

ALBERTA
TIMBER HARVEST PLANNING
AND
OPERATING GROUND RULES

1994

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1.0 INTRODUCTION

1.1 Forest Management in Alberta

Alberta's forests are an important source of economic wealth and natural resources. Timber is one important resource, but others such as fish, wildlife, water and agricultural forage are also valuable. Furthermore, forests provide many intangible values important to Albertans such as a wilderness environment, recreation opportunities in a natural forest setting, rare or unusual natural features and forest aesthetics. Albertans expect the forests to be managed to meet their diverse needs, while protecting forest ecosystems.

Alberta's forests are managed so they may be sustained to meet the present needs of Albertans and those of future generations. Accepted levels of timber use are based upon the ability of the environment to absorb the impact of harvesting. Our ability to determine, establish and maintain these levels requires the involvement and cooperation of Albertans, the provincial government and the forest industry.

As stewards of Alberta's fish, wildlife, forests and public lands, the mission of the Department of Environmental Protection is to manage Alberta's forests for:

- 1. sustainability;**
- 2. the integrated use of resources; and**
- 3. a healthy environment in harmony with the needs of Albertans.¹**

1.2 Purpose of the Ground Rules

The Timber Harvest Planning and Operating Ground Rules (called "the ground rules" from this point on) provide direction to timber operators and employees of the Department of Environmental Protection for planning, implementing and monitoring timber operations on timber licence and permit areas in Alberta. They highlight important management principles, define operating and planning objectives, and present standards and guidelines for timber harvest, road development, reclamation, reforestation and integration of timber harvesting with other forest uses.

The ground rules provide sufficient flexibility to accommodate most site conditions. The objectives (i.e., the expected results) and standards (i.e., the minimum strategies, practices and requirements needed to achieve the objectives) provided in these ground rules are expected to be met on all timber operations. Departures from these may be authorized only by prescribing special operating conditions in the timber disposition or in the approved Annual Operating Plan (AOP).

1.3 Application of the Ground Rules

The ground rules are authorized under Section 5 of the Forests Act and Section 100 (b) of the Timber Management Regulation. Compliance with the provisions and requirements of the Alberta Timber Harvest Planning and Operating Ground Rules is a standard condition of all commercial or deciduous timber licences and permits.

It is expected that the ground rules will be applied using sound judgement, practical experience, technical and professional competence.

The Forest Superintendent has the authority to approve Annual Operating Plans and may also waive or amend the application of specific ground rules in unusual or special circumstances. However, it must be done in writing

¹ Taken from Creating Our Future, Framework for Action, Department of Forestry, Lands and Wildlife, 1991

and must conform to departmental policy, the Forests Act, the Timber Management Regulation, the Public Lands Act or any other applicable provincial legislation or statute. This authority does not apply where other agencies or persons have legal jurisdiction.

1.4 Implementation

These ground rules shall be in effect from May 1, 1994 to April 30, 1999, or as directed otherwise by the Assistant Deputy Minister. The Department will initiate a review of these ground rules one year before they expire or sooner if warranted.

Harvest designs and cutblocks approved for layout before May 1, 1994 may be harvested as designed under the previous ground rules. Harvest designs approved after May 1, 1994 will be approved in accordance with these ground rules.

Logging operations will be guided by these ground rules for operations conducted after May 1, 1994.

2.0 SUSTAINED YIELD TIMBER MANAGEMENT AND TIMBER HARVESTING

2.1 Sustained-Yield Timber Management

Within the concept of sustainable forest development, Alberta's timber is managed according to the principles of **sustained-yield timber management**.

2.2 Timber Harvest Planning for Sustained Yield

2.2.1 Timber Harvest Planning - General

OBJECTIVE: To develop harvest plans that conform to the Forest Management and General Development Plans and which implement the principles of sustained-yield timber management and multiple use, employing appropriate silvicultural systems.

STANDARDS:

1. Timber operators shall plan to harvest only the timber volume authorized by the operator's quota certificate or permit, and to treat harvested areas within two years after harvest (where they are responsible for reforestation).
2. Timber harvest plans shall be referred to other resource agencies through the Department's Internal Referral System to address the concerns about other resources and from other users. The plans will be prepared in accordance with integrated resource plans, where they exist. (For more information about resource referrals, see Subsection 4.2.)
3. The silvicultural system and harvest pattern shall be based upon the requirements of the tree species present and the management and conservation objectives for timber and other resources.
4. The specific silvicultural system and harvest pattern shall be recommended in the cruise report and, following discussion with the operator, may be designated as a condition of the disposition .

GUIDELINES:

1. Healthy, vigorous stands should be retained for succeeding harvest passes. Timber that is the oldest and in the poorest condition (e.g., stands containing severe blowdown, serious insect or disease infestation or unusually high volumes of dead timber) or timber with a high risk of loss (e.g., land scheduled for industrial development or conversion to agricultural use) should be given priority for harvest. Retention of mature or overmature timber may be considered for wildlife or aesthetic reasons.
2. The normal silvicultural (regeneration cutting) system includes clearcutting in a pattern of alternating cut-and-leave blocks and patches using a two-pass system.

Where two-pass clearcutting is in significant conflict with other important forest values or resources (or where identified elsewhere in these ground rules), and where timber age and condition permits, a three-pass system will be used.

Three-pass logging could be considered where:

- a. There is a contiguous area of merchantable timber 1000 ha or larger;
 - b. Two-pass logging will create an adverse visual impact;
 - c. In areas where the number of roads in conjunction with two-pass logging reduces visual screening and hiding cover for wildlife; or
 - d. Where requested by Fish and Wildlife Services for critical or key habitat zones.
3. Selection harvest or other silvicultural systems (e.g., shelterwood, seed tree) may be used where they are determined to be the most suitable to meet environmental, ecological or timber management objectives, or to protect other resource values.

2.2.2 Integration of Deciduous and Coniferous Operations

OBJECTIVE: To plan overlapping operations to ensure merchantable coniferous and deciduous species are used fully.

STANDARDS:

1. Integrated harvest operations shall be planned and implemented according to approved General Development Plans (GDPs).
2. Normally, where both deciduous and coniferous timber is to be harvested, a single timber disposition will be issued to include both species types.
3. Integrated harvest plans shall include a harvest layout design for all merchantable stands and species (see Subsection 2.2.3). They should also consider mutual agreements on harvest scheduling, timber utilization, development and use of access, cleanup, reclamation and reforestation. (Refer to 5.2.2 Guideline #2 for more information.)

GUIDELINES:

1. It is essential that operators with overlapping timber dispositions communicate with each other and review each other's GDPs and AOPs before the AOPs are submitted.
2. Where more than one harvest operation is necessary to harvest both species types, all operations should be completed in the same season to avoid delaying reforestation and to reduce site disturbance.
3. Where the timber operator is authorized to harvest only coniferous or deciduous timber, and all species will not be used, logging operations should be confined to the pure and mixedwood stands that were used to calculate the annual allowable cut (AAC) of the species listed in the operator's timber disposition.

Standards and guidelines for preparing and submitting integrated AOPs are included in Subsection 5.2.2.

2.2.3 Utilization Standards

OBJECTIVE: To develop harvest designs that make full use of all merchantable timber from stands that meet or exceed the minimum applicable utilization standards.

STANDARDS:

1. All timber harvest operations shall be planned and conducted according to the utilization standards specified in the timber disposition, which are described as follows.
2. **Coniferous Utilization Standards**
 - a. **15/11 Utilization**
 - i. Merchantable Coniferous Stand: one where the **net merchantable volume** of trees in the stand is 50 m³ per ha or greater. (See also Subsection 2.2.4, standard no.1.)
 - ii. Merchantable Coniferous Tree: one that has a minimum diameter of 15 cm outside bark at stump height (30 cm) and a usable length of 4.88 m to an 11 cm top diameter (inside bark).
 - iii. Where the 15/11 cm standard with 60/40 rule and 14 m height option is selected, the same net volume standard applies. However, at least 60 percent of the trees in the stand must have a minimum stump diameter of 15 cm outside bark and reach a height of 14 m. In those stands, all trees meeting the merchantable tree standard will be harvested. (This option will result in reduced cuts compared to the pure 15/11 cm utilization AAC levels.)
 - b. **19/13 and Modified 19/13 Utilization**
 - i. Merchantable Stand: one where the **net merchantable volume** in a stand of trees is 30 m³ per ha or greater. (See also Subsection 2.2.4, standard no. 1.)

- ii. Merchantable Tree: one with a minimum diameter of 19 cm outside bark at stump height (30 cm) and a merchantable length of 4.88 m or greater to a 13 cm top diameter inside bark.
- iii. Where the Modified 19/13 Utilization option is selected, the same net volume applies. However, 60 percent of the trees within the stand must have a minimum stump diameter of 19 cm. In those stands, all trees with a stump diameter of 15 cm outside bark, and at least 4.88 m long to a top diameter of 11 cm inside diameter, are to be used.

3. Deciduous Utilization Standards

- a. Merchantable Deciduous Stand: one where the **net volume** of merchantable deciduous trees is 50 m³ per ha or greater and the conifer volume is less than 50 m³ per ha. (See also Subsection 2.2.4, standard no. 1.)
- b. Merchantable Deciduous Tree: one that has a minimum stump diameter of 15 cm outside bark and a merchantable length of 4.88 m or greater to a 10 cm top diameter inside bark, or to the point where the stem is unusable or there is no central stem due to heavy branching.

2.2.4 Designing Harvest Layouts

OBJECTIVE: To develop a harvest layout design:

- a. **that provides for a balance of timber volume and quality;**
- b. **based on stand, site and resource assessments;**
- c. **that uses appropriate harvest technology;**
- d. **compatible with the silvicultural requirements of the species to be reforested; and**
- e. **that protects watershed (water and soils), aesthetics, fish and wildlife habitat and other resource values.**

STANDARDS:

1. Where a two-pass harvest is planned, all timber stands in a timber disposition that currently meet the merchantability standards and are near, at, or older than rotation age shall be included in the harvest design. Where a three-pass harvest is planned, all timber stands that will be merchantable in 40 years and will be near, at, or older than rotation age shall be included in the harvest design. Merchantable stands excluded from harvest to protect other resource values shall be identified in the harvest design.
2. Permanent sample plots (PSPs) shall not be disturbed or harvested unless such action is approved by the Director of the Forest Management Division. These plots shall also be protected from blowdown.
3. **Pine and Deciduous Cutblock Sizes:** Cutblocks in deciduous stands or in stands where pine comprises 40 percent or more of the merchantable timber volume (evenly distributed throughout the cutblock) may be up to 100 ha in area but shall average no more than 60 ha.
4. **Spruce Cutblock Size:** Cutblocks in spruce timber may be clearcut to a maximum area of 24 ha in patches, or to a maximum area of 32 ha in strips where no part of the cutblock is further than 150 m from a seed source. When a timber operator with responsibility for reforestation makes a formal written commitment to treat and plant the cutblock within 24 months of harvesting, he may increase the cutblock size to that allowed for pine and deciduous.
5. Proposed cutblocks larger than these standards may be approved by the Forest Superintendent provided the request is supported by reasons that may include layout design, reducing road construction, reducing environmental impacts and economic considerations.
6. Where a harvest is planned for areas bordering or including previously harvested cutblocks, the following standards shall apply:
 - a. where the regenerated stock meets the applicable stocking standard and height requirement, the cutblock sizes prescribed in articles 3 and 4 of this subsection shall apply;
 - b. where new cutblocks are located beside previously harvested cutblocks that do not yet meet the regeneration stocking and height standards, the combined area of the existing and proposed cutblocks shall not exceed the maximum cutblock size specified in standards 3

- and 4.
7. Subsequent-pass cutblocks may be approved for harvest when previously harvested cutblocks are reforested to standards given in the Timber Management Regulation and the following height requirements are met:
 - a. **coniferous cutblocks:** regeneration has reached 2 m where a three-pass harvest is planned and 3 m where a two-pass harvest is planned.
 - b. **deciduous cutblocks:** regeneration has reached 3 m in height and 10 years have passed since the previous harvest pass.
 8. Stream protection buffers shall be retained along watercourses as prescribed in Subsection 3.2. (See Table #2, Page 27.)

GUIDELINES:

1. Each harvest pass should be balanced in timber volume and quality, and logging operability. When a balanced harvest is neither feasible nor desirable, the proportion may be altered to achieve specified management objectives. Where more than two passes are proposed, the last pass should not comprise less than 20 percent of the merchantable volume and area.
2. Cutblock boundaries should follow natural terrain features and timber type boundaries to minimize the impact of logging.
3. Where an integrated harvest plan is proposed, the first-pass coniferous and deciduous cutblocks should not be located beside each other (i.e., share a common border). Where it is unavoidable, the maximum cutblock sizes and dimensions shall not exceed the dimensions for the deciduous cutblock. The boundary between the coniferous and deciduous cutblocks shall be clearly marked.
4. Where prescribed burns are proposed for silvicultural site preparation or slash hazard reduction, cutblocks should be designed to facilitate control of fire and minimize erratic fire behaviour.
5. Cutblocks proposed for stands harvested previously using a selective cut, in which coniferous stocking is 3m or more in height, may be larger than these standards, provided a logging plan is submitted that shows sufficient healthy conifers will be left to meet the reforestation standards after logging.
6. In water-source areas or where the water table may be significantly altered by logging creating a risk of reforestation failure, harvest designs should avoid or moderate any changes that could reduce the capability of the site to grow trees. Design considerations may include reduction of cutblock sizes and widths, temporary deferral of harvest, use of a selection harvest pattern, or special site preparation techniques. These cutblocks should be designated as critical and accompanied with detailed cutblock plans.
7. Protection buffers should be identified and left where needed to achieve multiple-use objectives. To minimize the impact on other forest resources, harvest plans and operations may be modified by using treed buffers, visual screens, operations scheduling, careful placement of roads, and cutblock designs of appropriate shapes and sizes.
8. Roads used to access first-pass cutblocks should be designed so they can be used in succeeding harvests.
9. Harvest of timber stands or parts thereof may be deferred to minimize the impact of logging on fish and wildlife, recreation or tourism where a need has been identified. For these reasons, permanent land deletions should be identified in the Forest Management Plan.
10. In special cases, such as for important resource concerns, the retention period for subsequent-pass cutblocks may be extended to allow regeneration to reach a target height greater than that specified in standard 7. Conversely, the retention period may be shortened when there is a serious risk of timber loss or exclusion.
11. In some circumstances, the understory trees may be more valuable than the overstory stand. Such stands containing merchantable volumes of mature timber may be deferred from harvest with approval of the Forest Superintendent.

