, aesthetic, and wildlife-related concerns.
- Developing silviculture prescriptions that protect existing terrestrial lichens and facilitate terrestrial lichen regeneration.

[16] https://open.alberta.ca/publications/w10

Grizzly bear

DISCUSSION

Grizzly bear is listed as Threatened under Alberta's *Wildlife Act* and as a Species of Special Concern in the federal *Species at Risk Act*. Industrial activities, including forestry, in grizzly bear range can affect grizzly bear populations directly or indirectly in three main ways:

- Altering human caused bear mortality rates through the construction and maintenance of roads.
- Altering the amount, quality, and effectiveness of grizzly bear habitat.
- Displacing and causing undue sensory disturbance to individual grizzly bears.

Landscape-level planning is necessary to ensure the availability of effective habitat and to manage risk for grizzly bears, and provide adequate current and future availability of effective habitat. The indicators of suitable landscape conditions for grizzly bears are habitat effectiveness, security areas, road density and habitat connectivity. Specific grizzly bear conservation and management strategies for landscape planning for grizzly bear are agreed upon in the FMP.

Constructing and maintaining roads 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 grizzly bear zones and by using grizzly bear habitat maps in planning new access).

Core and secondary access management areas are available in the Grizzly Bear Zone layers (Operational Layers – Wildlife Sensitivity – Mammals – Grizzly Bear) in FWIMT.

BEST MANAGEMENT PRACTICES

The following best management practices assist in mitigating impacts to grizzly bear:

- Minimizing the number and length of roads in grizzly bear zones.
- Summer roads and crossings should avoid riparian corridors. Those routes within riparian corridors should minimize the ROW width and reduce vehicle speeds through construction standards and company operating procedures;
- Retention areas should be used in harvest areas to utilize existing hiding cover and connectivity to forest patches.

Operations within the core and secondary grizzly bear access management zones should be planned to reduce the duration of disturbance by conducting road construction and harvest activities in a condensed time frame followed by prompt reforestation and reclamation of access routes. When operations in non-frozen ground conditions are scheduled within grizzly bear access management zones, plans should be developed and activities scheduled in a manner that concentrate activities and minimize the repeated entry to the same areas annually contributing to the requirement of long term access, as well as the consideration of access control.

GROUND RULES

2.8.4 In core and secondary management zones, roads, skid trails, landings and campsites shall avoid natural meadows.

Trumpeter swan

DISCUSSION

Trumpeter swan is recognized as a Species of Special Concern by Alberta and protected under Alberta's *Wildlife Act*. The *Recommended Land Use Guidelines for Trumpeter Swan Habitat*[17] provides background, intent, and specific direction for managing industrial work near trumpeter swan breeding wetlands. Locations of breeding wetlands are available in the Trumpeter Swan Watercourse layer (Operational Layers – Wildlife Sensitivity – Birds – Trumpeter Swan) in FWIMT.

Trumpeter swans are sensitive to human disturbance. 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.

Timber harvest planning and operations must consider the sensitive nature of this species for three primary purposes:

- Protection of the long-term integrity and productivity of trumpeter swan breeding habitat;
- Avoidance of industrial disturbance to trumpeter swans during nesting and rearing of cygnets; and
- Minimize new road construction near identified trumpeter swan breeding wetlands to reduce the potential for disturbance of trumpeter swans from subsequent human use.

BEST MANAGEMENT PRACTICES

The following best management practices assist in mitigating impacts to trumpeter swan by:

- minimizing log hauling, road building, reclamation or scarification activity within 800 meters of the high water mark on identified trumpeter swan lake or water bodies from April 1 to September 30.
- managing in a manner that provides additional protection for trumpeter swans in the area, 200-500 m from the high water mark on identified trumpeter swan water bodies.
- using special measures within this zone, such as site preparation that reduces the potential for future vehicular access and attempts to limit maximum line of sight to 100 m.
- attempting to retain sufficient structure to contribute to a "forested" habitat in this zone.
- applying techniques that limit line of sight and contribute to the treed buffer of the wetland.

GROUND RULES

2.8.5 From April 1 to September 30, there shall be no tree felling, skidding or processing activity within 800 meters of the high water mark on identified trumpeter swan lakes or water bodies.

2.8.6 There shall be no timber harvesting or road construction within 200 meters of the high water mark on identified trumpeter swan lakes or water bodies.

2.8.7 From October 1 to March 31, and within 800 meters of the high water mark on identified trumpeter swan lakes or waterbodies, only temporary roads shall be constructed and utilized.

Barred owl

DISCUSSION

Barred owl is recognized as Species of Special Concern by Alberta and protected under Alberta's *Wildlife Act*. The barred owl is a large cavity nesting owl, and requires large decaying or dead trees for nesting. Barred owl habitat generally consists of old mixedwood forest.

[17] https://open.alberta.ca/publications/recommended-land-use-guidelines-for-trumpeter-swan-habitat

BEST MANAGEMENT PRACTICES

The following best management practices assist in mitigating impacts to barred owls in compartments identified in FMP as barred owl habitat:

- Aggregate harvest areas to minimize habitat fragmentation.
- Retaining a large diameter dead and dying trees, including decadent deciduous overstory trees (>34 centimeters diameter at breast height (DBH)), together with surrounding retention to provide clumps of trees for nesting habitat.
- Retaining additional structure including snags and coarse woody material to improve the habitat quality for prey populations.
- Avoiding harvesting between March 1 and August 15.

Key wildlife and biodiversity zones

DISCUSSION

Critical winter habitat for ungulates is often found in and adjacent to river and creek valleys. These landforms contain topographic variation and site productivity that contribute to habitat value during winter conditions that can stress ungulates. Also, south-facing valley slopes have relatively lower snow accumulations and warmer bedding sites. The valley landform itself provides protection from high wind chills, and travel corridors for landscape-scale habitat connectivity. High-quality winter ranges have been identified and mapped as KWBZs. KWBZs contribute to maintaining the distribution and abundance of ungulate populations.

Primary purposes of KWBZs include:

- the protection of the long-term integrity and productivity of ungulate winter ranges;
- the avoidance of increasing mortality rates and reduced body condition of ungulate; and
- the avoidance of direct and indirect sensory disturbance to animals during the mid-to late winter period.

KWBZs are available in the Key Wildlife and Biodiversity Zone layer (Operational Layers – Wildlife Sensitivity) in FWIMT.

BEST MANAGEMENT PRACTICES

The following best management practices assist in mitigating impacts to KWBZ:

- The amount of temporary access roads should be minimized.
- Where possible, all access roads should avoid key ungulate habitat features.
- Timber Operations within KWBZs should be conducted outside of the period January 15 to April 30 to prevent sensory disturbance and stressors during this key period.
- Where unavoidable the following strategies should be adhered to:
    - Completing operations in KWBZs earlier in the winter season when weather and ground conditions allow it.
    - Starting operations at the furthest point within the KWBZs and progress towards the edge of the zone.
    - No cessation of operations once started.
    - Spatially confining operations so that disturbance is not spread out throughout KWBZs.
    - Conducting operations to mitigate the impacts on critical winter habitat and calving areas.
- Areas of willow should be avoided by all operators, and maintained in harvest areas.
- Stand tending activities (mechanical or chemical) within KWBZ and core grizzly bear zone should only remove competing vegetative growth that interferes with Reforestation Standard of Alberta (RSA)[18] standards in order to maintain browse availability. If area overlapping with caribou range, see BMP in woodland caribou sub-section.

[18] https://open.alberta.ca/publications/7010852

GROUND RULES

2.8.8 All harvest areas and timber operations (i.e. road construction, harvest, log hauling, and silviculture) planned within the KWBZ at any time of year must be identified in the approved AOP.

a) Any additional harvest areas or timber operations to occur within the KWBZ that are not listed in the AOP, will require an AOP amendment.

Other species

DISCUSSION

Selected wildlife species require maintenance of undisturbed habitats, including breeding or denning locations.

GROUND RULES

2.8.9 Sensitive sites listed below shall be protected by retention of an undisturbed, forested buffer from the edge of larger, polygonal area features (i.e. mineral lick complex, large rookeries) or from the centre of a point feature (i.e. den). The buffer shall be as per below if otherwise not agreed to in the FMP. The timber disposition holder shall make a reasonable effort to identify sensitive sites proactively in planning and during timber operations. Sites discovered in the field shall receive the same buffer as per below and reported consistent with requirements identified in Section 3.

Table 2 Buffer widths for sensitive sites

in meters (m)

Sensitive site	Width of Forested Buffer
Boreal toad, Canadian toad, northern leopard frog, long-toed salamander, wandering garter snake, red-sided garter snake breeding sites and hibernacula	100
Bat hibernacula	100
Colonial bird nesting areas/rookeries	100
Sandhill crane nesting areas	100
Wolverine, grizzly bear, black bear dens	100
Natural mineral licks	100
Raptor nest trees	100

2.9 Recreation

PURPOSE

To manage the implications of forest management activities on forest recreation, in particular designated trails and associated infrastructure.

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 addresses recreational issues through a variety of tactics such as deferrals, buffers around specific sites or access management strategies.

Effective two-way communication between the timber disposition holder and publicly recognized recreational communities is necessary. Discussions held early in the operational planning process during the development of the GDP enable the timber disposition holder and the recreational community to work co-operatively with the AOPs implementing those discussions.

BEST MANAGEMENT PRACTICES

- Where applicable, the operational plans should provide opportunities for enhancement of existing Designated Trails providing they align with Alberta approved plans.

GROUND RULES

2.9.1 Operational activities to mitigate impacts on recreation and Designated Trails shall be described in the GDP and AOP.

2.9.2 The timber disposition holder shall engage with Alberta prior to development of the GDP to identify the user groups and Designated Trails in the areas proposed for timber operations.

a) The timber disposition holder shall work with those communities who have recognized trails and associated infrastructure or that have been identified by Alberta during the development of operational plans.

2.9.3 When timber operations are adjacent to or cross Designated Trails, the timber disposition holder may disrupt trail use but shall ensure trail continuity and use after timber operations are complete.

2.9.4 Roads shall avoid Designated Trails and associated infrastructure.

a) Where a Designated Trail has been approved for use as an access road it shall be returned to a pre-use condition or as agreed to by Alberta.

2.10 Grazing and timber integration

PURPOSE

To integrate timber and range management operations.

To develop a co-operative, long-term relationship between grazing disposition holders and timber disposition holders to sustain fiber and forage resources.

DISCUSSION

During operational planning, the emphasis is to integrate forest management activities and grazing to ensure the sustainability of timber, forage, wildlife and watershed values. Specific timber operations and silviculture activities and grazing systems will be identified in the AOP.

BEST MANAGEMENT PRACTICES

- Effective two-way communication between the grazing disposition holder and the timber disposition holder is necessary.
- Discussions held early in the planning process are intended to enable the grazing disposition holder and the timber disposition holder to work co-operatively minimizing the disruption to their individual operations.
- Alberta has developed the following standards as amended from time to time 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

2.10.1 The timber disposition holder shall conduct all operations in accordance with the Grazing and Timber Integration Manual[19] and Directive SD 2011-03[20].

2.10.2 Where a GTA is not required as per the Grazing and Timber Integration Manual, the timber disposition holder shall ensure timber operations do not negatively impact the range management, operations, infrastructure and any overarching approved plans for the grazing disposition. The timber disposition holder is responsible for the repair and/or replacement of any damage to improvements and infrastructure caused by timber operations.

[19] https://open.alberta.ca/publications/3594022

[20] https://open.alberta.ca/publications/directive-number-sd2011-03

2.11 Silviculture

PURPOSE

To implement silviculture activities that result in reforested stands that meet regeneration standards and desired future forest condition.

GROUND RULES

2.11.1 Planting boxes shall be disposed of within 24 months after the end of the timber year in which the harvest area has been declared skid cleared by the timber disposition holder. Boxes may be removed to an appropriate disposal facility or be disposed of by burning in the harvest area. Any boxes to be burned in a harvest area must be securely placed prior to and during burning. All plastic shall be removed from boxes and disposed of at an approved waste disposal site prior to burning. All disposal by burning must comply with other relevant Alberta policy.

2.11.2 Site preparation and other silviculture activities shall follow the AOP requirements and operating ground rules which apply to timber operations.

2.11.3 Any harvest area proposing use of domestic sheep for vegetation management, shall have a minimum 50 km setback from the mountain goat and bighorn sheep ranges. No deviations will be approved.

2.11.4 All domestic sheep and goats shall be contained within the treatment area during vegetation management. No deviations will be approved.

2.11.5 All domestic sheep and goats shall be removed from the treatment area at the end of the vegetation management program. No deviations will be approved.

2.12 Camps

PURPOSE

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

DISCUSSION

Temporary camps and other facilities are often a necessary part of timber operations in remote areas. Such facilities need to operate in an efficient and cost-effective manner without compromising the integrity of the environment.

BEST MANAGEMENT PRACTICES

Some best management practices for camps and other facilities include:

- place sites out of visual and auditory range from mineral licks and key wildlife areas or use a default of one kilometer;
- evaluate potential risks prior to selecting a final camp location;
- camps shall be kept clean; and
- camp food and garbage storage shall minimize the potential for problems with wildlife. Recommend following The BearSmart Guide to Playing Safely in Bear and Cougar Country[21] for specific mitigation relating to bears.

GROUND RULES

2.12.1 A temporary camp can be approved under an annual operating plan or reforestation program provided that:

a) the location or proposed location is provided (map, table) in the AOP or reforestation program;
b) the location does not require new clearings or harvesting;
c) the camp will not be used past the end of the timber year in which it is approved;
d) the camp will not be used in consecutive timber years;
e) the camp does not produce in excess of 25 cubic meters of waste water daily (110 person camp);
f) the camp is located on vacant public land (other than vacant dispositions); and,
g) the camp is less than one hectare in size.

2.12.2 A temporary camp that is located in a harvest area shall be reclaimed during site preparation operations before reforestation commences. If the camp is located outside of a harvest area, it shall be reclaimed to a pre-use condition.

2.12.3 Any camp or site that is used or designated for use for more than 12 consecutive months or past the end of the timber year in which it is approved will require an appropriate disposition under the *Public Lands Act*.

[21] https://open.alberta.ca/publications/9781460142691

2.13 Soils

PURPOSE

To conduct timber operations in a way that:

- maintains the capability of the site to support healthy forest tree growth;
- prevents degradation, contamination and destruction to the soils chemical, physical and/or biological properties;
- protects soils from erosion (i.e. wind, water, gravity or sedimentation) caused by human activities; and
- avoids or reduces impacts by sound planning and design, construction and use and prompt abandonment and reclamation.

DISCUSSION

Minimizing soil displacement, compaction, rutting and puddling during timber operations are primary concerns. Soils are most at risk of compaction, rutting and puddling when moist or wet, with poorly drained and waterlogged soils remaining wetter longer. The soils are equally at risk in the winter months if they are wet and the soil is not frozen. Rehabilitation of compacted soils 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, operator training and careful planning of operations. The weather and percentage of sensitive areas in the harvest area shall be taken into account when scheduling the following areas for harvesting.

Waterbodies have poorly drained soils that are susceptible to soil displacement and may require additional protection measures. Peatland soils are susceptible to erosion if disturbed and dried.

BEST MANAGEMENT PRACTICES

Best practices for operating on sensitive soils include:

- Activities should be planned in a manner that minimizes disturbance and adverse environmental effects, such as:
    - environmentally sensitive areas such as sensitive soils (e.g. erodible soils)
    - waterbodies, including peatlands; and
    - steep or unstable slopes.
- Areas susceptible to rutting, puddling or compaction will be avoided when planning temporary roads, decks, landings and skidding patterns.

GROUND RULES

2.13.1 The total area covered by temporary roads, bared areas, disturbed processing areas, and displaced soil, created by timber operations shall not exceed five percent of each harvest area unless the timber disposition holder has an approved FMP silviculture strategy for reclamation and reforestation for their roads, landings and bared areas.

a) The relevant FMA/FMP-specific addendum will clarify the specific disturbance requirements. If the FMP reforestation strategy table, FMP VOITs, and/or FMP implementation sections contain commitments to decompacting where necessary and for reforestation of any and all disturbed areas inside each harvest area, the disposition holder will be exempt from this rule.

2.13.2 Operations shall not occur when soil conditions are above field capacity (saturated).

2.13.3 Operations shall cease when instances of multiple pairs of ruts in a limited area or soil disturbance are created that are clearly related to operations during unfavorable ground conditions. Areas with single ruts or a limited number of short ruts can be indicative of an operator becoming aware of unfavorable conditions and making the decision to cease operations.

2.14 Road classification, planning and design

PURPOSE

To provide standards and specifications for construction, maintenance and reclamation of temporary roads.

DISCUSSION

As roads are one of the most significant components of forest management activities, timber disposition holders along with Alberta will co-ordinate and integrate road planning and construction plans with other resource operators. It is important to identify not only construction schedules but closure and reclamation timelines as well.

The Table 3 below provides consistent working guidelines to be used in planning and operations to facilitate integration. Timber disposition holders have historically maintained their own classification system and may continue to maintain unique road classification systems for internal purposes.

Temporary roads have a lifespan of three years or less. The timeline begins at the start of the timber year following the timber year in which the harvest area is approved.

Some temporary roads may be required for more than three years to meet sustainable forest management objectives. Temporary roads that are required for a period greater than three years will be identified during the planning process and discussed with the Department. Any road longer than three years will be identified in the non-standard schedule and assessed for approval.

BEST MANAGEMENT PRACTICES

Good road design considers minimizing the following:

- The number of water crossings
- The total footprint
- New clearings
- Grade
- Use of loop roads
- Disturbed, compacted or bared soils resulting from road construction

All road building activities should be sequenced to avoid or minimize repeat operations or multiple entries into an area.

Where topography (slope, elevation) limits the ability to locate roads away from riparian areas, access roads should be located as far away from the bed and shore of the watercourse as possible.

Revegetation should be completed concurrent with other silviculture activities or as soon as soil conditions permit.

Ditch vegetation should be protected during road maintenance wherever possible and re-established where necessary.