For more standards and guidelines that apply to harvest layout design, refer to:

- a. Subsections: 3.2, 3.4 and 3.5 for environmental considerations; and
- b. Subsections: 4.2, 4.3, 4.4, 4.5, 4.6, 4.7 and 4.8 for multiple-use and resource integration considerations.

2.2.5 Contingency Planning

OBJECTIVE: To identify and conserve those stands of timber that are available for harvest year-round to meet shortfalls in mill supply caused by unforeseen interruptions in wood deliveries that are beyond the control of the timber operator.

STANDARD:

1. Cutblocks designated for contingencies shall be identified in the AOP and marked in the field. Before harvesting, these cutblocks must be released for harvest in writing by the Forest Superintendent.

GUIDELINES:

1. Within a timber disposition, stands of timber accessible and operable at any time of the year should be identified and set aside for contingency use.
2. Acceptable reasons for using contingency cutblocks include, but are not limited to, the following situations: wildfire, unfrozen saturated soil conditions, late freeze-up, and early or unexpected thawing conditions.

2.2.6 Planning Harvest Designs for Reforestation

OBJECTIVE: To identify silvicultural requirements before harvest, and plan harvest designs to facilitate reforestation.

STANDARDS:

1. All cutblocks shall be reforested to the applicable stocking and growth standards described in the Regeneration Survey Manual (FLW Publication, Ref. 42, February 1992), and according to direction provided in the Forest Management Plan for the Forest Management Unit, the Silvicultural Component of the AOP, or as approved in the Annual Silviculture Plan.
2. Where the Land and Forest Services is responsible for reforestation, timber operators may be requested to:
 - a. harvest pine stands in a manner that leaves enough cones throughout the cutblock so that drag scarification still remains a viable reforestation treatment;
 - b. to coordinate access management plans with Land and Forest Services to help facilitate access needs beyond those required for harvest operations.Should this be requested, it shall be included as a condition of the disposition.
3. Harvest layouts shall be designed to avoid damaging regeneration on reforested cutblocks or other areas when the reserve timber is harvested.
4. Reforestation time lines prescribed in the Timber Management Regulation will begin when the cutblock has received **skid clearance** from a Forest Officer.
5. All timber harvest operators who are responsible for reforesting their timber disposition shall treat all harvested cutblocks within two years of skid clearance.
6. Where site preparation by prescribed burning is proposed for a timber disposition, it will be identified and included with the final AOP submission for approval. Blocks approved for burning must have a detailed burning plan prepared in accordance with the Prescribed Burn Manual (available from Forest Headquarters).

GUIDELINES:

1. Planning for reforestation and harvesting should be coordinated to minimize soil erosion, soil compaction and watercourse sedimentation.
2. Reforestation techniques that promote enhanced growth and yield of regenerated stands should be employed. For example, these techniques may include:
 - a. matching tree species to site conditions;
 - b. controlling spatial distribution of crop trees;
 - c. treating the site to enhance the micro- and macro-environment for seedling establishment and growth; and

- d. planting genetically improved seedling stock.
3. Cutblocks should be designed to include areas that require similar reforestation treatments.
4. Cutblocks that will be reforested to deciduous species by root suckers, should be harvested to ensure a minimum 60 percent canopy removal, except where understory protection measures take precedence.

For information about standards and guidelines to be used in the preparation of the Reforestation Schedule, see Subsection 3.1.1 of Appendix 2.

2.2.7 Planning Harvest Designs to Protect Forests From Insects and Disease

OBJECTIVE: To manage insect infestations and diseases, and to reduce the risk of spreading insects or diseases from cutblocks to regenerated stands or uncut stands.

STANDARDS:

1. Where unusually high insect infestations or incidents of disease are found, timber operators shall develop and implement strategies to salvage affected trees or stands.
2. Insect and disease conditions in a disposition shall be assessed during stand assessments and development of the AOP and reforestation plans. Where insect or diseases are recognized, especially:
 - dwarf mistletoe (*Arceuthobium americanum*, Nutt. ex Englman.);
 - spruce beetle (*Dendroctonus rufipennis*, Kirby);
 - mountain pine beetle (*Dendroctonus ponderosae*, Hopk.);
 - spruce budworm (*Choristoneura fumiferana*, Clem); and
 - jack pine budworm (*Choristoneura pinus*, Free.),
 the AOP shall be referred to the Forest Protection Section of the Forest for evaluation and advice.

GUIDELINES:

1. Priority should be given to harvesting stands with a high incidence of disease or insects, or stands that are most at risk because diseases or insects are known to be present at above-normal population levels. Harvest designs should minimize the risk of stand degradation and blowdown that might provide a refuge or be the centre for insect infestations or disease.
2. Stands with high levels of dwarf mistletoe infections or spruce beetle infestations should be given priority for harvest. All infected trees should be felled within the cutblock. Management may include creating a mistletoe-free zone 30 m wide inside the cutblock perimeter or reforesting the cutblock to a species resistant to mistletoe.
3. Wherever possible, wildlife and protection buffers should be selected from stands free of diseases or insect infestations.

2.3 Timber Harvest Operations

2.3.1 Timber Harvest Operations and Piece Utilization

OBJECTIVE: To harvest timber according to the approved Annual Operating Plan using harvest practices in order to:

- a. minimize the waste of merchantable timber;
- b. minimize the amount and degree of soil disturbance;
- c. maintain the capability of the site to support healthy tree growth;
- d. avoid significantly increasing the risk of timber loss; and
- e. minimize the impact of logging on the environment, fish, wildlife and other resources.

STANDARDS:

1. The timber operator must obtain approval of the final AOP before timber operations can begin in a timber disposition.
2. Written approval from the Forest Superintendent is required for major modifications to the AOP,

and for any changes to the harvest design that impact upon roadside, streamside, recreation, tourism or wildlife buffers and reserves, or visually sensitive areas. Where such modifications are proposed, maps showing the changes shall be supplied to Forest Headquarters for departmental referral and Forest Superintendent approval.

3. Minor modifications (i.e., less than 5 percent of the cutblock area) to cutblock boundaries identified during harvest operations, and deviations of up to 20 m on the centrelines of rights-of-way (ROW), are permitted when approved in writing by a Forest Officer.
4. Timber operations, including falling, skidding, decking and reforestation, shall be confined within approved cutblock boundaries or ROWs, and shall avoid damage to regeneration on reforested areas unless approved otherwise by the Forest Superintendent.
5. Cutblock boundaries shall be marked in a manner approved by the Forest Superintendent. Boundary marks must be clearly visible both during and after harvesting.
6. Merchantable trees shall be felled, skidded, decked and handled so that waste of merchantable timber is avoided.
7. A merchantable conifer log or piece is 2.44 m (plus 5 cm trim allowance for sawlog operators) or longer with an 11 or 13 cm (inside bark) small end, depending on the applicable utilization standard, where rot content or form does not render it unusable. The timber operator shall not be required to manufacture pieces from an unmerchantable tree.
8. A merchantable deciduous log or piece is 2.44 m or longer to a 10 cm (inside bark) small end where rot content or form does not render it unusable. The timber operator shall not be required to manufacture pieces from an unmerchantable tree.
9. Conifer and deciduous log butts or large ends exhibiting advanced decay greater than 50 percent in area of the cut surface may be bucked at 0.61 m (2.0 ft.) intervals or less to 50 percent sound wood.
10. All merchantable deciduous and coniferous trees, logs or pieces on ROWs, skid trails, landings and campsites shall be recovered and used where a market for the species exists. This requirement may be waived by the Forest Superintendent where such trees, logs or pieces are required for wildlife habitat.
11. Breakage or mechanical damage to merchantable logs shall be kept to a minimum.
12. When all merchantable logs and pieces are recovered and skidded to a collection area for loading and hauling, a cutblock will be given skid clearance.
13. When all timber has been removed and operational cleanup and reclamation is completed, a cutblock will be given final clearance. (Cleanup and reclamation shall be completed within 24 months of the cutblock's harvest.)
14. Logs that are too long for transport shall be bucked into merchantable log lengths.

For more standards and guidelines that affect timber harvest operations, see Subsection 4.3.

2.3.2 Understory Protection

OBJECTIVE: To protect healthy, vigorous, young understory growing stock within cutblocks during timber harvest and reforestation operations.

STANDARDS:

1. Damage to thrifty understories shall be avoided at all stocking densities; greater attention shall be given to protecting understories as their value increases. The value of the understory may depend upon any of the following factors:
 - a. the management objectives for the area (i.e., for recreation, wildlife habitat, timber and soil/watershed protection);
 - b. the density and height of the understory;
 - c. the condition of the understory (i.e., form, root condition, height, vigour and health);
 - d. limiting physical site factors; and
 - e. reforestation expectations.
2. White spruce shall be given priority for protection in the understory; however, other tree species may also be protected for specific purposes. Protected species will be recognized as acceptable species in fulfilling reforestation standards. Stands with trees that are healthy, vigorous, windfirm, have good form and are likely to grow to become merchantable by the second rotation cut, shall be

- given highest priority for protection.
3. Understory protection is required during all phases of timber operations (i.e., falling, skidding, hauling, reclamation and reforestation).
 4. Post-harvest assessments shall be done by the persons with the responsibility for reforestation to assess the success of understory protection planning and to provide additional information for reforestation.

GUIDELINES:

1. Where understories are to be protected, cutblocks should be designed and operated to minimize the risk of blowdown to understory trees.

2.3.3 Protection of Forests From Wildfire During Harvest Operations

OBJECTIVE: To minimize the risk of wildfire starting or escaping from timber harvest operations.

STANDARDS:

1. Firefighting equipment shall be kept on hand and maintained as required by the Forest and Prairie Protection Act and associated regulations.
2. Slash accumulations resulting from timber harvesting and road and campsite construction shall be disposed, and slash hazard reduction shall be completed in accordance with the Forest and Prairie Protection Regulations Part II, Alberta's Prescribed Burn Manual, and Alberta's Prescribed Burning Fuels Inventory Manual (available from the Forest Protection Division).
3. Logging debris from roads, landings and campsites, that is not required for wildlife habitat, shall:
 - a. be spread without burning provided this can be done without inhibiting reforestation or causing excessive soil compaction or disturbance; or
 - b. be decked, windrowed or piled (but not on organic soils) and protected by a fireguard (piles, decks and windrows shall be kept at least 8 m from standing timber with 8-m breaks at 70-m intervals); or
 - c. be burned on mineral soil when and where it is safe and checked to ensure all fires are extinguished before the fire season begins.
4. A **Slash Accumulation-Free Zone** shall be created in each cutblock where there is no significant accumulation of logging debris within 5 m of the perimeter or around islands of uncut timber inside the cutblock. The bordering undisturbed forest floor shall be used as a benchmark to determine what constitutes a significant accumulation. Unacceptable accumulations may include piles of trees or unmerchantable timber, and tops or branches deposited during logging that could create fuel ladders for fire into the bordering stand.

3.0 TIMBER HARVESTING AND THE FOREST ENVIRONMENT

3.1 Maintaining the Forest Environment

To ensure that Alberta's forests continue to produce high-quality timber and yield other benefits, it is important to keep the land intact and protected from damage. The watershed (i.e., soils and water) is the primary component of the forest environment that can be protected during timber operations.

3.2 Watershed Protection and Harvest Planning

OBJECTIVE: To design harvest layouts that minimize the impacts of harvest operations on water yield, regime and quality, watercourse structure, soils, cover and riparian habitat for fish and wildlife.

STANDARDS:

1. Watercourses shall be evaluated and classified according to Table 1 (Watercourse Classification).
2. Streamside protection buffers shall be incorporated according to the standards prescribed in Table 2 (Standards and Guidelines for Operating Beside Watercourses).
3. Where water-source areas coincide with highly productive fish and wildlife habitat, timber harvest operations shall be approved only if the impacts can be avoided or mitigated.