GROUND RULES

2.14.1 Road planning, construction, maintenance and reclamation shall adhere to the specifications in Table 3.

2.14.2 All temporary roads shall have a lifespan of less than or equal to three years.

Table 3 Temporary road specifications

Criteria	Specification
Road description and tenure	AOP Temporary Winter or dry conditions Up to three years
Planning requirements	Details to be addressed in development plans. Approved in the AOP.
Layout	Centre line spatially delineated.
ROW design and construction	20 meters maximum clearing width 10 meters maximum road surface
Borrow Pits	Location identified prior to construction or as per submitted temporary field authorization (TFA).
Timber Salvage	As per AOP.
Debris	Partial disposal. Mechanical or manual cutting of slash and debris to reduce fire hazard to acceptable levels.
Erosion Control	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.

2.15 Road Construction, Maintenance and Reclamation

PURPOSE

New temporary 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) should be used as a priority wherever practical and feasible. After operations are completed or there is no immediate need for the temporary road, reclamation should commence. Reclamation activities on temporary roads should follow harvest operations and silviculture as soon as possible.

BEST MANAGEMENT PRACTICES

Construction considerations for new temporary roads, skid trails and landings include:

- Placement in locations and constructed to minimize soil erosion
- Avoiding the removal of vegetation and topsoil in the vicinity of the watercourse
- Proper erosion control measures should be in place to reduce risk of sedimentation
- Sites requiring extra precautions include those with fine-textured soils, steep slopes or high moisture levels. Existing access (e.g. seismic lines, trails, and existing roads) should be used wherever practical and feasible on sites requiring extra precautions

Erosion control measures may include:

- Shallow surface cross ditches based on slope and soil type
- Re-established drainage
- Slope stabilization
- Rut-free driving surface establishment
- Access management measures

GROUND RULES

2.15.1 Temporary access road construction activities that are required outside an approved ROW shall be considered incidental to construction provided the following conditions are:

a) immediately adjacent to AOP approved disposition (temporary road and associated ROW only);
b) reclaimed or reforested in the same fashion as the adjacent harvest area;
c) without conflict of existing dispositions and/or adjacent land uses; and
d) log decks or decking areas are
    i. ≤ 0.18 hectares in size; and
    ii. located on average ≥ 400 meters apart; and
e) bank stabilization, are related to hill cuts impacted during construction; and
f) push outs and turnarounds are:
    i. ≤0.04 hectares in size; and
    ii. located on average ≥ 800 meters apart. Where this distance is not feasible due to operational constraints, line of sight between push outs should be minimized.

2.15.2 Temporary harvest road construction drainage pits (*e.g.* bell holes, “snake pits”) for water management that are required outside an approved ROW but within a harvest area shall be considered incidental to construction.

2.15.3 On those parts of the ROW not used for grade construction or log storage, disturbance to the duff and organic soil shall be minimized.

2.15.4 Individual live, damaged or dead trees that pose a significant safety risk for workers completing timber operations may be removed to ensure a safe working space.

2.15.5 The fill required for road construction shall be taken from the ROW where feasible.

2.15.6 Initial erosion control measures shall be concurrent with grade construction.

2.15.7 Ditch backslopes shall have a stable profile.

2.15.8 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 as directly as possible;
c) provide cross movement for water from seeps and subsurface flows; and
d) be installed with adequate spillways or downspouts where they drain onto unstable or bare soil.

2.15.9 Temporary roads that are no longer required shall be reclaimed including the removal of water crossings and monitored until stabilized.

2.15.10 Seed mix for revegetation must meet the Native Plant Revegetation Guidelines for Alberta and must be free of species listed in the Weed Control Act . Alternate mixes containing annual, non-native plants may be used for early erosion control but resultant vegetation must not be persistent on site. Legumes shall not be used in seed mixes in core or secondary grizzly bear access management areas.

2.15.11 Roads that are not immediately required within the temporary road timeline but are necessary for future operations shall meet the following criteria:

a) Water 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, and cross-ditched to disperse runoff and suspended sediment into undisturbed areas. If seeding for purposes of temporary erosion control, Seed mix is as per 2.15.10.
c) Access control structures are installed where required.

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

a) Decompacting when necessary, and returning them to an acceptable landform.
b) Removing all water crossing and drainage structures and reclaiming stream banks and approaches.
c) Rolling back topsoil stripped from road and landing construction including slash and logging debris for revegetation and erosion control.
d) Reforesting disturbed areas within harvest areas in compliance with the reforestation strategy table.
e) Reforesting disturbed areas outside of harvest areas where:
    i. the road has been developed through a reforested harvest area;
    ii. an existing access was widened to facilitate access; or
    iii. the road was built through standing timber.
f) Reforestation shall be to a density to support future stand growth. Where the road passes through non-productive landbase, reforestation is not required.
g) Establishing access control where required.

2.15.13 Merchantable and non-merchantable timber may be used for corduroy with notification to the Department upon installation. With approval, corduroy may be left in place as long as water movement is not inhibited.

2.16 Access Management

PURPOSE

To manage existing and proposed access recognizing key resource values.

DISCUSSION

The impacts of roads on resource values may require mitigation through access management measures. Access management are those measures used to restrict or impede on-highway vehicle access and normally involve harvest area access controls at strategic locations, but would not involve the amount of work that a full deactivation would require. Access management may be short or long term and may restrict any vehicle access.

Wildlife, sensitive areas (e.g. historical sites, soils), protection of road quality and safety are reasons for implementing access management.

Reasons for applying access management include:

- For the better management, conservation or enhancement of resource values.
- For worker and public safety.
- For access control when high forest fire hazard conditions exist.
- To prevent damage to the road.
- When temporary roads must be closed and are expected to be reused.

GROUND RULES

2.16.1 Where access management has been identified as an objective in ALSA regional or sub-regional plans, the timber disposition holder shall consult with Alberta to review any access management strategies.

2.16.2 In designated areas, and upon direction from Alberta, the timber disposition holders shall restrict road access during specified periods. Restricted access issues shall depend on whether the road is new access or is existing access.

2.17 Aquatic and Riparian Area Protection

PURPOSE

To manage the implications of timber operations on values of water quality, water quantity, hydrologic function, hydrologic connectivity and aquatic and riparian areas by:

- preventing sedimentation in watercourses, waterbodies and wetlands.
- preventing soil, logging debris and deleterious substances from entering watercourses, waterbodies and wetlands.
- maintaining the health, diversity and natural distribution of aquatic biota.
- maintaining intact hydrologic function of aquatic systems.
- maintaining the quantity and productive capacity of aquatic and terrestrial habitats.
- maintaining overall watershed function in terms of its ability to provide reliable water supplies of sufficient quality.

DISCUSSION

Timber operations can directly and indirectly affect aquatic and riparian environments 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 or waterbody. Water crossings, if not properly designed, can create physical barriers to the movement of fish and other aquatic biota along watercourses and in waterbodies. Roads and ditches can increase the efficiency of water movement into streams and transport sediments from the upland source to riparian areas or crossing sites where they are deposited in the watercourse or waterbody. Upland timber harvesting can also affect watershed streamflow regimes of the timing, magnitude and duration of flows. These effects can lead to changes in channel morphology and habitat structure; primary productivity and food-web pathways; and the distribution, abundance and diversity of aquatic species.

Riparian areas adjacent to watercourses, waterbodies, wetlands and water source areas perform a number of ecological functions. Riparian areas help to regulate stream temperatures, reduce sheet, rill and gully erosion, and moderate stream temperature. Functional riparian areas provide bank stability; woody material for creating aquatic habitats and structure; and provide a source of food (i.e. carbon) and nutrients for aquatic organisms. Riparian areas also provide habitats supporting a high diversity of wildlife species and other biota that rely on the transitional zone between terrestrial and aquatic ecosystems, and provide corridors linking different landscape and habitat features. The primary strategy for maintenance and protection of the aquatic environment and fish habitat values is to maintain treed buffers and protect soils along watercourses and waterbodies and adopt rigorous water crossing and erosion control measures.

Wetlands are an important part of Alberta's forests and provide ecological benefits including filtering and storing water, providing habitat for plants and animals, and storing and sequestering carbon. Treed and shrubby wetlands are important boreal caribou habitat within caribou ranges and all wetlands provide important habitat for migratory birds, waterfowl, amphibians, ungulates and other wildlife. Minimizing negative impacts of timber operations to wetlands is important for maintaining their unique hydrologic features and the flora and fauna they support.

BEST MANAGEMENT PRACTICES

Stewardship of wetlands in Alberta guiding principles include maintaining wetland quantity, quality, hydrologic process and hydrologic connectivity.

Key stewardship objectives include:

- Maintaining surface and subsurface water flow.
- Avoiding soil compaction or soil layer disturbance.
- Maintaining structure and function of riparian and wetland vegetation.
- Avoiding site level run-off and erosion.
- Preventing sediment and pollutants from entering wetlands.

Forest industry activities including forest harvest, road construction and use, crossings and other associated activities should avoid wetlands as a first step where feasible.

Avoidance should always be the primary consideration for any activity that could adversely affect wetlands, avoidance is not always possible due to the high density of wetlands in Alberta's boreal forest.