Table 1 - Watercourse Classification

Watercourse Classification	Mapping Designation	Physical Description	Portion of Year Water Flows	Channel Development	Fish and Wildlife Concerns	Land Use Impact
Large Permanent	<ul style="list-style-type: none"> • Solid heavy line or double line 	<ul style="list-style-type: none"> • Major streams or rivers. • Well-defined flood plains. • Valley usually exceeds 400m in width. 	<ul style="list-style-type: none"> • All year. 	<ul style="list-style-type: none"> • Unvegetated channel width greater than 5m. 	<ul style="list-style-type: none"> • Resident fish populations. • Important overwintering habitat. • Important feeding and rearing habitat. 	<ul style="list-style-type: none"> • Water quality often reflects all upstream land use impacts and natural processes. • Primarily sedimentation of stream channels.
Small Permanent	<ul style="list-style-type: none"> • Usually solid although some are heavy broken lines. 	<ul style="list-style-type: none"> • Permanent streams. • Often small valleys. • Bench (floodplain) development. 	<ul style="list-style-type: none"> • All year but may freeze completely in the winter. 	<ul style="list-style-type: none"> • Banks and channel well- defined. • Channel width 0.5m to 5m. 	<ul style="list-style-type: none"> • Significant insect populations. • Important spawning and rearing habitat. • Resident fish populations. • Overwintering for non-migratory species. 	<ul style="list-style-type: none"> • Primarily sedimentation of stream channels. • Water quality. • Fish populations sensitive to siltation. • Loss of streambank fish habitat.
Intermittent	<ul style="list-style-type: none"> • Usually broken light line. • Should be identified on the ground. 	<ul style="list-style-type: none"> • Small stream channels. • Small springs are main source outside periods of spring runoff and heavy rainfall. 	<ul style="list-style-type: none"> • During wet season or storms. • Dries up during drought. 	<ul style="list-style-type: none"> • Distinct channel development. • Usually channel is unvegetated. • Channel width to 0.5m • Some bank development. 	<ul style="list-style-type: none"> • Food production areas. • Potential spawning for spring spawning species. • Drift invertebrate populations in pools and riffles. 	<ul style="list-style-type: none"> • Sedimentation from bank and streambed damage will damage fish habitat downstream.
Ephemeral	<ul style="list-style-type: none"> • Not normally mapped. 	<ul style="list-style-type: none"> • Often a vegetated draw. 	<ul style="list-style-type: none"> • Flows only during or immediately after rainfall and 	<ul style="list-style-type: none"> • Little or no channel development. • Channel is usually vegetated. 	<ul style="list-style-type: none"> • Siltation may impact fish habitat. 	<ul style="list-style-type: none"> • Sedimentation downstream due to ground disturbance.

			snowmelt.			
Water-source Areas (except muskegs)	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Areas with saturated soils or surface flow. Seepages. 	<ul style="list-style-type: none"> All year. May or may not freeze in the winter. 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Potential high value to fall spawners. Potential high-use areas for terrestrial wildlife. 	<ul style="list-style-type: none"> Disturbance may cause stream sedimentation. Interruption of winter flow may disrupt fish egg incubation.
Lakes	<ul style="list-style-type: none"> Solid line outline a waterbody. Reserved areas will be noted on referral map. 	<ul style="list-style-type: none"> Large water collection areas permanently filled with water. 	<ul style="list-style-type: none"> Normally frozen in the winter. 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Important fish-bearing habitat. 	<ul style="list-style-type: none"> Aesthetic values may be disrupted. Potential for wildlife disturbance. Local sedimentation.

Table 2 - Standards & Guidelines for Operating Beside Watercourses

Watercourse Classification	Roads, Landings and Bared Areas	Watercourse Protective Buffers	Operating Conditions Within Buffers and Water-Source Areas Where Operations are Approved	
			Tree Felling	Equipment Operation
Large Permanent	<ul style="list-style-type: none"> Not permitted with 60 m of the high-water mark or from water-source areas within that buffer. May be permitted within 60 - 100m of the high-water mark with written approval of a Forest Officer. 	<ul style="list-style-type: none"> No disturbance or removal of merchantable timber within 60m of the high-water mark except where specifically approved in the Annual Operating Plan. 	<ul style="list-style-type: none"> Trees will normally be felled so they do not enter the watercourse. The objective is that no slash or debris is to enter the watercourse. Should slash or debris enter the watercourse, immediate removal is required without a machine entering the watercourse. 	<ul style="list-style-type: none"> Where removal of timber within 60m is approved, no machinery is to operate within 20m of the high-water mark. Timber within 20m shall be removed by winching or other means such that the machine stays outside of the 20m strip. Where possible, topographical breaks should be used as protection strip boundaries.
Small Permanent	<ul style="list-style-type: none"> Not permitted within 30 m of the high-water mark or from water-source areas within that buffer. May be permitted within 30- 100 m of the high-water mark with written approval of a Forest Officer. 	<ul style="list-style-type: none"> No disturbance or removal of merchantable timber within 30 m of the high-water mark except where specifically approved in the Annual Operating Plan. 	<ul style="list-style-type: none"> Trees will normally be felled so they do not enter the watercourse. The objective is that no slash or debris enter the watercourse. Should slash or debris enter the watercourse, immediate removal is required without a machine entering the watercourse. 	<ul style="list-style-type: none"> Where removal of timber within 30m is approved, no machinery shall operate within 20m of the high-water mark. Timber within 20 m shall be removed by winching or other means such that the machine will remain outside the 20m strip. Where, possible, topographical breaks should be used as protection boundaries.
Intermittent	<ul style="list-style-type: none"> Not permitted within 30 m of the high-water mark or water-source areas within that buffer. 	<ul style="list-style-type: none"> Buffer of brush and lesser vegetation to be left undisturbed along the channel. Width of buffer will vary according to soils, topography, water-source areas and fisheries values. Treed buffer is not required unless specifically requested by a Forest Officer 	<ul style="list-style-type: none"> Trees will be felled so they do not enter the watercourse unless otherwise approved. Should slash or debris enter the watercourse, immediate removal is required without the machine entering the watercourse. 	<ul style="list-style-type: none"> Heavy equipment may operate within 20 m only during frozen or dry periods. No random, skidding through watercourse channels. Crossings must be planned with adequate crossing structures. Crossings are to be removed on completion of operations. Where fish and spawning movements have been identified, Special crossings that will not obstruct upstream fish passage or cause stream siltation may be required.
Ephemeral	<ul style="list-style-type: none"> Construction not permitted within a 	<ul style="list-style-type: none"> Buffer of lesser vegetation in wet 	<ul style="list-style-type: none"> Large accumulations of slash or debris accumulations be removed progressively. 	<ul style="list-style-type: none"> Random skidding through watercourse permitted only during frozen or dry ground periods.

	watercourse or a water-source area.	gullies to be left undisturbed.		<ul style="list-style-type: none"> • Temporary crossings are to be removed on completion of operations.
Lakes (little or no recreation, waterfowl or sport fishing potential)	<ul style="list-style-type: none"> • Not permitted within 100m of the high-water mark without written approval of a Forest Officer. 	<ul style="list-style-type: none"> • On lakes exceeding 16ha in area, there will be no disturbance of timber within 100m of the high-water mark except where specifically approved in the Annual Operating Plan. 	<ul style="list-style-type: none"> • Trees within these areas shall be felled away from the waterbody. • No slash or debris shall enter the waterbody. 	<ul style="list-style-type: none"> • If timber removal is approved, no machinery is to operate within 20m of the high-water mark.
Lakes (with recreational, waterfowl or sport fishing potential)	<ul style="list-style-type: none"> • For shorelines not located within reserved areas, no disturbances will be permitted within 200 m of the high-water mark without the written approval of the Forest Superintendent. 	<ul style="list-style-type: none"> • On lakes exceeding 4 ha in area, there will be no disturbance or removal of timber within 100 m of the high-water mark except where specifically approved in the Annual Operating Plan. 	<ul style="list-style-type: none"> • Trees will be felled so they do not enter the waterbody. • No slash or debris shall enter the waterbody. 	<ul style="list-style-type: none"> • If timber removal is approved, no machinery is to operate within 20 m of the high-water mark. • Consideration must be given to aesthetics when harvesting adjacent to lakes with recreational potential. Any timber harvesting within reserved areas shall be conducted subject to specific operating conditions.
Water-source Areas and Areas Subject to Normal Seasonal Flooding.	<ul style="list-style-type: none"> • Construction not permitted unless approved in the Annual Operating Plan. • No log decks permitted. • The number of stream crossings must be minimized. • No disturbance of organic duff layers or removal of lesser vegetation. 	<ul style="list-style-type: none"> • Treed buffers of at least 20 m on all streams. • No harvest of merchantable trees or disturbance of lesser vegetation unless approved in the Annual Operating Plan. • Buffer width may be altered according to its potential to produce surface water, provided it is approved in the Annual Operating Plan. 	<ul style="list-style-type: none"> • Heavy machinery not permitted in the 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 should be carefully harvested from water- source areas to minimize root disturbances of duff layers and watercourse damming. 	<ul style="list-style-type: none"> • Road construction, timber harvest, reforestation and reclamation shall be done with equipment capable of operating without causing excessive disturbance to the organic soil layers. • Heavy equipment is not permitted during moist or wet soil conditions. May be operated during frozen periods according to specific conditions in the approved Annual Operating Plan. • No dirt caps or depositing of soil will be permitted on roads in water-source areas, unless a separation layer is incorporated or the road is designed to provide adequate surface and subsurface drainage away from the road-bed. Where a separation layer is used, the soil cap shall be removed as operations are completed.

NOTE: Limitations on any logging machinery within water-source areas also apply to scarification equipment.

4. On sensitive or complex sites, detailed cutblock plans shall be required for road construction, harvest, reforestation and reclamation. The intensity of planning required is determined by the complexity and sensitivity of the site and the degree of disturbance expected (see Subsection 1.3 in Appendix 2).
5. Where watersheds are managed for water regulation, or to support important aquatic resources, watershed assessments shall be provided to the timber operator and harvest designs must meet identified water management objectives.
6. Water-source areas shall be identified using procedures described in the Predisturbance Watershed Assessment Manual (ENR Pub. T/100).

GUIDELINES:

1. Conditions in water-source areas may differ between sites and buffers may be altered from the above standards according to the potential of the source area within the buffer to produce surface water, provided this is approved in the AOP and there are no other resource concerns.
2. Normally, harvesting on sustained slopes steeper than 45 percent should not be approved. In special circumstances where harvesting is approved, it should be done during the time of year and in a manner that will minimize the potential for soil erosion. Detailed cutblock plans are required for these areas.
3. Timber operators should cooperate to plan and coordinate their reclamation activities when separate harvest operations are conducted on the same cutblocks.

For other standards and guidelines that apply to watershed protection, see Subsection 4.3.2.

3.3 Watershed Protection During Operations

OBJECTIVE: To conduct timber harvest, reforestation and reclamation operations in a way that will:

- a. minimize the potential for soil erosion;
- b. prevent soil, logging debris and deleterious materials from entering watercourses;
- c. ensure that the capability of the site to support healthy forest tree growth is maintained; and
- d. minimize the impact of logging on other resources;

STANDARDS:

1. Watercourse protection buffers are required beside permanent streams, rivers and lakes, and can be required for intermittent watercourses where fisheries values are present, in accordance with Table 2. Logging will not normally be permitted within protection buffers. Where a proposal to harvest is submitted, the operator must demonstrate that fish and wildlife habitat will be maintained or enhanced and watershed values protected. All operations proposed in watercourse protection buffers are to be described in the AOP.
2. Care is to be taken to minimize damage to the soil's structure, density, fertility, drainage or porosity, especially during periods when it is water saturated.
3. Where the capability of the soil to grow trees is reduced, reclamation techniques shall be applied with the objective of restoring site productivity.
4. Forest Superintendent approval is required to harvest timber from streamside or other protection buffers not specifically approved in the AOP. Such requests are subject to the appropriate referral.
5. Soil, logging debris or deleterious materials shall not be deposited into the water or onto the ice of any watercourse or waterbody during road construction, harvest, reclamation or reforestation operations. Such material unavoidably deposited onto the ice surface must be removed immediately.
6. Any previously unknown and unmapped creek(s) encountered during any operations shall be given the protection prescribed in Table 2 for its class.
7. Site preparation equipment shall be permitted to cross permanent and intermittent

- watercourses only at approved crossings.
8. Every timber operator is responsible for completing reclamation work required as a direct result of his operations.

GUIDELINES:

1. During harvest, reforestation or reclamation operations, activities that cause wheel or track ruts should be avoided or stopped.
2. Logs should not be decked in a manner that causes damages to soils, watercourses or water-source areas. Decks placed on water-source areas during frozen periods should be removed before the ground thaws.

Standards and guidelines for operating beside watercourses, water-source areas and lakes are summarized in Table 2.

3.4 Watershed Protection During Road, Landing and Campsite Construction and Maintenance

3.4.1 Planning of Roads, Landings and Campsites

OBJECTIVE: To plan and design roads, landings and campsites that minimize the area disturbed and to construct them to the minimum standards necessary in ways that:

- a. achieve the objectives of the harvest, timber haul, reforestation and reclamation;
- b. meet the expected tenure and season of use; and
- c. allows for safe use.

STANDARDS:

1. All roads shall be planned and constructed to the standards and guidelines described in Table 3. [See also Resource Road Planning Guidelines (ENR Pub. T/25).] The standards in Table 3 may be modified by the Forest Superintendent to suit unusual situations.
2. Road ROWs shall be no wider than the standards shown in Table 3 for a specified class of road. Exceptions may be considered in the following situations:
 - a. in cutblocks;
 - b. for areas requiring significant cut-and-fill;

Table 3 - Standards and Guidelines for the Planning and Construction of Roads

This table is not available in this electronic version. Please consult a published hardcopy version or the Information Centre identified on the front cover on this document.

- c. where a variable width ROW is aesthetically desirable;
 - d. where extra width is required for safe road use; or
 - e. where reasonable increases in clearing widths are required on sloping terrain to promote rapid drying of the road surface.
3. Existing roads, trails and campsites shall be used wherever possible.
 4. Roads, skid trails, landings and campsites should be located where they will:
 - a. avoid identified unstable areas, water-source areas, springs and seepages;
 - b. follow natural benches, moderate slopes and ridges;
 - c. avoid steep or sustained slopes/grades; and
 - d. minimize the amount of mineral soil disturbed, compacted or exposed during construction.