Table 4 Watercourse classification

Classification	Physical description	Portion of year water flows	Channel width for classification	Fisheries/Wildlife values	Potential impacts	Fish-bearing potential
Large permanent	Major streams or rivers; Well-defined flood plains; Often wide valley bottoms.	All year	Non-vegetated channel width > 5 meters	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.	Yes
Small permanent	Permanent streams; Often small valley bottoms; Bench floodplain development; Banks and channel well defined.	All year but may freeze completely in the winter or dry up during periods of drought.	>.7 meters to 5 meters	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.	Yes
Transitional	Often small valley bottoms; Bench floodplain development.	All year but may freeze completely in the winter or dry up seasonally or during periods of drought.	>0.4 meters to .7 meters	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.	Yes

Classification	Physical description	Portion of year water flows	Channel width for classification	Fisheries/Wildlife values	Potential impacts	Fish-bearing potential
Intermittent	Small stream channels; Small springs are main source outside periods of spring runoff and heavy rainfall; Distinct channel development; Channel usually has no terrestrial vegetation; Usually some bank development.	During the wet season or storms; Dries up seasonally and during drought.	≤ .4 meters	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.	Yes
Ephemeral	A vegetated draw directly connected to a higher order watercourse.	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.	No

Table 5 Waterbody classification

Classification	Physical description	Portion of year water flows	Wetland boundary[1]	Fisheries/Wildlife values	Potential impacts	Fish-bearing potential
Water-source areas (springs)	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.	Yes
Lakes	Large water collection areas permanently filled with water; Greater than two meters deep at deepest part of lake.	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.	Yes
Oxbow lakes	Large water collection area formed when oxbow cut off from main river channel; Often vegetated.	Normally frozen in winter.	N/A	Important habitat for ungulates.	Thermal cover/grazing areas.	Yes

Bog	Peatland elevated above the water table, which is usually found more than 40 cm below the surface; Precipitation sourced; Can be wooded or shrub covered. Trees dominated by stunted black spruce.	Typically stagnant and isolated from surface or groundwater influences.	No channel development, but may be pronounced vegetation changes.	Important habitat for ungulates; Potential high-use areas for terrestrial wildlife and waterfowl; Important amphibian habitat in pools.	Rutting and compaction of susceptible wet/saturated soils may permanently disrupt vegetation growth, wildlife habitat and water movement; Disturbed and dried peatlands are susceptible to erosion; Disturbance will decrease carbon sequestration and storage; Vegetation removal or disturbance may influence terrestrial wildlife habitat and feeding grounds.	No

Fen	Permanently saturated peatland; Terrain affected by the water table which is usually within 20 cm of the ground surface; Receive water from variety of sources; Can be wooded, shrub covered or ground cover dominated.	Year-round surface/subsurface flow.	No channel development, but may be pronounced vegetation changes.	Important habitat for ungulates; Potential high-use areas for terrestrial wildlife and waterfowl; Important amphibian habitat in pools; Water filtration functions and water source for downstream areas and fish habitat.	Rutting and compaction of susceptible wet/saturated soils may permanently disrupt vegetation growth, wildlife habitat and water movement. Disturbed and dried peatlands are susceptible to erosion; Disturbance will decrease carbon sequestration and storage; Erosion and sedimentation may affect water quality and yield and influence habitats (e.g. fish habitat); Blockage of natural flow may influence downstream habitats; Vegetation removal or disturbance may influence terrestrial wildlife habitat, and feeding grounds, and quality of downstream fish habitat.	No	No

Conifer swamp	Mineral wetland with water table near, at or above the ground surface in most years; >25% tree cover of which 75% or more is coniferous.	Typically frozen in winter and generally stagnant unless connected to watercourse.		No channel development, but may be pronounced vegetation and water table changes.	Important habitat for ungulates; Potential high-use areas for terrestrial wildlife and waterfowl; Important amphibian habitat in pools; Water filtration functions and water source for downstream areas and fish habitat.	Rutting and compaction of susceptible wet/saturated soils may permanently disrupt vegetation growth, wildlife habitat and water movement; Disturbance will decrease carbon sequestration and storage; Erosion and sedimentation may affect water quality and yield and influence habitats (e.g. fish habitat); Blockage of natural flow may influence downstream habitats; Vegetation removal or disturbance may influence terrestrial wildlife habitat, feeding grounds, and quality of downstream fish habitat.	No
Non-Conifer swamp	Mineral wetland with water table near, at or above the ground surface in most years; **Mixedwood or Deciduous Swamp** – >25% tree cover of which less than 75% is coniferous. **Shrubby Swamp** – shrubs >2m typically alder/willow, more than 25% shrubby cover and a canopy with 25% or less tree cover	Typically frozen in winter and generally flowing as typically part of a flowing water system. More seasonal fluctuation than in Conifer Swamp.		As per Conifer swamp	As per Conifer swamp	As per Conifer swamp	No

Temporary or seasonal marsh	Mineral wetlands with water levels near, at or above the ground surface for variable periods; **Temporary:** Typically dry except at snowmelt or after heavy rain. **Seasonal:** Typically dry by end of summer; Dominated by graminoid species (sedges and rushes) occupy >25% of the basin.	Normally frozen in winter	No channel development, but may be pronounced vegetation and water table changes.	Important habitat for ungulates; Potential high-use areas for terrestrial wildlife and waterfowl; Important amphibian habitat; Water filtration functions and water source for downstream areas and fish habitat.	Erosion and sedimentation may affect water quality and yield and influence habitats (e.g. fish habitat); Disturbance will decrease carbon sequestration and storage; Blockage of natural flow may influence downstream habitats; Vegetation removal or disturbance may influence terrestrial wildlife habitat, feeding grounds, and quality of downstream fish habitat.	No
Semi-permanent marsh	Mineral wetlands with water levels near, at or above the ground surface year round accept for drought; Dominated by graminoid species (sedges and rushes) occupy >25% of the basin.	Normally frozen in winter	Shorelines defined by distinct riparian zones, pronounced vegetation change and seasonal water level fluctuations.	Important habitat for waterfowl, other water birds and ungulates ; Important amphibian habitat; Potential for fish habitat or water source area for downstream fish habitat; Water filtration functions.	Erosion and sedimentation may affect water quality and yield and influence habitats (e.g. fish habitat); Blockage of natural flow may influence downstream habitats; Disturbance will decrease carbon sequestration and storage; Vegetation removal or disturbance may influence terrestrial wildlife habitat, feeding grounds, and quality of downstream fish habitat.	Yes
Shallow open water	Open water <2 meters deep at deepest part of lake; May have no inlets or outlets or may have a widened channel with continual inflow and	Normally frozen in winter	Shorelines defined by distinct riparian zones, pronounced vegetation change and	Important habitat for waterfowl, other water birds, and ungulates; Important amphibian habitat;	Erosion and sedimentation may affect water quality and yield and influence habitats (e.g. fish habitat); Blockage of natural flow may influence downstream habitats; Vegetation removal or disturbance may influence terrestrial wildlife habitat,	Yes

outflow via surface streams; Aquatic vegetation in open water portions and graminoid species along edges.	seasonal water level fluctuations.	Potential for fish habitat or water source area for downstream fish habitat.	feeding grounds, and quality of downstream fish habitat.

[1] The wetland boundary is the furthest ecological extent of a wetland bordering upland or other non-wetland habitat, as indicated by a shift from hydric to non-hydric soils and facultative wetland vegetation to upland vegetation in the majority of years. The wetland boundary is delineated by the absence of wetland soil and vegetation indicators

Table 6 Standards and guidelines for operating beside watercourses

Classification	Roads, landings, and bared Areas[1]	Watercourse protection areas[1]	Operating conditions within riparian areas and water source areas where operations are approved[1]	
			Tree felling	**Equipment operation**
Large permanent	Not permitted within 100 m of the high water mark or water source areas within the riparian management zone.	No disturbance or removal of timber within 60 m of high water mark. No removal of timber shall be approved within 10 m of the high water mark; Watercourses with deeply incised unvegetated banks shall have the buffer start from the top of the incised valley and not 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.	No disturbance or removal of timber within 30 m of high water mark. No removal of timber shall be approved within 10 m of the high water mark; Watercourses with deeply incised unvegetated banks shall have the buffer start from the top of the incised valley and not the high water mark.	Trees shall be felled so that they do not enter watercourse. Should slash or debris enter the watercourse immediate removal is required without a machine entering the watercourse.	Where removal of timber within 30 m is approved, no machinery is permitted within 20 m of the high water mark.
Transitional	Not permitted within 30 m of the high water mark or water source areas within the riparian management zone.	No disturbance or removal of timber within 10 m from the high water mark or to the top of the break in slope where the break occurs within 15 m.	Trees shall be felled so that they do not enter watercourse. Should slash or debris enter the watercourse immediate removal is required without a machine entering the watercourse.	Heavy equipment may operate within 20 m when conditions allow; No skidding through watercourse except on approved crossing as per **Error! Reference source not found.**.
Intermittent	Not permitted within 30 m of the high water mark or water source areas within the riparian management zone.	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 the Department. Should slash or debris enter the watercourse, immediate removal is required without the machine entering the watercourse.	Heavy equipment may operate within 20 m when conditions allow; No skidding through watercourse except on approved crossing as per **Error! Reference source not found.**.

Classification	Roads, landings, and bared Areas[1]	Watercourse protection areas[1]	Operating conditions within riparian areas and water source areas where operations are approved[1]	
			Tree felling	**Equipment operation**
Ephemeral	Construction not permitted within the watercourse.	Buffer of undisturbed vegetation in gullies.	Trees should be felled so they do not enter watercourses and any accumulations of slash and debris are to be removed progressively.	Skidding shall only occur when conditions allow. Any crossing required as per **Error! Reference source not found.** shall be approved and reported as per Section 2. No skidding through ephemerals except on approved crossing as per **Error! Reference source not found.**.

[1] All distances are horizontal distance.

Table 7 Standards and guidelines for operating beside waterbodies

Classification	Roads, landings, and bared areas[1]	Watercourse protection areas[1]	Operations within waterbody or within protection area require AOP approval?	Operating conditions within riparian areas and water source areas where operations are approved[1]	
				Tree felling	Equipment operation
Water-source areas (spring)	Construction not permitted. No log decks permitted; The number of 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.	Yes	Heavy machinery not permitted with in water source areas during unfrozen soil conditions; Minimal disturbance or removal of duff or lesser vegetation; Timber may be harvested if stream sedimentation is the only resource concern, provided there is no disturbance of the organic soils and lesser vegetation when harvesting the trees; On unstable areas subject to blowdown, merchantable trees shall be carefully harvested from water source areas to minimize root disturbances of duff layers and watercourse damming.	Road construction, timber harvest, reforestation and reclamation shall be done with equipment capable of operating without causing excessive disturbance to the soil layers; Heavy equipment is not permitted during moist or wet soil conditions, but may be operated during frozen periods; No soil caps or depositing of soil permitted on roads in water source areas, unless a separation layer is incorporated or the road is designed to provide adequate surface and sub-surface drainage away from the road bed; Where a separation layer is used, the soil cap shall be removed as operations are completed.

Classification	Roads, landings, and bared areas[1]	Watercourse protection areas[1]	Operations within waterbody or within protection area require AOP approval?	Operating conditions within riparian areas and water source areas where operations are approved[1]	
				Tree felling	Equipment operation
Lakes	For shorelines not located within reserved areas, no disturbances shall be permitted within the following distances of the high water mark. On lakes exceeding 4 ha in area, no disturbance within 200 m of the high water mark. On lakes less than 4 ha, no disturbance within 100 m of the high water mark.	On lakes exceeding 4 ha in area, no disturbance or removal of timber within 100 m of the high water mark. the Department may require additional protection in the GDP; 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 the Department's approval.	Yes	Trees shall be felled so they do not enter the waterbody. 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 30 m of the high water mark; Consideration must be given to aesthetics when harvesting adjacent to lakes with recreational use.
Oxbow lakes	Construction not permitted within 100 m of oxbow lake.	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.	Yes	Heavy equipment not permitted around oxbow lakes during unfrozen conditions; Trees shall be felled so they do not enter the waterbody. 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.

Classification	Roads, landings, and bared areas[1]	Watercourse protection areas[1]	Operations within waterbody or within protection area require AOP approval?	Operating conditions within riparian areas and water source areas where operations are approved[1]	
				Tree felling	Equipment operation
Bog Fen	Road construction or log decking only when conditions allow (no disruption of flow).	N/A	No	Minimal disturbance or removal of duff or lesser vegetation; Timber may be harvested. Repeated use of skid trails is to be avoided when harvesting peatland systems regardless if frozen or non-frozen.	Road construction, timber harvest, reforestation and reclamation shall be done with equipment capable of operating without causing excessive disturbance to the peat layers; Heavy equipment only permitted when conditions allow (no disruption of flow); Heavy equipment must avoid repeated disturbance when operating in peatland systems regardless if frozen or non-frozen.
Conifer swamp Non-conifer swamp	Road construction or log decking only when conditions allow.	N/A	No	Minimal disturbance or removal of duff or lesser vegetation. Timber may be harvested.	Heavy equipment only permitted when conditions allow.
Temporary or seasonal marsh	Non-frozen construction or log decking not permitted.	N/A	No	N/A	Heavy equipment only permitted when conditions allow (no disruption of flow). No skidding through waterbody except on approved crossing as per **Error! Reference source not found.**.
Semi-permanent marsh	Construction or log decks not permitted within 30 m of the marsh edge.	No disturbance or removal of timber within 10 m of waterbody.	Yes	Trees shall be felled so they do not enter the waterbody.	No skidding through waterbody except on approved crossing as per **Error! Reference source not found.**.
Shallow open water	Construction or log decks not permitted within 30 m of the waterbody.	No disturbance or removal of timber within 20 m of waterbody.	Yes	Trees shall be felled so they do not enter the waterbody.	No skidding through waterbody except on approved crossing as per **Error! Reference source not found.**.

[1]All distances are horizontal distance.

GROUND RULES

2.17.1 Watercourses and waterbodies shall be classified according to Table 4 and Table 5.

a) All unmapped or incorrectly classified watercourses or waterbodies encountered during operations, regardless of source, shall be classified and protected as per Table 4 and Table 5.

2.17.2 All watercourses and applicable waterbodies that are presumed to be fish bearing or support fish-bearing habitat are identified in Table 4 and Table 5.

2.17.3 For any activity that may disturb or alter the bed and banks of a watercourse or waterbody that have fish-bearing potential, an assessment of the potential effects on fish and fish habitat shall be conducted by qualified professional.

2.17.4 Erosion and sedimentation control measures shall be implemented to avoid erosion from disturbed areas with exposed mineral soil and to prevent sediment deposition into the watercourse or applicable waterbody.

2.17.5 Watercourse and waterbody protection areas shall be established as identified in **Error! Reference source not found.**6 and **Error! Reference source not found.**7. Where uncertainty exists on the classification of the watercourse or waterbody, the protection area shall be that required by the higher order watercourse or waterbody.

2.17.6 Sediment, logging debris and deleterious materials shall not be deposited into the water or onto the ice of any watercourse. Any such substances or materials that are unavoidably deposited in a watercourse shall be removed immediately and reported to Alberta.

2.17.7 Deleterious materials shall not be deposited into or onto the ice of any waterbody. Any such substances or materials that are unavoidably deposited in a waterbody shall be removed immediately and reported to Alberta.

2.17.8 Activities in watercourses or waterbodies identified as having fish-bearing potential shall be scheduled to protect fish, eggs, juveniles and fish habitats from harm. Where a qualified professional determines that activities can be carried out, those activities shall be carried out in accordance with the written specifications and recommendations of the qualified professional.

2.17.9 In-channel activities shall be avoided during the restricted activity periods in Table 8 for any watercourses or waterbodies identified as potential habitat for Athabasca rainbow trout, bull trout or westslope cutthroat trout. Where a qualified professional determines that activities can be carried out within these periods, those activities must be carried out in accordance with the written specifications and recommendations of the qualified professional.

Table 8 Aquatic species restricted activity period

Species	Fish Management Zone	Period of Restricted Activity
Athabasca rainbow trout	All	April 16 to July 15
Bull trout	All	September 1 to April 30
Westslope cutthroat trout	All	May 16 to August 15

2.17.10 Simple beaver ponds shall have the same classification as the watercourse flowing out of the pond (downstream) as measured at a representative width within 50 meters of the dam. Buffer width is from the projected high water mark of the channel and not the edge of the elevated water level or vegetation change.

Simple beaver ponds refer to damming scenarios where there is only one dam, the watercourse flowing out of the pond can be classified accurately and the system is likely transitional or temporary where flow has been interrupted but is expected to be relatively short in duration <10 years.

Complex beaver ponds refer to more stable, multiple-dam systems with flooding that is longer in duration. These systems are typical of flatter, northern boreal systems where a lack of topography is unlikely to lead to a temporary occurrence only. These systems will function as wetlands as plant communities stabilize with the water

inundation. These systems may appear and will function ecologically as marsh or shallow open water wetlands and will be treated accordingly.

2.18 Water Crossings

PURPOSE

To construct, maintain and reclaim water crossings in a manner that avoids negative environmental impacts and protects hydrologic function, fish and fish habitat.

DISCUSSION

It is important to implement 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 habitat are not compromised during crossing construction, maintenance and reclamation.

Similarly, wetland hydrological function or physical structure should not be compromised. The Alberta Wetland Classification System[22] (AWCS) and the Alberta Wetland Identification and Delineation Directive (2015-04) provide information regarding wetland identification and delineation, including key characteristics for differentiating wetland from non-wetlands, and wetland classes, forms and types.

The planning of crossings should consider tenure, user integration, timing constraints and restricted activity periods, existing plans and assessments, and pertinent policy and legislation.

Authorizations by Alberta do not imply authorizations under federal legislation related to fish and fish habitat, notably the *Federal Fisheries Act*, *Species at Risk Ac*t. The timber disposition holder should contact Habitat Management, Fisheries and Oceans in relation to the application of federal laws relating federal Legislation.

BEST MANAGEMENT PRACTICES

Roads should be planned to:

- avoid crossings;
- minimize the number, length, and sensitivity of crossings; and
- avoid multiple crossings on the same watercourse or waterbody.

To maintain natural hydrologic function, it is important that water crossings consider the direction, amount and seasonality of surface and subsurface water flows.