3.4.2 Construction of Roads, Landings and Campsites

OBJECTIVE: To build and maintain roads, landings and campsites in ways that:

- a. minimize the potential for soil erosion;
- b. prevent soil, debris or deleterious materials from entering watercourses; and
- c. protect the banks and channel of any watercourse.

STANDARDS:

1. Roads, skid trails, landings and campsites shall be placed in locations and constructed so that soil erosion, damage to streambeds and sedimentation of watercourses are minimized (and constructed according to the standards in Table 3).
2. On those parts of the ROW not used for grade construction, disturbance to the duff and organic soil shall be minimized to reduce damage to the roots of bordering trees and to provide a protective soil cover.
3. Ditches shall be constructed to the same gradient as the road and be deep enough to drain the subgrade, unless limited by topography. Ditch backslopes shall have a regular profile from the top of the cut to the bottom with no hanging banks or sharply cut ditches.
4. Trees with root systems damaged by road construction activities shall be removed from the edge of a road cut.
5. Erosion control is part of all road, landing or campsite construction. The roads, landings and campsites require proper drainage to disperse water. They also require erosion control devices and/or revegetation to stabilize disturbed soils, cut-and-fill slopes and ditches.
6. Water from roads, ditches and bared soil surfaces shall not be permitted to drain directly into watercourses. Vegetated buffers shall be left or a system of obstructions (e.g., logs, rocks, mounds, etc.) installed to dissipate the force of water, where buffers alone do not retard water and soil movement effectively.
7. Cross-drainage culverts and other drainage devices shall be installed as road subgrade 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 springs; and
 - d. be installed with adequate spillways or downspouts where they drain onto unstable or bare soil.

Where conditions do not permit cross drains, structures such as ditch blocks may be used.

8. All roads, ditches and otherwise bared areas with the potential to drain into a water-source area or watercourses shall have erosion controls installed concurrently with grade construction.
9. All erosion control and revegetation establishment shall be completed, where required to stabilize soils, during the growing season, either concurrently with or in the same year as the construction. If construction takes place in the autumn or winter, revegetation shall be completed, as soon as soil conditions permit, during the following growing period.

GUIDELINES:

1. Roads should be constructed during dry weather using mineral soil and/or gravel materials and approved techniques.
2. A portion of the clearing debris and strippings from construction of roads, landings and campsites should be retained and used for revegetation and erosion control on disturbed areas.
3. Erosion control structures should be in place before decking timber on bared surface areas along road ROWs.
4. Preferably, no more than 2 km of bared surface area should be developed between the time the subgrade is constructed to when erosion control activities are completed.

3.4.3 Locating, Designing, and Constructing Watercourse Crossings

OBJECTIVE: To locate, design and build stream crossing structures in ways that:

- a. minimize the potential for soil erosion;
- b. prevent soil, debris or deleterious materials from entering watercourses;
- c. protect the banks and channel of any watercourse;
- d. meet the intended needs of the operator safely; and
- e. meet the requirements for maintaining upstream fish passage.

STANDARDS:

1. Watercourse crossings shall be constructed according to standards and guidelines described in Table 3 and the publication Stream Crossing Guidelines, Operational Guidelines for Industry (ENR Pub. T/80).
2. Culverts for all classes of streams must be designed and installed to prevent erosion at both the inflow and outflow ends of the structure. Culverts shall be of sufficient length beyond the fill, the overburden properly backsloped and stabilized to prevent sediment from entering the watercourse, and the ends of the culvert kept open at all times.
3. Where extended use of a seasonal or temporary road is required for activities such as reforestation treatment or future logging operations, stream crossings shall be adequate to meet peak streamflows for the expected life of the road.
4. Properly constructed logfills (See guideline 5 of this subsection) on temporary roads may be used to cross ephemeral watercourses during dry periods, and cross intermittent watercourses (with developed channels) during frozen periods. As soon as the temporary road is abandoned, logfill shall be properly removed so that no soil is allowed into the water channel. Logfills installed during frozen periods shall be removed before the spring thaw.
5. On approaches to watercourse crossings, the organic soil layer and lesser vegetation shall not be stripped from portions of the ROW not actually needed for the road grade.

GUIDELINES:

1. To minimize the risk of erosion and the deposit of sediment into a watercourse, crossings should:
 - a. have stable approaches;
 - b. be at right angles to the watercourse;
 - c. be located where channels are well defined, unobstructed and straight;
 - d. be at a narrow point along the watercourse;
 - e. allow room for direct, gentle approaches; and
 - f. accommodate peak streamflows.
2. Bridge abutments should not constrict the normal stream channel. Where streambanks must be built up to construct a bridge abutment, soil shall be brought in and deposited from the end of the grade; no equipment shall enter the stream channel. Bridge spans must extend beyond streambanks and abutment walls.
3. The use of bridges is preferred on fish-bearing streams; however, steel culverts may be permitted where they will not restrict upstream passage of fish. Bridges over one span or culverts larger than 1.8 m in diameter require a permit from the Water Resources Services of Alberta Environmental Protection.
4. The number of crossings on intermittent or ephemeral watercourses should be limited and constructed at specified locations using appropriate watercourse crossing structures,

- particularly for work occurring on cutblocks during unfrozen ground conditions.
5. A properly constructed logfill has the following:
 - a. enough logs to adequately fill an ephemeral draw or watercourse channel so that when the logs are removed there is little or no damage to the banks or channel bottom;
 - b. logs delimbed and bucked to at least 1.5 m longer than the grade fill at each end;
 - c. logs covered by a layer of suitable material that separates the soil from the logs, which will permit total removal of the soil cap;
 - d. a soil cap not exceeding 30 cm;
 - e. logs may be cabled or strapped where the bottom logs will not be frozen into the ground; and
 - f. a bottom layer of logs may be left in place when removing the logfill to provide for summer crossing of ephemeral watercourses.

For more standards and guidelines that apply to watercourse crossings, see Subsection 4.3.2.

3.4.4 Maintaining Roads and Watercourse Crossing Structures

OBJECTIVE: To maintain all roads and watercourse crossing structures to:

- a. ensure that erosion and road surface degradation is minimized;
- b. ensure there is no deposition of soil, debris or deleterious material into a watercourse;
- c. maintain upstream fish passage; and
- d. ensure the road and crossing structures can continue to be used safely during their lifetime.

STANDARDS:

1. The timber operator shall conduct an annual inventory of roads and watercourse crossing structures until they are satisfactorily reclaimed and abandoned. All erosion control and maintenance activities proposed are to be identified in the Road Management Section of the AOP (See Appendix 2).
2. Stream crossings shall be kept free of accumulated debris. Culverts plugged with ice shall be reopened to prevent flooding during the spring thaw.
3. Prompt action shall be taken to re-establish vegetation or erosion control structures where initial work has failed.
4. Stream crossings that fail shall be reclaimed or replaced (if necessary) with more appropriate crossing structures as soon as possible.
5. Stream crossings shall be maintained in a manner that upstream fish passage is retained.

GUIDELINES:

1. All-weather roads should be properly maintained to reduce wheel or track ruts, and to minimize watercourse sedimentation from erosion and traffic during adverse weather.
2. Permanent roads constructed by logging operators may be temporarily closed to vehicles. Closure must be approved by the Forest Superintendent.

3.4.5 Borrow and Gravel Pits

OBJECTIVE: To minimize the number of borrow and gravel pits, the area disturbed and their impact on other resources.

STANDARDS:

1. All borrow pits located off the LOC must be authorized by a Forest Officer or an appropriate land use disposition before they are developed.
2. Off the LOC, all sand and gravel pits must be authorized under an appropriate disposition (e.g., Surface Materials Lease (SML), or sand and gravel licence (SMC) before they are developed.
3. Removal of sand and gravel from within the unvegetated channel of any watercourse is

- prohibited.
4. All borrow and gravel pits no longer required must be reclaimed (recontoured to stable slopes and revegetated).

GUIDELINES:

1. The fill required for road construction should be taken from the ROW.
2. Access to borrow pits located off the ROW should be constructed so that the pit is not readily visible from the road.

3.4.6 Abandoning and Reclaiming Roads, Landings and Watercourse Crossings

OBJECTIVE: To reclaim roads, landings and watercourse crossings upon abandonment to:

- a. return the site to the original or near original landform, drainage and productivity; and
- b. to stabilize disturbed soil and minimize the risk of erosion.

STANDARDS:

1. Reclamation procedures shall be according to guidelines provided in The Resource Handbook (ENR Technical Report No. T/75), and standards and guidelines provided in the Resource Road Planning Guidelines (ENR Technical Report No. T/25).
2. Watercourse crossings, roads, skid trails and landings that are no longer required, and which have a high risk of soil erosion, shall be reclaimed and abandoned, and their condition monitored annually until they are satisfactorily stabilized.
3. Roads required as access for successive harvest passes shall be temporarily reclaimed to the following standards unless approved otherwise in the AOP:
 - a. remove all watercourse crossing and drainage structures, and reclaim streambanks and approaches;
 - b. stabilize all potentially erodible slopes through rollback, seed to approved vegetation species, and cross-ditch to disperse runoff and suspended sediment into undisturbed areas; and
 - c. install access closure structures where required.
4. Where streamflow may be potentially constricted by a temporary winter snow or ice crossing on any watercourse, the crossing shall be notched or completely removed before the spring thaw.
5. Should the Land and Forest Services agree to leave an access route open, at the request of another resource user, the timber operator shall be relieved (in writing) of further monitoring, reclamation and maintenance responsibilities. The requesting resource user shall assume maintenance responsibilities under and appropriate disposition.

GUIDELINES:

1. Road reclamation may occur in a manner that permits ATV access, depending on:
 - a. reforestation plans and/or further management requirements;
 - b. wildlife concerns;
 - c. fire control requirements;
 - d. erosion potential;
 - e. trapper or other user needs;
 - f. aesthetic concerns; or
 - g. recreation and tourism requirements.
2. Skid trails, landings and roads that are no longer required should be permanently reclaimed by:
 - a. scarifying and returning them to an acceptable land form;
 - b. removing all watercourse crossing and drainage structures and reclaiming streambanks and approaches;
 - c. cross-ditching;
 - d. rolling back topsoil (including slash and logging debris) and revegetating erodible bared surface areas;
 - e. reforesting disturbed areas inside cutblocks; and

- f. establishing access closures where required.

3.5 Campsites and Miscellaneous Facilities

OBJECTIVE: To establish, maintain and reclaim campsites and miscellaneous facilities to:

- a. meet health and safety requirements required by provincial legislation;
- b. minimize the risk of fire escaping into surrounding timber;
- c. minimize impacts on other resources; and
- d. prevent erosion or pollution of soils on the site and in the surrounding watershed.

STANDARDS:

1. Sites developed for facilities such as mills, permanent campsites, fuel storage areas or waste disposal require an appropriate land use disposition.
2. The timber operator shall construct a fireguard around a facility site, when directed to do so by a Forest Officer, according to the Forest and Prairie Protection Act and its regulations.
3. The location of temporary campsites needs the written approval of a Forest Officer before the start of camp construction.
4. All combustible refuse and garbage shall be progressively burned in an incinerator when burning conditions are safe, or disposed at an approved waste disposal site.
5. Waste petroleum products, toxic chemicals or prohibited debris shall be collected and disposed at a waste disposal site approved for such substances.
6. All sumps containing sewage from a kitchen or washroom facility shall be properly treated daily and disposed in accordance with the Public Health Act.
7. A temporary storage site for petroleum and chemical products shall be located a minimum of 100 m from any watercourse and in an area that does not allow a direct flow into a watercourse.
8. Permanent petroleum and chemical storage facilities shall be located a minimum of 300 m from any watercourse and surrounded by an impermeable berm of sufficient height to contain the contents of the storage tank(s). Before the site is abandoned, it shall be reclaimed and the berm levelled.

GUIDELINE:

1. Campsites should be located no less than:
 - a. 300 m from the high-water mark of any permanent watercourse;
 - b. 300 m from or out of sight of a numbered highway, where possible;
 - c. 100 m from a public secondary road;
 - d. 1 km from identified mineral licks and other identified key wildlife areas; or
 - e. 1 km from a recreational or improved tourist facility, unless otherwise approved in the AOP.

4.0 TIMBER HARVESTING AND INTEGRATED RESOURCE MANAGEMENT

4.1 Integrated Resource Management

In Alberta, forests are managed for timber production and their many other resources and values. Forest managers must consider the impact of logging on other resources and forest users when they plan and conduct harvest operations. Integrated planning in cooperation with all stakeholders can yield a variety of benefits for many people.

4.2 Integrating Timber Harvesting with Other Resources

OBJECTIVE: To plan and conduct timber harvesting according to:

- a. the principle of integrated resource management, recognizing and considering other resource uses and values;
- b. integrated resource plans for those areas of the province covered by such plans; and
- c. the guidelines specified in the Policy for Resource Management of the Eastern Slopes, Revised 1984 (ENR Publication T/38) for those areas of the Eastern Slopes covered by the policy.

STANDARDS:

1. Land and Forest Services shall refer cruise reports both in-service and to other resource agencies to review before a timber disposition is issued. The information gathered from this referral shall be included with the stand assessment information and given to the timber operator to use in developing his AOP.
2. Land and Forest Services shall refer General Development Plans (GDPs) and AOPs to the Fish and Wildlife Habitat Biologist/Technician and to those provincial government agencies that expressed interest in the logging plans during the previous referral.

GUIDELINE:

1. Before the preliminary AOP is prepared, the timber operator should consult with registered trappers, holders of grazing dispositions, recreation and tourism operators, private property owners, industrial operators and any other affected groups in or near the proposed harvest area. Timber harvest operators should maintain contact with these people during the development of harvest plans to ensure their concerns are being addressed appropriately.

4.3 Managing Fish and Wildlife Habitat in Timber Harvest Operations

4.3.1 Fish and Wildlife Habitat Management Zones

OBJECTIVE: To establish areas where the application of specific operating standards and guidelines will assist timber operators in meeting fish and wildlife habitat objectives.

STANDARD:

1. The Habitat Biologist/Technician will identify and explain fish and wildlife habitat management zones for the Forest Management Plan of each Forest Management Unit before zones other than the General Fish and Wildlife Habitat maintenance zone can be applied at a disposition level. Zones may be revised for the cruise report.

GUIDELINE:

1. Special operating conditions may be applied to specific zones in addition to the standards and guidelines identified in these ground rules.

4.3.2 General Fish and Wildlife Habitat Maintenance Zone

OBJECTIVE: To develop harvest designs and conduct harvest operations in ways that will:

- a. encourage richness of wildlife species by maintaining or enhancing habitat diversity;
- b. manage for a well-distributed habitat capable of providing long-term population viability for all seasonal and year-round resident wildlife species;
- c. ensure that forest management activities maintain the capability for wildlife use of habitat; and
- d. protect fish habitat.

STANDARDS:

1. Instream activities in fish-bearing watercourses shall be scheduled to avoid migration, spawning and incubation periods of resident fish species. Instream work must be carried out in a manner that avoids stream sedimentation.
2. The capability for upstream fish passage must be maintained when any road crossing is built over a fish-bearing watercourse.
3. In fish-bearing watercourses, any negative impacts on the stability and fish habitat values of streambanks must be minimized. Where streambanks are damaged, they must be reclaimed using techniques approved by Alberta Fish and Wildlife Services.

Other standards and guidelines that apply to the protection of fish habitat are found in subsections 3.2, 3.3 and 3.4.3.

GUIDELINES:

1. Mature/overmature forest provides habitat for numerous species of wildlife and contributes to the biodiversity of the forest. A minimum of 10 percent of the gross productive forest land base of each forest management unit (FMU) should be managed as mature/overmature forest that is representative of stand types in the area. Unmerchantable stands, watercourse protection buffers and other areas not scheduled for harvest may contribute to the 10 percent. Where special wildlife management objectives require more than 10 percent mature/overmature forest, such areas will be identified in the Forest Management Plan or the cruise report. Proposals by Alberta Fish and Wildlife Services to manage more than 10 percent of an area as mature/overmature forest should be justified based on management objectives for wildlife species associated with older forests.

The stands managed as overmature/mature should be distributed throughout the disposition and be of a variety of sizes from 4 ha or larger; large patches are preferred. The amount and distribution of overmature/mature timber in a particular disposition should be arrived at by the Land and Forest Services and Alberta Fish and Wildlife, in consultation with the timber operator, at the cruise report stage.

2. In deciduous timber dispositions where there are no coniferous stands suitable for providing winter thermal cover over large areas, special effort will be made to developing future thermal cover through understory protection where such understories exist.
3. Using the following guidelines, timber operators should design, construct and manage their roads to minimize the impact on fish and wildlife.
 - a. Roads and trails should be constructed away from important wildlife habitat areas, including reproductive habitat for selected management species, key features such as mineral licks, and important feeding habitats and watering sites.
 - b. In designated areas, road construction and hauling activities should avoid critical wintering, breeding and birthing periods when populations may be more vulnerable to sensory disturbance and harassment.
 - c. In designated areas, the Forest Superintendent may request timber operators to restrict road access during specified periods, implemented in accordance with departmental policy. Road access in some key habitats should be removed after all

- operations have been completed.
- d. Cutblock access roads should be managed to minimize the secondary impacts of vehicle access (e.g., hunting pressure, poaching and animal harassment). Roads may be closed by removing stream crossings, rolling back slash, roots and other logging debris on portions of the ROWs, scarifying and planting, or other similar techniques.
4. Cutblocks and clearings beside long-term roads should be managed to minimize the line-of-sight.
 5. In cutblocks, the distance to winter hiding cover should not exceed 200 m. Cutblocks where the distance to cover is 150 m to 200 m will be acceptable provided measures are taken to improve cutblocks for wildlife use (e.g., creating irregular edges, leaving residual stands in cutblocks, ensuring understories and leaving debris piles). Where these features are not provided within cutblocks, distances to hiding cover should not exceed 150 m.
 6. The distance to winter thermal cover should be considered when designing cutblocks, especially during planning of subsequent harvest passes. Unmerchantable, deferred, isolated, inoperable or other timber cover not scheduled for harvest may provide adequate thermal cover. Where such cover is unavailable, timber stands that will provide thermal cover should be retained as required.
 7. Timber operators should incorporate irregular and natural boundaries in their harvest layout wherever possible, and limit the line of sight. Adjacent to roads that will be used five years or longer, the sight distance should be less than 400 m.
 8. Wildlife travel corridors are required in well-defined valleys or along permanent streams and rivers. These should contain timber stands on the floodplain of well-developed valleys, and forested areas at the top of well-developed valley breaks. These corridors should be at least two "sight distances" in width to allow undisturbed movement of wildlife. Where the stream buffer provides adequate sight distance, no additional consideration is needed. Harvest designs may include selective harvest, narrow cutblocks, and other techniques designed to maintain or enhance travel corridors.
 9. Dead standing trees and some live trees should be left for snag recruitment (8 per ha) in the cutblock to provide habitat, wherever this does not jeopardize worker safety. Large-diameter dead and selected live trees of unmerchantable species should be identified as a high priority for retention. Trees are preferred in a clumped distribution.
 10. Scattered pieces of large woody debris (8 cm diameter and greater) should be retained within cutblocks for small mammal habitat.
 11. Piles of large woody debris should be left within cutblocks to provide denning sites for furbearers and their prey species, and cover for small mammals and birds. The piles should be randomly located in the cutblocks (approximately 50 m apart). For fire protection, however, the piles should not be left within 8 m of cutblock edges.
 12. Mineral licks, springs that are frequented by wildlife, and water-source areas that are potentially significant for fish spawning and egg incubation should be protected. They should be identified on logging plans and mineral licks, and springs should be protected by a buffer with the width of one sight distance. When sites are encountered during harvest operations, specific prescriptions shall be applied incorporating procedures such as relocation of cutblock boundaries and retention of undisturbed vegetation buffers.

4.3.3 Ungulate Zone

OBJECTIVE: To enhance habitat in important ungulate winter range and other key habitats that have relatively high ungulate populations when compared to surrounding areas in the Forest Management Unit.

All standards and guidelines stated for the General Wildlife Habitat Maintenance Zone shall apply to the Ungulate Zone, in addition to the following standard and guidelines.

STANDARD:

1. The ungulate species and the area of concern shall be identified in the cruise report.

GUIDELINES:

1. A three-pass harvest pattern should be used to enhance moose and elk habitat. This will extend the availability of early successional vegetation for forage, and maintain thermal cover and snow-interception cover. Regeneration should be 10 m tall in first-pass cutblocks before third-pass cutblocks are approved for harvest. The objective is to have adequate and well-distributed thermal cover after the third pass; this may be achieved in some areas with unmerchantable stands. Normally, one third of the merchantable timber will be harvested in each harvest pass.

In special situations (e.g., poor stand condition), cut proportions may be altered, if at least 20 percent of the merchantable timber is retained for the third pass. Distribution of mature stands after the second pass must allow for optimum use by ungulates. Other systems of forest management may be acceptable if ungulate habitat enhancement objectives are met.

2. To provide security and encourage use of cutblocks by ungulates, cutblock design should include vegetation management methods that will limit the line of sight adjacent to long-term roads (i.e., roads used five years or longer). This could be accomplished, for example, by using an offset layout with 100 m - 200 m wide cutblocks adjacent to roads.
3. Operations should be scheduled to avoid vehicle access and disturbance of ungulates during the critical late winter period (January 1 to April 30). Operations that cannot be avoided during this time should minimize or localize access and disturbance through a low-impact strategy to be devised by the operator, Alberta Fish and Wildlife Services and Land and Forest Services.
4. In ungulate zones specified for elk, the distance to winter thermal cover should not exceed 300 m from any point in a cutblock.
5. In ungulate zones specified for mule deer, forest management prescriptions should be developed to retain suitably distributed stands for winter habitat.

4.3.4 Caribou Zone

OBJECTIVE: To sustain or enhance caribou habitat in designated areas, and maintain the capability for caribou to use the habitat.

STANDARD:

1. Logging shall be implemented according to the provincial guidelines for timber harvesting in caribou habitat. Management plans will identify special timber harvest strategies to guide the preparation of individual logging plans.

4.3.5 Floodplain Zone

OBJECTIVE: To maintain or enhance fish and wildlife habitat along floodplains and stream and river valley bottoms.

STANDARDS:

1. Outside designated watercourse protection buffers, forest harvest proposals on floodplains must ensure fish habitat is protected and wildlife habitat is enhanced according to specified objectives.

GUIDELINES:

1. Selective harvesting and small cutblocks should be considered to help achieve specific fish and wildlife objectives.
2. Well-planned selective harvesting or small, multiple-pass cutblocks within larger stands should be considered in the floodplain zone, but only where thermal and snow-interception cover and key habitat (e.g., snags, woody debris) are not jeopardized.
3. Small timber stands surrounded on at least three sides by meadows or shrublands should be maintained in a state of mature forest cover.

4.3.6 Special Wildlife Habitat Zone

OBJECTIVE: To provide a framework for the special management of special habitat for any wildlife species.

Examples of potential special wildlife areas include forests near trumpeter swan lakes, colonial nesting areas and habitat of rare, threatened and endangered species. It may also include the habitats of featured species as defined by Alberta Fish and Wildlife Services. Standards and guidelines will depend upon the particular wildlife species being managed and the circumstances of the site.

4.4 Integrating Timber Harvesting with Tourism, Recreation Resources and Protected Areas

OBJECTIVE: To minimize the impact of timber operations that occur near to recreational or tourism site developments and facilities and legislated protected areas.

STANDARD:

1. Timber operators shall plan and conduct their timber operation in consideration of legislated protected areas and approved recreation resource management plans, where they exist (e.g., lake-shore management plans, river corridor plans).

GUIDELINES:

1. Where possible, roads should avoid high-value recreation areas, or be built according to standards that will ensure they can be used safely while minimizing their impact on the recreation values of the area.
2. Roads should be clearly posted with appropriate traffic control and cautionary signs, particularly during periods of high recreational use (i.e., hunting season and summer) when timber harvesting or hauling operations are in progress.
3. Logging techniques that will minimize the visual impact of logging should be used near recreation areas.

4.5 Integration of Timber Harvesting with the Trapping Industry

OBJECTIVE: To minimize the impact of timber operations on the trapping opportunities within a Registered Trapping Area.

STANDARDS:

1. The timber operator shall make a reasonable effort to refer the GDP or supply information pertinent to a trapping area to senior partners of Registered Trapping Areas when they may be affected by proposed harvest operations. Normally, this shall occur five years before harvest operations begin. When requested, the timber operator shall provide the trapper with the harvest design map immediately following the Department's approval of the operator's final AOP.
2. Timber operators shall advise trappers of impending harvest activities at least 10 days before operations begin, preferably by personal contact. This will allow trappers time to remove equipment that may be lost or damaged by timber operations, or to reschedule trapping activities to reduce conflicts.
3. If known, locations of trapper cabins, trails and trapline, or other improvements will be shown on AOP maps.

4.6 Integrating Timber Harvesting with Domestic Grazing

OBJECTIVE: To minimize the impact of timber operations on range resources and domestic grazing, and to protect improvements on public land.

STANDARDS:

1. On grazing dispositions, timber operators shall consult with the grazing disposition holders to address specific concerns before operations begin.
2. During harvest, hauling, reforestation and reclamation operations, the timber operator shall ensure that any existing roads, bridges or improvements to active grazing dispositions are maintained.
3. The timber operator shall ensure that timber operations do not reduce the carrying capacity of the range for domestic livestock grazing.
4. Grazing disposition holders shall be advised by the timber operator at least 10 days before operations begin on timber dispositions affecting a grazing disposition.

GUIDELINE:

1. Where possible, timber operators should schedule operations in cooperation with grazing operators.

4.7 Integrating Timber Harvesting with Other Industrial Developments

OBJECTIVE: To recover and use timber removed from industrial clearings, and to make use of common roads and campsite locations where timber harvesting is proposed near or on industrial developments (e.g., mine sites, oil and gas fields, oil sands developments, and sand and gravel operations).

STANDARD:

1. Timber operators shall use existing roads and campsites wherever it is feasible and safe.

GUIDELINES:

1. Timber operators should cooperate with industrial operators to maximize timber recovery from industrial clearings.
2. Timber operators should coordinate and integrate their road planning and construction with other resource industries to develop roads of acceptable standards to meet the needs of all users safely and efficiently. Integration may include road use agreements and should contain uniform environmental protection standards.

4.8 Managing Forest Aesthetics

OBJECTIVE: To minimize the impact of timber operations on the visual quality of the forest landscape.