The Wetland Best Management Practices for Forest Management Planning and Operations Practitioner Guide[23] published by the Forest Management Wetland Stewardship Initiative (FMWSI) can assist with operational planning and provides best management practices that can help forest practitioners better incorporate wetland stewardship into their work.

GROUND RULES

2.18.1 The timber disposition holder shall require approval for any crossing structure not listed in Table 9 for the appropriate watercourse and Table 10 for the appropriate waterbody.

2.18.2 All Class “A” waterbodies shall be crossed using a single span bridge and be submitted as non-standard.

2.18.3 Any non-frozen crossings or any frozen crossings not shown in Table 10 of semi-permanent marsh or shallow open water shall be mapped and reported in non-standard GDP and AOP submissions for review.

2.18.4 Discrete crossings installed on fens or non-conifer swamps shall be mapped and reported in the AOP and harvest area status reports if non-frozen. Discrete frozen crossings of fens and non-conifer swamps do not require mapping and reporting but locations shall be provided to the Department upon request.

[22] https://open.alberta.ca/publications/9781460122587.

[23] https://boreal.ducks.ca/publications/wetland-best-management-practices-for-forest-management-planning-and-operations-practitioner-guide/

a) Freezing-in access within these features (not at discrete locations) is permitted and is not considered a crossing subject to Table 10

2.18.5 Any acceptable discrete crossings that are installed on a bog, conifer swamp or temporary or seasonal marsh shall not be reported in the GDP, AOP or harvest area status reports but locations shall be available to the Department upon request.

a) Freezing-in access within these features (not at discrete locations) is permitted and is not considered a crossing subject to Table 10

2.18.6 Any crossing structures used to cross any type of wetland shall not alter hydrologic function by considering surface and subsurface flow in frozen or non-frozen conditions as well as potential impact on fish habitat or supporting fish habitat.

Table 9 Acceptable watercourse crossing structures

Watercourse	Condition	Acceptable structure					
		Log fill	Modified log fill[1]	Snow fill[2]	Culvert	Bridge	Ice Bridge
Large permanent	Non-frozen					✓	
	Frozen			✓		✓	✓
Small permanent	Non-frozen		✓		✓	✓	
	Frozen	✓	✓	✓	✓	✓	✓
Transitional	Non-frozen		✓		✓	✓	
	Frozen	✓	✓	✓	✓	✓	
Intermittent	Non-frozen	✓	✓		✓	✓	
	Frozen	✓	✓	✓	✓	✓	
Ephemeral	Non-frozen	✓	✓		✓	✓	
	Frozen	✓	✓	✓	✓	✓	

[1] Modified log fill can be used on watercourses less than 1.5 meters wide

2 Does not apply to freezing in temporary roads

Table 10 Acceptable wetland crossing structures

Waterbody	Condition	Acceptable structure							
		Log fill	Modified log fill	Snow fill[1]	Culvert	Bridge	Ice bridge	Swamp mat	Corduroy
Bog	Non-frozen	✓	✓		✓	✓		✓	✓
	Frozen	✓	✓	✓	✓	✓		✓	✓
Fen	Non-frozen	✓	✓		✓	✓		✓	✓
	Frozen	✓	✓	✓	✓	✓		✓	✓
Conifer swamp	Non-frozen	✓	✓		✓	✓		✓	✓
	Frozen	✓	✓	✓	✓	✓		✓	✓
Non-conifer swamp	Non-frozen	✓	✓		✓	✓		✓	✓
	Frozen	✓	✓	✓	✓	✓		✓	✓
Temporary or seasonal marsh	Non-frozen	✓	✓		✓	✓		✓	✓
	Frozen	✓	✓	✓	✓	✓		✓	✓
Semi-permanent marsh	Non-frozen								
	Frozen			✓			✓		
Shallow open water	Non-frozen								
	Frozen			✓			✓		

1 Does not apply to freezing in temporary roads

2.18.7 All water crossings during installation, removal and operations, shall:

a) prevent erosion and sedimentation;
b) have stable approaches;
c) minimize bank and channel disturbance;
d) have no direct drainage into watercourse from either the road surface or ditches;
e) maintain surface and subsurface flow at all times;
f) maintain fish passage for all species at all crossings on watercourses and applicable waterbodies with fish-bearing potential as indicated in Table 4 Watercourse classification and **Error! Reference source not found.**; and
g) be designed for a minimum of 1:25 year flood levels with the exception of winter crossings that are removed before break-up.

2.18.8 A properly constructed native timber bridge shall:

a) have a brow log installed on both sides of the bridge deck to prevent soil from entering the watercourse;
b) have no equipment enter the watercourse or waterbody;
c) have timber of suitable size and strength is available for construction;
d) have the span extend beyond banks and abutment walls; and
e) have a separation layer between soil cap and timber.

2.18.9 A properly constructed logfill shall:

a) have enough logs to adequately fill an ephemeral draw, watercourse or waterbody channel so that when the logs are removed there is little or no damage to the banks or channel bottom;
b) have logs longer than the grade fill at each end;
c) have logs covered by a layer of suitable material that separates the soil from the logs, which shall permit total removal of the soil cap;
d) have provisions made to allow for easy removal, that do not disturb the banks, watercourse or waterbody; and,
e) be removed as soon as operations are completed or before spring thaw (whichever comes first) so that no soil is allowed into the watercourse or waterbody.

2.18.9.1 The bottom layer of logs may be left in place when removing the logfill to provide for summer crossing of ephemeral watercourses or waterbodies. The decision to remove or retain a bottom layer of logs in place shall be made by the timber disposition holder once initial silviculture (two-year reforestation obligation) has been completed and based on the resultant risk of sedimentation and hydrologic function.

2.18.9.2 A properly constructed modified logfill shall meet the criteria of a properly constructed logfill with addition of a culvert which must remain free of debris.

2.18.10 A properly constructed culvert shall:

a) be designed, properly sized and installed to prevent erosion at both the inflow and outflow ends of the structure and ensure the passage of debris to prevent blockage;
b) align to the channel and slope of the watercourse;
c) be reopened if frozen before spring thaw; and
d) be properly marked for identification.

2.18.11 A properly constructed snow-fill shall:

a) have sufficient clean snow exists to fill watercourse or waterbody; and
b) have any soil deposited over the snow fill is removed prior to break-up.

2.18.12 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 bank;
d) Appropriate ice thickness exists to bear necessary load requirements; and,
e) No alterations to bed or bank are required.

2.18.13 Bridges and other crossing types may be purpose-built and used for silviculture access provided rules associated to other crossings as well as all of the following requirements are met:

a) They are removed upon completion of initial (two-year treatment) silviculture requirements;
b) They are spatially identified by the company with locations retained and made available to the Department upon request;
c) Measures are in place to prevent soil or other debris from entering the watercourse channel; and
d) They are intended only to accommodate ATV load(s).

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

2.18.15 Measures shall be implemented to minimize the duration and amount of disturbance of the bed and banks of the watercourse or waterbody during installation, removal and operations. Where damage to bed and banks of a watercourse or waterbody occur, the bed and banks must be immediately restored.

2.18.16 Measures shall be implemented to prevent the transfer of biota that are not indigenous to the environment at the crossing site as per the Decontamination Protocol for Work in or Near Water[24].

2.18.17 Where there is an emergency resulting from a crossing failure or there is an imminent risk to the aquatic environment, public health or safety, or an imminent risk of structural failure to a water crossing, the timber disposition holder may take appropriate measures to deal with the emergency and shall notify Alberta of the failure within 24 hours of becoming aware of the failure.

2.18.18 Bridge abutments shall not constrict the active high-water channel. Where 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 channel. Bridge spans must extend beyond banks and abutment walls.

2.18.19 Any crossings that are no longer required shall be reclaimed with the objective of preventing any sediment from entering the watercourse or waterbody. Their condition shall be monitored annually until they are stabilized meeting the following requirements:

a) Removing all crossing and drainage structures and reclaiming banks and approaches.
b) Cross-ditching approaches, rolling back topsoil (including slash and logging debris) and re-vegetating erodible bared surface areas with vegetation capable of maintaining bank stability in the long term, such as sedges and willow cuttings, within one year.

[24] https://open.alberta.ca/publications/9781460148204

2.19 Forest Health Damaging Agents

PURPOSE

To minimize the risk of occurrence and spread of forest health damaging agents, which have the potential to negatively impact forest management objectives, and to prioritize the salvage of timber affected by forest health damaging agents.

DISCUSSION

Biological, physiological and environmental agents that may have an adverse effect on the health of the forest 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. The impact of forest health damaging agents may be addressed during timber operations.

Priority for management should be given to those forest health damaging agents that have the greatest impact, or could potentially cause the most damage, by:

- reducing or removing of merchantable volume;
- increasing the wildfire hazard; or
- causing detrimental changes to forest ecosystems.

GROUND RULES

2.19.1 Timber operations in stands affected by forest health damaging agents shall be prioritized by the type, intensity and risk posed by forest pests. Timber disposition holders shall take appropriate measures to address forest health damaging agent concerns.

3. Monitoring and Reporting

3.1 Reporting

PURPOSE

To clearly outline the requirements for reporting to the Department all aspects of timber operations by the timber disposition holder.

DISCUSSION

The intent is to make reporting expectations clear and provide certainty to both the forest industry and the Department.