STANDARD:

1. The manual, Forest Landscape Management Strategies for Alberta (Forestry, Lands and Wildlife Pub. No. T/228), shall be used to identify visual resources, their sensitivity and vulnerability, and to act as a guide for mitigating the aesthetic impact of timber harvesting.

GUIDELINES:

1. The potential visual impact of harvesting and reforestation activities within cutblocks located beside sensitive viewsheds and major travel corridors should be considered during harvest planning. Visual management practices should be incorporated into cutblock harvest plans to temper adverse visual impacts.
2. Landscape assessment maps for some major corridors are available from Land and Forest

Services. The visual impact that logging has on the landscape should be considered for all areas identified as sensitive from these maps and other sources. Priority should be given to viewsheds from major travel corridors, recreation trails and watercourses, recreation areas, tourism facilities, municipalities, or any other area identified in the cruise report or Forest Management Plan.

3. Land and Forest Services will assess the visual sensitivity of the area covered by a disposition and provide the assessment to the timber operator in the cruise report. This should include vantage points of particular concern and identify local residents who may have an interest in the aesthetic aspects of the operation. With this information, the timber operator shall address their concerns and incorporate principles of aesthetic layout designs in the developing the AOP.

5.0 TIMBER HARVEST PLAN SUBMISSION REQUIREMENTS

5.1 The General Development Plan

5.1.1 Purpose

The General Development Plan (GDP) gives a comprehensive description of a timber operator's proposed harvest strategy and reclamation operations for a five-year period, and includes all his licences and permits. The GDP provides direction to the Department for preparing and issuing timber dispositions; assists the timber operator and the Department in recognizing and planning integration of timber harvesting with other timber operators, forest resources and users; ensures all concerns are identified and addressed early in the planning process to an appropriate level of detail; and is a mechanism used by the timber operator and the Forest Service to plan, coordinate and monitor reclamation activities on several timber dispositions.

5.1.2 Development and Submission Requirements for GDPs

OBJECTIVE: To provide an up-to-date strategy that gives direction and coordination for:

- a. **identifying the operator's timber supply;**
- b. **issuing timber dispositions;**
- c. **developing roads and AOPs;**
- d. **integrating operations with other timber operators and non-timber resource values;**
and
- e. **inspecting, maintaining and reclaiming the timber operator's roads.**

STANDARDS:

1. The timber operator shall submit a GDP by May 1 of each year to Land and Forest Services. The plan is subject to a departmental review and may be referred to other provincial government agencies. Land and Forest Services shall respond within 60 days.
2. The operator shall submit four copies, unless more are requested by the Forest Superintendent.
3. The GDP shall be based on the objectives and harvest sequence described in the forest management plan for the appropriate Forest Management Unit (FMU).
4. The GDP is intended to be sufficiently flexible to allow the timber harvest operator to respond to natural catastrophes, industrial developments and changing economic conditions.
5. When two or more operators with overlapping timber dispositions (or harvest rights) propose harvest operations for the same planning area, they shall develop their respective GDPs to ensure the plans are coordinated with each other.
6. The final AOP shall be approved only if there is an approved GDP covering the operating year or period for which the final AOP approval is requested. Normally, the AOP for the upcoming year/period should be covered by a GDP submitted in the previous year.

GUIDELINE:

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

5.2 The Annual Operating Plan (AOP)

5.2.1 Purpose

The Annual Operating Plan describes how timber harvesting will be implemented in a timber disposition. It describes how, where and when the operator will develop roads, harvest timber, integrate operations with other resource users, mitigate the impact of logging, reclaim disturbed sites, and reforest harvested areas in

the disposition.

5.2.2 Developing the Annual Operating Plan

OBJECTIVE: To develop a multi-phase operating plan, in compliance with the forest management plan, the GDP and resource referrals, and to describe how operations will be integrated with other forest resource and environmental objectives.

STANDARD:

1. Stand and site assessments provided by the Department will include a basic level of stand assessment and any or all of the following information, as required:
 - a. a timber inventory map (Phase 3 Forest Inventory or an approved equivalent) that includes a classification of stands according to condition using the following criteria:
 - stands damaged by blowdown, insects, disease or other causes,
 - overmature stands,
 - unstable stands,
 - reforested and young stands, and
 - immature and unmerchantable stands;
 - b. a watershed assessment identifying erodible and unstable soils, steep slopes, watercourse classification and water-source areas;
 - c. an identification of wildlife habitat zones and a description of fish-bearing streams;
 - d. a description of understory at a stand level of detail;
 - e. sensitive viewsheds, aesthetic viewpoints and consult residents who may have a concern about the aesthetics of logging (where they are known);
 - f. recreation facilities and tourism operations; and
 - g. names and addresses of trappers.

GUIDELINES:

1. Timber operators may be required to describe how referral concerns for identified sensitive sites were addressed. They may also be required to:
 - a. enhance stand and site assessment information where necessary for planning operations;
 - b. describe the potential impact of logging on soil, wildlife, fisheries, watershed, aesthetics, recreation, tourism facilities and other resource concerns;
 - c. Consider alternative harvesting methods on complex or sensitive sites; and
 - d. enhance understory descriptions to include composition, size, distribution and density.
2. Where two or more overlapping timber dispositions will be harvested within two years of each other, the respective timber operators should cooperatively develop a comprehensive harvest design. A mutually agreed-upon design should be submitted by both operators. It should include:
 - a. an integrated harvest design that includes merchantable coniferous, mixedwood and deciduous stands;
 - b. a description of the harvest agreement between the operators for the harvest of all merchantable trees on the site (this should clearly identify the rights and responsibilities of each party with respect to the harvest operation, reclamation and reforestation of the site); and
 - c. a schedule identifying harvest, reforestation and reclamation activities.
3. The approval of one operator's AOP should not be unduly withheld or delayed due to deficiencies in content or time lines of the other's AOP (particularly when the operations are not planned for the same year).

5.2.3 The Annual Operating Plan Preparation, Submission and Approval Process

OBJECTIVE: To prepare and submit AOPs that ensure orderly and progressive development, review and approval of timber operations, and which consider all resource values

and uses.

STANDARDS:

1. Each year, timber operators are to prepare and submit an AOP for each timber disposition to be harvested. The AOP shall be prepared and submitted in accordance with the dates prescribed in the Timber Management Regulation and the time line shown in Figure 1.
2. The AOP shall be prepared and submitted on a Department of Environmental Protection Annual Operating Plan form (Form TM 118/87 or equivalent), and accompanied by associated supplements and Alberta Phase 3 Forest Inventory Maps or approved equivalents.

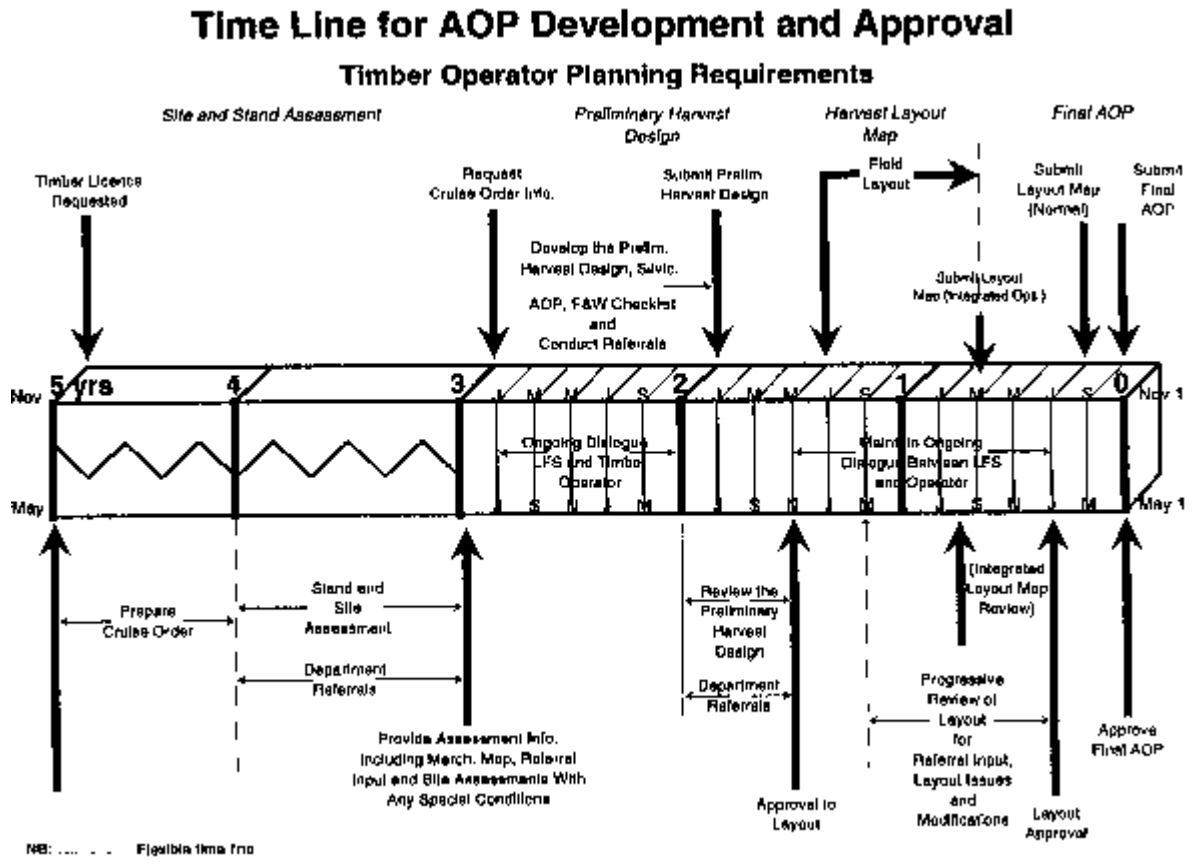
GUIDELINE:

1. Annual Operating Plans for low-volume Commercial and Deciduous Timber Permits areas, harvest operations conducted on Miscellaneous Timber Use areas or on other areas managed by Land and Forest Services for small operators, may be prepared and submitted using the Annual Operating Plan Short Form.
2. Annual Operating Plans may be developed and submitted in either two or three stages. A three-stage submission is required where two or more logging operations must integrate with one another. Where a three-stage submission is required, the operator will be advised in the cruise report.

5.2.3.1 Preliminary Harvest Design

OBJECTIVE: To develop a preliminary harvest design based on the information provided by the Department and the timber operator's site assessments. The purpose is to, as fully as possible, address resource concerns in the preliminary stages of AOP preparation.

Figure 1 - AOP Submission and Approval Process



STANDARDS:

1. The timber operator shall be supplied with information from the Department's resource referral, and site and stand assessments in a cruise report summary with maps, three years before the scheduled start of the operating period of the final AOP. This information shall be used to develop the preliminary harvest design. The Department's resource referral comments will identify other site specific resource users and values, where they are known, and may include direction about their protection or mitigation of resource use conflicts.
2. The timber operator shall prepare and submit a preliminary harvest design, covering not less than two years of operations (but may show the entire disposition) two years before the scheduled start of the legislated operating period. Cutblocks that require detailed plans will be identified at this time. Table 4 summarizes the planning activities and information required for development of the preliminary harvest design.
3. From the review of the preliminary harvest design, the Forest Superintendent may also identify cutblocks where detailed plans for resource integration or protection, or where special attention to environmental protection is required. This request will also be based upon departmental referrals, site assessments and consultations with local resource users.

GUIDELINES:

1. To ensure that all referral comments, resource information, environmental concerns and timber operator concerns are properly understood and addressed, on-going communications between the timber operator and Land and Forest Services should be maintained.
2. At the discretion of the Forest Superintendent, a preliminary harvest design may be waived for simple or small harvest operations.

5.2.3.2 Harvest Layout Map

OBJECTIVE: To mark the road and cutblock layout as approved in the Preliminary Harvest Design and to modify it to mitigate previously unrecognized resource and harvest constraints.

STANDARDS:

1. With approval to the layout phase, all cutblock boundaries and, where required, road locations shall be established and clearly marked in the planning area.
2. Where an AOP is submitted in two stages, Land and Forest Services shall progressively conduct spot checks as the operator progresses with his layout. The timber operator will provide interim maps for review to the Forest Officer-in-Charge and the Fish and Wildlife Habitat Biologist/Technician which show any modifications or resource mitigation (for minor changes to the preliminary design, photocopies showing the changes may be sufficient). Land and Forest Services shall review marked boundaries, stream crossing locations, resource and protective buffers and road locations to ensure all resource and environmental concerns are addressed appropriately.
3. To facilitate review of the field layout, the final layout shall be submitted as soon as possible after the layout is completed to allow Land and Forest Services sufficient time to conduct field checks during a snow-free period.
4. In a three-stage submission (i.e., integrated operations), a harvest layout map shall be submitted after the cutblocks and roads have been marked in the field, at least nine months before the scheduled start of the legislated operating periods. Land and Forest Services shall conduct spot checks similar to those for the two-stage submission; however, attention shall also be given to the integrated harvest design to ensure that all timber is progressively and appropriately used.
5. The timber operator shall correct deficiencies in the layout before layout approval is given.
6. Late submissions and major changes in harvest design proposed after layout approval is given will require further review and approval by Land and Forest Services, which may extend the review process and time lines.

GUIDELINES:

1. The time line shown in Figure 1 is flexible, provided mutual agreement is reached and it is in accordance with the Timber Management Regulation. If the operator institutes planning sooner than required, the reviews and approvals by Land and Forest Services should also be moved forward to correspond with the time line intervals.
2. To facilitate the layout and orderly review of field layouts, the time line for AOP submission and approval should be managed so that both the timber operator and Land and Forest Services have sufficient time to review the layout during a snow-free period.
3. To ensure that concerns and conflicts are resolved adequately and at the appropriate time, ongoing discussions between the timber operator and Land and Forest Services should be maintained while the harvest layout development is in progress. Unanticipated conflicts and concerns with referral comments, harvest layout and modifications should be resolved immediately so that approval of the final AOP may proceed without delay.

5.2.3.3 Final AOP

OBJECTIVE: To submit a final, comprehensive AOP that provides a detailed description of how the timber harvest shall be conducted in the cutblocks proposed for harvest in the following operating year/period.

STANDARDS:

1. The final AOP (may be the text only if the appropriate number of maps were previously submitted and there have been no changes since layout approval) shall be submitted a minimum of two months before the start of the legislated operating period. Provided all specific resource concerns are adequately addressed and the layout map is approved, the final AOP shall be approved within two months of its submission.
2. Special operating conditions shall be included with approval of the final AOP. Normally, these conditions will reflect those operational concerns identified and discussed with the operator during the planning and layout stages.

GUIDELINE:

1. Before beginning harvest operations, a meeting with the operator and Department should be held to review the conditions of approval (e.g., understory protection and other special requirements) for impending harvest operations.

5.3 Planning of Roads

5.3.1 Class I to IV Permanent Roads

OBJECTIVE: To plan, review and construct permanent roads in a manner that will minimize their impact on the environment, including forest resources and other values.

STANDARDS:

1. The timber operator shall submit a schedule for planning, construction, yearly inspection and maintenance of permanent roads as part of the GDP.
2. Class I, II and III roads, and the Class IV roads to be used more than five years, shall be built under the authority of a Licence of Occupation (LOC). They shall be classified in relation to their expected life, season of use and design specifications, and according to the standards in Table 3.
3. Class I, II and III roads shall be planned and constructed in three phases.

5.3.1.1 Phase 1- Identifying the Regional Corridor (For Classes I, II and III)

OBJECTIVE: To identify the general corridor of a road (plus or minus 1 km) based on an efficient log haul and on other resource uses and values, referral information, and environmental and terrain suitability.

STANDARDS:

1. Road proposals shall include a location, assessment and comparison of alternative corridor locations based on terrain analysis at a 1:50 000 scale.
2. Based on the Phase 1 review, the Department shall, in this submission, identify the approved corridor, other forest resource concerns, environmental concerns and mitigation requirements (including planning needs), and the environmental impacts to be addressed.

GUIDELINE:

1. A Phase 1 road proposal may be included as part of the GDP or submitted separately, depending on the status of development and the complexity of the road design.

5.3.1.2 Phase 2 - Detailed Route Planning (Class I, II, III and Class IV with LOCs)

OBJECTIVE: To select a route centreline that minimizes any adverse environmental impacts and optimizes harvest and hauling efficiency.

STANDARDS:

1. The Phase 2 detailed route selection plan shall include any of the following, as appropriate:
 - a. a map or photograph of appropriate scale showing the general location of the road, together with any optional locations;
 - b. a 1:15 000 Phase 3 Forest Inventory (or 1:20 000) map(s) showing the route alignment and stream crossings;
 - c. survey profiles of the centreline on steep terrain or at difficult stream crossings;
 - d. All crossing structures that are to be marked in the field, including the type of structure proposed and a written description of the watercourse crossings;
 - e. cross-sectional profiles for approaches to streams where the route involves steep terrain requiring side-hill cuts;
 - f. the entire centreline to be marked; and
 - g. a statement describing identified environmental concerns and proposed mitigative measures.
2. When the Phase 2 Detailed Route Selection is approved, the Department (Fish and Wildlife Services and Land and Forest Services) shall provide the operator with a list of the specific conditions. With the exception of site-specific conditions, the conditions provided by the Department shall generally include those contained in these ground rules. The operator shall submit an application for an LOC at this time.

GUIDELINE:

1. The Company should submit Phase 2 detailed route plans at a time of year that allows the Department to review them in the field under snow-free conditions (normally submitted with or during the time interval of the preliminary harvest design).

5.3.1.3 Phase 3 - Construction Phase

OBJECTIVE: To construct the road as planned and approved.

STANDARDS:

1. The timber operator may begin construction when he has received a letter of authority. The letter of authority will be written when the LOC is approved.
2. Before construction begins, the Company shall supply the detailed plans or designs for permanent watercourse crossings, if requested by the Forest Superintendent.

5.3.2 Temporary Roads

OBJECTIVE: To plan and construct temporary roads so that their impact on the environment and other resources is minimized and the productive capability of the land is

maintained.

STANDARD:

1. Any roads to be used for harvest operations, log hauling or reforestation during unfrozen ground conditions shall be planned and constructed with appropriate erosion control and drainage structures.

5.3.3 Upgrading of Existing Roads and Re-Use of Abandoned Roads

STANDARD:

1. Proposals to upgrade existing roads, or re-use abandoned roads including realignment, reconstruction or reinstallation of stream crossings, are subject to the requirements and conditions for planning and approval of new roads.

5.4 Reforestation Program

5.4.1 Purpose

A reforestation program is required by Alberta's Timber Management Regulation (Section 143.1). The reforestation program provides a planning link between timber harvest operations, reforestation operations and the goal of Free-to-Grow.

5.4.2 The Silviculture Component of the AOP

OBJECTIVE: To prepare a plan that will provide a link between the harvest strategy (silviculture system) and the reforestation tactics that will be employed to ensure the successful reforestation of cutblocks and achieving the goal of Free-to-Grow.

STANDARDS:

1. The silviculture component of the AOP shall include the information outlined in Section 3.0 of Appendix 2.
2. The silviculture component of the AOP shall be submitted with the preliminary plan so that there is sufficient time allowed for Lands and Forest Services field inspections (see Figure 1). The reforestation tactics shall be approved as part of the final AOP. Submission of the silviculture component of the AOP may be flexible where approved by the Forest Superintendent.
3. Where the Land and Forest Services is concerned about the proposed silviculture strategy or tactic for specific cutblocks within the timber disposition, approval of the balance of the final AOP should not be delayed or withheld, provided all other conditions are satisfactory.
4. Where the Land and Forest Services can show that a proposed tactic for a particular cutblock is not likely to meet reforestation objectives, then the proponent shall either support their proposal with additional information or modify the tactic.
5. If a cutblock is declared sensitive, the timber operator shall provide additional information beyond the strategic and tactical levels. This shall include the actual technique (e.g., type of site preparation machine) and its expected impact on the sensitivity of the cutblock (e.g., using a continuous furrow trenching on the contour to reduce erosion).
6. Any special operating conditions included in the AOP approval shall apply to both the timber harvest and the reforestation operations.

5.4.3 The Annual Silviculture Schedule

OBJECTIVE: To develop and submit a complete and comprehensive list of all cutblocks (with silviculture tactics) where reforestation operations will be conducted during the next operating year.

STANDARDS:

1. The Annual Silviculture Schedule shall list all timber dispositions and cutblocks where reforestation operations are to be completed in the approaching year. It shall include all cutblocks to be treated, the reforestation activities for each cutblock and the schedule (by month) for the activities that will be completed.
2. This plan shall be submitted annually each spring, separately from the AOP on a date agreed upon by Land and Forest Services and the timber operator or by March 31 of the year the work is to be done.
3. Where the timber operator proposes a change of tactics from those in the silviculture component of the AOP, such tactics must be approved by Land and Forest Services before reforestation operations begin. This schedule allows for an opportunity to review (and revise if necessary) the reforestation prescription for each cutblock.
4. The schedule shall also include other proposed activities for different specified cutblocks in the disposition, including:
 - assessments or surveys (e.g., post-treatment, establishment, performance surveys);
 - stand tending; and
 - other activities such as fertilizing, drainage, spacing, thinning, etc.

5.4.4 Silviculture Reporting

OBJECTIVE: To report, record and monitor all reforestation or silviculture work completed on harvested cutblocks.

STANDARD:

1. Timber operators who conduct silviculture work on their disposition shall report the details of all work completed in a format acceptable to the Forest Superintendent. This information shall be submitted by a date jointly agreed upon by Land and Forest Services and the timber operator, or by May 15 of the following year.

GUIDELINE:

1. Reports for specific projects may be required to be submitted within 30 days of the completion of a project. The information may be submitted in a form that provides the appropriate information for silviculture record updating.

GLOSSARY

Alberta Fish and Wildlife Services: A division of the Department of Environmental Protection.

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.

Annual Operating Plan (AOP): A plan prepared and submitted by the timber operator each year.

Borrow Pit: A source of fill material used in road construction.

Buck: To cut a felled or downed tree into shorter lengths.

Buffer: A protected strip of vegetated land beside roads, watercourses, mineral licks or other important features.

Clearcutting: A harvest method where all the merchantable trees in a defined area are harvested.

Commercial Timber Licence (CTL): A timber disposition authorizing a quota holder to harvest predominantly coniferous timber and minor deciduous timber volumes. Sometimes known as a Coniferous Timber Licence.

Commercial Timber Permit (CTP): A timber disposition issued under Section 22 of the Forests Act authorizing the permittee to harvest public timber.

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.

Cruise Report: A report prepared by the Land and Forest Services after an area of timber has been assessed containing information used in the preparation of logging plans.

Cutblock: A specified area of merchantable timber with defined boundaries designated for harvest.

Deciduous Timber Licence (DTL): A timber disposition that authorizes the holder of a Deciduous Timber Allocation (DTA) to harvest predominantly deciduous and minor coniferous timber volumes.

Department, The: The Department of Environmental Protection

Ditch Blocks: Barriers constructed across ditches to retard water flow, to redirect water from the ditch, or to form a small catch basin.

Duff: The layer of partially and fully decomposed organic materials lying below the litter and immediately above the mineral soil.

Dwarf mistletoe (Arceuthobium americanum Nutt.): A flowering parasitic plant of the Loranthaceae family most commonly found growing on lodgepole and jack pines.

Even-aged stands: Stands where the ages of most trees are within 20 years of each other.

Final Clearance: The status given to a cutblock after all harvest and reclamation requirements have been met.

Floodplains: A flat area bordering a watercourse, made up of unconsolidated river-borne sediment, and

which is periodically flooded.

Forests Act, The: The legislative statute that authorizes the Minister to administer and manage the forested lands of Alberta.

Forest Management Division: A branch of the Lands and Forest Service.

Forest Management Plan (FMP): A plan prepared by the Department for a forest management unit that describes how the timber will be managed.

Forest Management Unit (FMU): A defined area of forest land located in the Green Area of the province designated by the Department to be managed for sustained timber yield.

Forest Officer: An employee of Land and Forest Services who represents the Minister in the administration of the Forests Act, the Timber Management Regulation, the Public Lands Act and the Forest and Prairie Protection Act and Regulations on public forested lands.

Forest Superintendent: The senior Land and Forest Services manager located at a regional headquarters charged with supervision of all forest management activities in any one of 10 Forests.

General Development Plan (GDP): A five-year operating plan prepared, updated and submitted annually by the timber harvest operator.

Grazing Disposition: An authorization issued by the Department for the purpose of domestic livestock grazing on public land (i.e., lease, licence or permit).

Guidelines: Desired actions and practices to achieve the stated objectives.

Harvest Prescription: The strategy and technique that will be used to harvest timber.

Harvest Sequence: The order in which areas or compartments of timber will be harvested as established by the Department in the Forest Management Plan of an FMU.

High-Water Mark (Unvegetated Channel): Stream course water levels corresponding to the top of the unvegetated channel or lake shore.

Integrated Resource Management: The management of forest resources in an area to meet the management objectives of an integrated resource plan.

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.

Land and Forest Services (LFS): A part of the Department of Environmental Protection.

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

Licence of Occupation (LOC): A disposition issued by the Department, authorizing occupation of a linear corridor, normally for an access road.

Line-of-Sight Distance: The distance at which an object can be identified.

Logfill Crossings: Stream crossings constructed with logs placed in a streambed parallel to the flow of the water.

Mass-wasting: Movement of large masses of land, soil or regolith (i.e., slumping, landslides, rock slides and massive undercut erosion).

Mature/overmature Stands: Stands that have reached rotation age or have a reduced growth rate. Such stands normally have large mature or overmature trees, an abundance of large live trees with heart rot, numerous snags, stubs and high stumps, and an abundance of large downed woody debris.

Miscellaneous Timber Use Area (MTU): An area managed by Land and Forest Services to provide timber to operators who harvest small volumes of timber each year.

Mixedwood Stands: Stands containing both deciduous and coniferous species.

Objectives: The aims or results the Department expects to achieve through the standards and guidelines established in the ground rules.

Permanent Reserve: An area permanently excluded from harvesting.

Permanent Roads: Roads that will be in use for more than two years.

Permanent Sample Plots (PSP): Plots established for long-term timber growth-and-yield studies.

Phase 3 Forest Inventory: A provincial forest inventory of the forested lands of Alberta.

Prescribed Burn: A fire managed for the purpose of reducing logging slash or for silvicultural site preparation.

Prohibited Debris: Any flammable debris or waste material that, when burned, may result in the release of dense smoke, offensive odours or toxic air contaminants, and includes:

- a. garbage or refuse from commercial or industrial operations;
- b. rubber or plastic, or anything containing or coated with rubber or plastic or similar substances;
- c. used oil from internal combustion engines, hydraulic oil and lubricants; and
- d. motor vehicle tires.

Quota Certificate: A certificate that entitles the owner to a percentage share of the AAC of a Forest Management Unit. This percentage is translated into a fixed roundwood volume.