Timber operations monitoring is necessary to ensure all legislated requirements are met. Ground rules governing operations reporting ensure consistency among timber disposition holders. The intent of activity reporting is to communicate that a given activity has occurred, where it occurred and when it occurred.

Timber operations monitoring and reporting is necessary to ensure legislated requirements are met in all treatment areas. Ground rules governing operations reporting are required to ensure consistency among forest operators. FMA holders and quota holders (forestry companies) who harvest more than 30,000 m³/year under tenure are to report their timber operations for compliance with timber harvesting ground rules and the approved Annual Operating Plan.

Prior to commencing timber operations (harvesting, silviculture, road building, crossing installation or reclamation), start-up meetings may be arranged with local forest area office. The purpose of the start-up meeting or a joint inspection is to establish a common understanding regarding field operations expectations in relation to the ground rules and the approved AOP.

GROUND RULES

3.1.1 Timber disposition holders shall notify the local forest area office when there will be an extended pause in timber operations.

For timber disposition holders harvesting more than 30,000 m³/yr:

3.1.2 Timber disposition holders shall notify the Department upon commencement of harvesting activities.

3.1.3 Timber disposition holders shall submit a biweekly (every two weeks) status report to the Department. The harvest area status report shall and contain:

a) Opening number and Field ID number
b) Notifications/changes (including amendments, if required) (*i.e.* additional crossings not listed in AOP, addition of 5% harvest area)
c) Harvest start date
d) Skid clear date
e) Haul clear date
f) Road construction date
g) Reclamation date
h) AOP approval date

In the event there are no changes to the status report, “NO CHANGES” will be stated.

3.1.4 A summary of all biweekly harvest area status reports for the entire timber year shall be submitted to the Department at the end of the timber year, by May 1.

For timber disposition holders harvesting less than 30,000 m³/yr:

3.1.5 Timber disposition holders shall notify local forest area office upon commencement of harvesting activities and upon completion of each phase of timber operations as described in 3.1.3.

3.2 Monitoring

PURPOSE

To establish a common understanding between the Department and industry field staff that monitor timber operations to ensure expectations are clear regarding interpretation of field standards outlined in timber harvest planning and operating ground rules.

DISCUSSION

Timber disposition holders in Alberta are required to keep records of their self-inspections. the Department's staff will periodically monitor timber operations and verify inspection information received. the Department performs audits or spot checks of harvest area status reports, verifies all reported instances of non-compliance and determines enforcement actions and applicable remedies. A request for the timber disposition holder's company inspection reports may occur to verify compliance with OGRs.

GROUND RULES

3.2.1 Timber disposition holders shall keep records of their timber operations. These records shall be provided to the Department upon request within 10 days.

3.2.2 Timber disposition holder shall establish a monitoring program for their timber operations and water crossings. These inspections shall be provided to the Department upon request within 10 days.

3.2.3 Where an operational emergency results in adverse effects and it is not possible for the timber disposition holder to provide prior notice to the Department, the timber disposition holder may take appropriate measures to manage the emergency and must notify the appropriate ministry within Alberta and the local forest area office within 24 hours of becoming aware of the emergency.

3.2.4 Non-emergency operational activities that contravene OGRs, forest tenure document, legislation or the approved AOP shall be reported to the Department within 48 hours upon discovery. Incidents must be documented on the harvest area status report and communicated to the local forest area office through a phone call, text message or email.

Glossary

Acceptable species
List of tree species contributing to approved AACs as identified in the approved FMP.

Access roads
Access roads are those roads that are between harvest areas and have a lifespan of less than three years. The timeline shall begin at the start of the timber year following the year of AOP approval.

Adverse effects
Impairment of or damage to the environment, human health or safety, or property;

Adverse ground conditions
Situations where active operations or activities result in environmental damage to the land such as but not limited to, erosion, soil compaction or soil rutting.

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 timber disposition holder each year, which provides the authorization to harvest. An AOP is a requirement of the Timber Management Regulation.

Approval
Issued by Alberta. The approval decision is prepared outlining significant items considered in plan approval and outlining conditions to be met within specified time periods by the timber disposition holder or a decision made by the Department on an AOP.

As built
An opening number accompanied by a spatial depiction of the harvest area generated either from cutover photography or from GPS technology capable of 3 m or better accuracy

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.

Base 2 strata
For purposes of these ground rules, there are two strata on which to report variance: Conifer (C, CD) or Deciduous (D, DC). Base 2 strata are not to be confused with Base 10 Strata.

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:

- Genetic diversity (the genetic complement of all living things)
- Taxonomic diversity (the variety of organisms)
- Ecosystem diversity (the three-dimensional structures on the earth's surface, including the organisms themselves)
- 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)
- 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
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]

Class 'A' watercourse
Class 'A' watercourses are critical fish habitat protection areas. Alberta's *Water Act* sets out a regulatory mechanism that governs certain activities within a waterbody through various Codes of Practice.

College/Association
The Alberta Association of Forest Management Professionals (AAFMP). Formerly the College of Alberta Professional Foresters (CAPF) and 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 forest health damaging agents.

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
Subset of the FMU used for tracking and reporting SHS variance. Also referred to as stewardship reporting compartment.

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]

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.
- For regulated forestry professionals, file a formal complaint with the Association of Alberta Forest Management Professionals.

Corridor
1. A physical linkage connecting two areas of habitat and differing from the habitat on either side. Corridors are used by organisms to move around without having to leave the preferred habitat. A linear habitat patch through which a species must travel to reach habitat more suitable for reproduction and other life sustaining needs. Many corridors, linking several patches of habitat, form a network of habitats. The functional effectiveness of corridors depends on the type of species, the type of movement, the strength of the edge effects and its shape.

2. An area of uniform width bordering both or one side of a lineal feature, such as a stream or route. [Dunster]

Cross-drainage structures
Culverts or other drainage structures that permit water to move from one side of a road to the other, normally under the road grade.

Deactivation
Taking a road out of active use through implementation of erosion control measures, road blocks and/or other methods.

Deciduous timber allocation (DTA)
A timber disposition issued under Section 22 of the *Forests Act* authorizing the permittee to harvest public deciduous timber.

Delegated authority
The Department 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
Any substance that, (a) 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. [Section 34(1) of the *Fisheries Act*]

Department License of Occupation (DLO)
A disposition issued by Alberta under the *Public Lands Act* authorizing occupation of a linear corridor, often for an access road.

Designated Trail
A Designated Trail means a trail designated under section 4(1)(a) or (b) of the *Trails Act* (which will take affect May 1, 2022).

Discrete (Crossing or Location)
A single, defined, mappable location. Typically the narrowest point of a feature.

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.

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
May include one or more of the following:

- 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.

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]

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.

Fish passage
Free transit of fish, upstream and downstream, associated with migration or localized movements that are necessary to complete their life cycle. Depending on the context, fish passage is also a route for fish to move between habitat types.

Forest Area Manager
The senior Department manager located at a forest area charged with supervision of all forest management activities in a forest area. It may also mean someone else who is authorized to approve an AOP.

Forest health
A condition of the forest; a forest is considered healthy if it can sustain itself to meet the specific forest land management objectives of today or in the future.

Forest health damaging agents
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. Previously referred to as insects and diseases.

Forest management activities
Includes all aspects of operational planning, timber operations, road work, monitoring and reporting of timber operations. Essentially all activities during FMP implementation.

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.
- 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 professional
A regulated member of the Association of Alberta Forest Management Professionals on one of the following registers:

- Registered Professional Forester (RPF)
- Registered Professional Forest Technologist (RPFT)
- Registered Professional Forester Conditional (RPF-C)
- Registered Professional Forest Technologist Conditional (RPFT-C) [AAFMP]

Forest management plan (FMP)
A long-term plan used to outline higher-level management objectives, sustainability and timber production assumptions for a forest management agreement (FMA).

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*[25] 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.

Forests Act
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 the Department granting approval to the submitting timber disposition holder.

Ground rules
Standards for operational planning and field practices that must be measurable and auditable and based forest management plan objectives.

Guideline
A preferred or advisable course of action respecting land and resource management. Guidelines imply a degree of flexibility, based on administrative judgment or feasibility of applying the guideline, and are consequently not normally enforceable through legal means.

Harvest area
Treed areas harvested, usually in one season, for the purpose of obtaining wood for the production of various wood products such as lumber and pulp. A specified land area with defined boundaries where timber harvesting is scheduled, or has occurred. Also referred to as a block, cutblock or opening.

Hiding cover
See “sight distance.”

High water mark
Stream course water levels corresponding to the top of the unvegetated channel or lakeshore.

Harvest area design
The stands identified for harvest that meet forest management objectives in the absence of a SHS.

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.

Harvest roads
Temporary roads located within a harvest area. Formerly referred to as in-block roads.

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.

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

25 https://www.qp.alberta.ca/1266.cfm?page=p42.cfm&leg_type=Acts&isbncln=9780779828074&display=html

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.

Issue
The topic to be discussed. The problem to be solved. The theme of the discussion.

Laid out
Field assessment of harvest areas and roads (on the ground) required prior to submission of AOP; also includes the delineation/marking of both harvest area boundaries and roads on the ground. Examples of delineation/marking include but are not limited to: ribbon, paint or other means approved by the Department.

Landing
Any area where logs are gathered for processing or further transport to a mill site.

Landscape
A landscape (or LMU) is a heterogeneous area in which the pattern of the mosaic of local ecosystems or land uses is repeated in similar form throughout kilometres wide area (after Forman 1986). Landscapes may coincide with a climatic, physiographic or ecological boundary; however, landscapes are not strictly ecologically based and include human use and modification of the area.

Large residual tree
A residual tree with a diameter measured at breast height (DBH) greater than the approximate average merchantable tree DBH of the harvest area.

Logfill
Water crossings constructed with logs placed in a channel, bed or on landscape parallel to the flow of the water.

Loop Routes
The portion(s) of road accessible by on-highway vehicles which connects two or more separate road systems.

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.

Natural variation of the landscape
For the purpose of harvest planning, is the range of stand polygon sizes prior to harvest within the compartment boundary.

Operational plan
Any of GDP, AOP, or reforestation program.

Pattern
The arrangement of forest stands or harvest units.

Permanent roads
Roads that will be in use for more than three years issued under a *Public Lands Act* disposition (LOC or DLO).

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.

Progressive Reclamation
Any concurrent reclamation of land undertaken during, following or in connection with construction/development and ongoing operations associated with an active approval.

Progressive or "interim" reclamation is a standard best practice that means 'cleaning up while you work.' Progressive reclamation re-establishes part of the disturbed area that is no longer required for ongoing operations.

Provincial Base 10 strata
An Alberta-wide standardized classification of forested stands with ten categories based on tree species composition. Also referred to as minimum strata. Assignment rules provided in the Yield Projection Interpretive Bulletin of the Alberta Forest Management Planning Standard.

Quota
The timber quota is a share of the allowable cut of coniferous timber within a forest management unit.

Reclamation
Permanent removal of water crossings; re-contouring of road crown and ditches; reseeding or planting of the former ROW.

Recreation site
Includes areas designated by Alberta as ecological reserves, wilderness areas, wildland parks, provincial parks, heritage rangelands, natural areas and recreation areas.

Record
A record of information in any form. The term “record” includes notes, images, audiovisual recordings, x-rays, books, documents, maps, drawings, photographs, letters, vouchers and papers and any other information that is written, photographed, recorded or stored in any manner. The definition of “record” does not include software or any mechanism that produces records.

Reforestation
Any operation involving seed management; seedling production; site preparation; tree planting; seeding; regeneration or reforestation surveying; stand cleaning; stand tending; stand thinning; tree improvement; fertilization; drainage; pruning or site analysis that is carried out in the course of forest renewal.

Reforestation strategy table
For each managed stand yield stratum plus each operational stratum identified in an FMP, outlines the desired future forest condition and the series of harvest, reforestation and maintenance treatments expected to be followed in order to attain the desired outcome. Details the typical silviculture prescriptions to be implemented operationally in order to meet reforestation standards and create the desired future forest, and identifies strategies for minimizing the effects of site and climatic limitations on survival and productivity of seedlings. Previously referred to as the silviculture matrix.

Regeneration
The renewal of a tree crop by natural or artificial means. It may also refer to the young crop itself.

Reserve
In its strictest sense, an area of land designated as being off-limits to any exploitive activities that might change the nature of the area. Not all reserves are so tightly controlled. [Dunster]

Residual structure
Standing structure that is taller than 2 m, within a harvested area. Areas buffered for sensitive ecological or wildlife habitat may be included for residuals. Required buffers for lakes and small and large permanent streams are not included. This includes non-merchantable trees and shrubs, live merchantable trees, snags and stubs.

Residual tree
A live canopy tree that is spatially within a harvested area. Areas buffered for sensitive ecological or wildlife habitat may be included for residuals. Required buffers for lakes, small and large permanent streams are not included.

Resources
Physical and intrinsic features of the land, including but not limited to timber, wildlife, water and soil.

Review
Acceptance or appraisal conducted by Alberta.

Right-of-way (ROW)
A cleared area, usually linear, containing a road and its associated features such as shoulders, ditches, cut and fill slopes, or the area cleared for the passage of utility corridors containing power lines or over- or under-ground pipelines. Typically, the right-of-way is a specially designated area of land having very specific rights of usage attached. Rights-of-way may be owned by someone else. [Dunster]

Riparian area or management zone
1. Riparian areas on public land are the vegetation zones next to flowing and standing water bodies (e.g., rivers, lakes, sloughs). They are found in all natural regions of the province, from the prairies and foothills to the boreal mixed wood region. [GOA, 1997]

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]

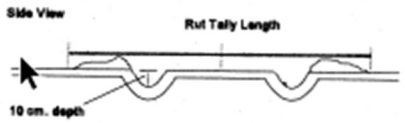
Road work
All aspects of road planning, design, construction, maintenance and reclamation.

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:

- Depth - 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 behavior of wet soil when most of the soil pores are filled with water and soil literally flows from underneath the wheel to the sides and upward forming visible tire imprint into the mineral soil. Intensity/depth of rutting is directly related to the number of equipment passes. Soil is considered susceptible to rutting when it forms a stable hand cast.

Sensitive 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.

Sight distance
The distance at which 90 per cent or more of an adult big game animal is hidden from the view of a human. This distance may vary from one stand to another.

Silt fence
Permeable fabric barriers installed along the contour to filter surface water runoff and trap sediment from sheet or overland flow and prevent it from entering streams.

Silviculture activities
Planting, seeding, site preparation, vegetation management, fertilization and all other activities undertaken to establish and grow forests to achieve specified management objectives, needs and values.

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, 1986]

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. This environment can be created by altering the ground cover, soil or microsite conditions; using biological, mechanical or manual clearing; prescribed burning; herbicides or a combination of methods. [Dunster]

Skid trail
An unimproved temporary forest trail suitable for use by equipment such as bulldozers and skidders in bringing trees or logs to a landing or road.

Small patch of residual trees
A patch of less than 0.2 hectares 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 standing dead tree that is taller than 2 metres.

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 five per cent maximum allowable area within a harvest area, includes bared landing areas, temporary roads, displaced soils or ruts. Includes: forest floor layers missing; evidence of surface soil removal, gouging and piling surface soil displaced; surface soil may be mixed with subsoil; and/or subsoil partially or totally exposed.

Soil productivity
The capacity of a soil to provide for growth.

Spatial Harvest Sequence (SHS)
The areas scheduled for timber harvesting for the first 20 years. Provided in the FMP.

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 at risk is maintained by Alberta.

Species group
Conifer or deciduous.

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.

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.

Stub tree
A large residual tree that has been "topped off" at approximately 6 m (may be less) to create an artificial snag.

Sustainable forest management (SFM)
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.

Swamp mat
Swamp mats, also known as access mats or rig mats, are a type of matting that is generally used to provide a temporary road. Swamp mats provide a solid, level surface not affected by surface water and precipitation.

Temporary field authorization (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 Area or Green Area. 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 three years of construction.

Temporary planting camp
Camp established to facilitate planting activities. Lifespan of the camp is less than 12 months.

Thermal cover
Generally, an area of at least 10 ha having a coniferous canopy at least 10 m in height, with at least 70 per cent crown closure and a minimum width of 200 m. This cover is used by animals to assist in their temperature regulation during extreme weather conditions.

Timber disposition
Harvesting rights in Alberta are granted through one of three forest tenure systems: forest management agreement, timber quota and Timber permit.

Timber disposition holder
Refers to the company that has a timber disposition.

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 operation
Any kind of activity involved in cutting, removing, harvesting, manufacturing, transporting or marketing timber or primary timber products, or reforestation.

Trapper
The Senior License Holder of a trapline in a Registered Fur Management Area.

Understory
The trees and other woody species growing under the canopies of larger adjacent trees and other woody growth. [Dunster]

Unstable slope
Slopes of loose or poorly consolidated materials beyond the angle of repose, geological features having a high probability of failure, or soils that will not support loads.

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.

Waterbody
The bed, bank or shore of a lake, pond or other natural body of standing water, whether it contains or conveys water continuously or intermittently.

Watercourse
The bed, bank or shore of a river, stream, creek or other natural body of flowing water, whether it contains or conveys water continuously or intermittently.

Watershed
An area of land, which may or may not be under forest cover, which 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]

Wetland
Land saturated with water long enough to promote wetland or aquatic processes as indicated by the poorly drained soils, hydrophytic vegetation, and various kinds of biological activity that are adapted to a wet environment. According to the Alberta Wetland Policy, wetlands are classified as one of marsh, bog, fen, swamp or open water wetland.

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 100 m or a series of forest retention patches that connect two forested areas. These may include merchantable or unmerchantable stems.

Wildlife zone
As defined on Alberta's Wildlife Sensitivity maps.

Windfirm boundaries
Harvest area boundaries established at locations that are stable and that minimize the potential for timber losses from wind.

Sources
AAFMP – Association of Alberta Forest Management Professionals

Dunster, J. and K. Dunster, 1996. Dictionary of natural resource management. UBC Press, Vancouver, B.C.

GOA – Government of Alberta, 1997. About public lands. Managing Riparian Areas.

Smith, D.M. 1986. The practice of silviculture. John Wiley and Sons. New York, N.Y., pp. 329-