Recreation/Tourism Sites: Sites with recreation and tourism developments that are managed for recreation.

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

Reserve Block: An area of timber shown on a harvest layout design, that is or will be merchantable by the final harvest pass, to be retained for a subsequent-pass harvest.

Retention Period: The length of time between harvesting passes.

Right-of-Way: A strip of land over which a power line, railway line, road or other linear development extends.

Rollback: Strippings and debris returned to disturbed areas for reclamation purposes.

Scarification: Treatment given to the soils of a site to prepare it for reforestation.

Selection Harvest: An uneven-aged silvicultural system in which selected trees are harvested individually or in small groups at periodic intervals throughout a rotation; the objective is to improve the timber condition, composition, structure and value.

Selective Cutting: A harvest practice in which only trees of a certain species with a specified diameter and/or value are harvested.

Senior Partner of Traps: The person recognized by the Department as the owner of the trapping rights in a registered trapping area.

Sensitive or Complex Sites: Sites that have soil, water, slope, aesthetic, vegetation or wildlife characteristics that require special protection beyond the normal precautions described in the ground rules.

Sight Distance: The distance at which 90 percent 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.

Silviculture: The theory and practice of controlling the establishment, composition, structure and growth of forests.

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.

Skid Clearance: The clearance given to a cutblock when all merchantable trees are harvested and the logs and pieces are skidded from the cutblock to a landing. This is when the reforestation time lines begin.

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.

Snag: A dead standing tree at least 6 m in height that may provide roosting or cavity nesting/denning opportunities for wildlife.

Soil Damage: Disturbance to soil structure, fertility, porosity or hydraulic conductivity, which has led to a reduction in the capability of the soil to grow trees.

Spruce beetle (Dendroctonus rufipennis): A bark borer that generally attacks spruce and may kill mature stands during heavy infestations.

Stand: A community of trees sufficiently uniform in species, age, arrangement or condition so as to be distinguishable as a group in the forest or other growth in the area.

Standards: Refer to minimum strategies, practices and requirements needed to achieve objectives. Standards include legislated requirements, regulations, established provincial policy, or those ground rules the committee agrees should be standards.

Stocking: A measure of the proportion of an area occupied by trees/seedlings, expressed in terms of a percentage of occupied fixed area sample plots.

Strippings: Layers of humus-bearing topsoil and fine woody material above mineral soil.

Stub: A stub is a standing dead tree that is generally less than 6 m.

Subgrade: The road base.

Subsequent-Pass: Any harvest occurring after the first harvest pass.

Sustained-Yield Timber Management: "This is the yield that a forest can produce continuously at a given intensity of management" (Society of American Foresters, 1971, Terminology of Forest Science, Technology, Practice and Products, Washington D.C.).

Temporary Road: Temporary roads are those that are part of a cutblock, or connect cutblocks and are built, used and reclaimed before expiry of the AOP or reclaimed within two years of construction.

Three-Pass Harvest: A harvest pattern in which all the available merchantable timber in an area is harvested in three separate passes. Normally it is done over approximately equal areas and in equal volumes.

Timber Disposition: Licences and permits that allow timber operators to harvest from Crown lands.

Timber Operations: Includes all activities related to timber harvesting including site assessments, planning, road construction, harvesting, reclamation and reforestation.

Timber Operator: The timber disposition holder or person responsible for controlling harvest planning and operations in the timber disposition. It also refers to those persons working on behalf of the disposition holder while conducting timber operations.

Timber Management Regulation: The legislative statute that describes the mechanism and regulations by which the forested lands of Alberta are managed.

Trim Allowance: An allowance on a bucked log to permit trimming and squaring of lumber in the sawmill.

Two-pass Harvest: A harvest pattern in which all the merchantable timber in an area is harvested in two harvest passes. Normally, the harvest is done over approximately equal areas and in equal volumes.

Understory Growing Stock: Trees growing under the main forest canopy.

Uneven-aged stand: Stands in which the trees differ markedly in age, usually with a span greater than 20 years.

Viewshed: The visible area, as it appears from one or more viewpoints.

Watercourse: For the purposes of these ground rules it shall refer to the bed, bank or shore of a river, stream, creek or lake or other natural body of water, whether it contains or conveys water continuously or intermittently.

Watershed: An area of land that collects and discharges water into a single creek or river through a series of smaller tributaries.

Water-Source Area: That portion of a watershed where soils are water-saturated and/or surface flow occurs and contributes directly to streamflow.

Wildlife: Any vertebrate species found in a forest environment, excluding domestic animals.

Windfirm Boundaries: Cutblock boundaries established at locations that are stable and minimize the potential for timber losses from wind.

Winter Hiding Cover: Vegetation that conceals 90 percent of a standing animal (broadside) at a distance of 60 m.

Winter Thermal Cover: An area of at least 10 ha having a conifer canopy at least 10 m in height, with at least 70 percent crown closure and a minimum width of 200 m that is used by animals to assist in their temperature regulation during the winter.

APPENDIX 1 - THE GENERAL DEVELOPMENT PLAN

The General Development Plan consists of the following:

1. **Schedules** with the following information:
 - a. the sequence of timber to be harvested over the next five-year period;
 - b. timber production objectives for all dispositions (by year);
 - c. road developments (Class III permanent or better) showing planning and construction time lines and the status of LOC applications;
 - d. all roads noted that are to be monitored, and all outstanding and anticipated reclamation work related to LOC road and stream crossings abandonment; and
 - e. a brief description of land uses and resource issues that may be affected by or influence harvest planning during this planning period (resource uses and potential conflicts shall be identified from departmental referrals, local referrals and consultation with known resource users).

2. A **map** (1:500 000 or 1:250 000 scale) that shows the following:
 - a. the millsite location;
 - b. proposed haul routes (differentiating existing roads from roads to be constructed) and primary routes to be used for reforestation access;
 - c. the timber dispositions to be operated;
 - d. other important forest resource areas or facilities that could be directly affected by logging; and
 - e. the general location of routes, dispositions and facilities where reclamation work is scheduled and where roads and watercourse crossings are abandoned.

APPENDIX 2 - THE ANNUAL OPERATING PLAN

1.0 TIMBER OPERATIONS SECTION

The Timber Operations Section of the final AOP includes four subsections as follows:

- a. A Timber Harvest Prescription;
- b. A Harvest Layout Map;
- c. Detailed Cutblock Plans (where required); and
- d. A Watercourse Crossings Description (where required).

1.1 Harvest Prescription

A harvest prescription may include any or all of the following information for the cutblocks to be harvested during the impending harvest period, using a completed TM 118 form or an approved equivalent:

- a. stand and site factors and information that influence and assist in interpretation of the harvest design;
- b. a contingency plan (where necessary) describing which cutblocks may be harvested;
- c. a description of all watercourse crossing structures;
- d. a list of cutblocks indicating harvest season, cutblock number, primary species, area, volume and any special operating conditions; and
- e. a list of subsequent-pass cutblocks showing their areas and estimated timber volumes.

1.2 Harvest Layout Maps

Harvest Layout Maps shall be submitted on a 1:15 000 Phase 3 Forest Inventory map or an approved alternative showing some or all of the information shown in Table 4, depending upon the complexity or sensitivity of the site.

All relevant information shall be accurately shown on the maps submitted with the final AOP.

Table 4 - Guidelines for Information to be Provided at Each Planning Phase

Planning Phase	Information Which May be Required or Issues to be Resolved
<p>Preliminary Harvest Design Phase</p>	<ol style="list-style-type: none"> 1. Verify merchantable and unmerchantable timber types, reserves, and immature stands. 2. Enhance the Phase 3 Forest Inventory, where necessary. 3. Verify the operator's timber base. (i.e., deciduous and coniferous planning areas). 4. Identify thermal cover stands. 5. Assess the condition of the timber, identify stands with a high risk of loss due to age, disease, insect or fire damage, poor drainage or instability. 6. Identify and classify watercourses (i.e., permanent, intermittent or ephemeral). 7. Identify water-source areas, springs and seepages (i.e., Predisturbance Watershed Assessments). 8. Identify steep and unstable slopes, and erodible soils. 9. Identify and update map with existing trails, seismic lines, powerlines and access routes (including LOC numbers and road classes). 10. Mark known important wildlife sites (e.g., mineral licks, nesting sites, denning and birthing areas) and fish-bearing streams. 11. Identify important trapline information (i.e., RTA boundaries, hand-cut trails, access routes, trap locations and trapline cabins). 12. Show existing cutblocks - update maps for previous years logging. 13. Verify reforestation status of bordering cutblocks. 14. Mark Land and Forest Services permanent sample plots. 15. Show protective buffers along watercourses, roads and wildlife habitat features. 16. Proposed integrated cutblock layout design showing first, second or subsequent cutblocks. 17. Proposed road layout including all classes I to IV permanent and their LOC no.s. 18. Proposed internal cutblock roads (including temporary Class IV and V roads). 19. Proposed stream crossing locations, type and structures. 20. Identify Sensitive cutblocks requiring detailed cutblock plans. 21. Stratify cutblock reforestation responsibility (i.e., conifer, deciduous, or mixedwood). 22. Identify areas with potential for erosion and may require reclamation. 23. Identify Trapper concerns (also addressed in the harvest design). 24. Fish and Wildlife Checklist (Appendix 3) 25. Identify cutblocks where understory protection is proposed. 26. Silviculture component of the AOP. 27. Forest Protection Supplement 28. Prescribed burn plan, where proposed. 29. Insect and Disease assessment, where required. 30. Grazing operator concerns, (also addressed in the harvest design). 31. Recreation sites, provincial parks, and protected areas 32. Referrals to other users
<p>Harvest Layout Phase</p>	<p>In this phase, information from items 2, 4-12, 14-19, 21-24, 26, and 28-32 of the preliminary harvest design should be verified or updated on the harvest layout map. This updated information is derived from extensive field work and referrals.</p> <p>In addition the harvest layout map should include the following information:</p> <ol style="list-style-type: none"> 1. Stream crossings to be constructed or retained for reforestation activities. 2. Detailed cutblock plans for sensitive cutblocks. 3. Campsite locations.
<p>Final AOP Submission</p>	<p>With the final AOP, a copy of the approved harvest layout map shall be included along with a completed TM118 Annual Operating Plan Form (or approve equivalent) and the tables or schedules with the following information summarized:</p> <ol style="list-style-type: none"> 1. Reforestation status of existing cutblocks within the harvest planning area. 2. List of the cutblocks proposed for harvest with estimated volumes of timber by species type and the area of each cutblock. 3. List of roads including all Class I to IV to be used with LOC numbers.

	<ol style="list-style-type: none">4. List of proposed crossing structures, their type and location.5. List of crossing structures to be retained for use during reforestation.6. Sensitive cutblocks with detailed cutblock plans.7. Cutblock reforestation responsibility (i.e. conifer, deciduous and mixedwood).8. Cutblocks requiring erosion control and reclamation.9. Trapper concerns.10. Season of harvest for each cutblock.11. Campsite location.12. Cutblocks where understories will be protected.13. Forest Protection Supplement.14. Grazing operator concerns.15. A Road Management Plan.16. A list of concerns identified from the referrals and a description how the concerns have been mitigated.
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1.3 Detailed Cutblock Plans

Detailed cutblock plans may be requested in areas where better than normal protection is required on sensitive or complex sites. The type and level of information required will depend upon the nature of the concern, and the complexity or sensitivity of the site. Sites that should be considered for detailed cutblock plans include:

- cutblocks located in areas of rough topography with unstable and/or erodible soils;
- cutblocks with sustained slopes greater than 30 percent;
- cutblocks with high drainage densities or those containing water-source areas;
- cutblocks adjacent to, or with drainage into, identified critical fish-spawning habitat;
- cutblocks requiring special understory protection;
- cutblocks located in identified important wildlife areas;
- cutblocks located next to high-value recreation or tourism areas/facilities, municipalities, public/private facilities, high-use trails, lakes or rivers, or areas of high aesthetic value;
- cutblocks located in watersheds managed for water production and control; and
- cutblocks beside Natural Areas or Ecological Reserves.

Detailed cutblock plans may include any or all of the following information, depending upon the sensitivity or complexity of the site.

1. A map (1:5000 scale) showing:
 - location of roads, landings and spur roads (including location of roadside decks, landings and sorting areas for integrated operations);
 - skid trails and skidding direction;
 - classification and location of streams;
 - location and type of watercourse crossings;
 - location of springs, seepages and water-source areas;
 - location of steep slopes, and unstable and erodible soils;
 - location of protective buffers for watercourses, wildlife habitat features or other important areas/facilities; or
 - location of coniferous understory requiring protection.
2. A brief harvest, reforestation and reclamation prescription that includes some or any of the following:
 - pertinent stand and site description;
 - a description of how resource conflicts/concerns will be mitigated;
 - a brief description of how the site will be harvested, reforested and reclaimed with a proposed schedule; and
 - where detailed cutblock plans are required for understory protection, the techniques and methods that will be used to protect the understory.

1.4 Watercourse Crossings Description

Where bridges or large culverts are required to cross permanent streams, detailed drawings of the designs may be requested as part of the AOP. Plans for all crossings on permanent streams shall be referred to the Fish and Wildlife Services before they are approved.

2.0 FOREST PROTECTION SECTION

2.1 Prescribed Silvicultural Burns

Where a site is to be treated with prescribed fire for reforestation site preparation, a detailed plan as outlined in the Prescribed Burn Manual shall be prepared for those cutblocks identified in the AOP and

submitted with the Preliminary Harvest Design.

2.2 Fire Control Plan (Supplement)

Where logging debris disposal or slash hazard reduction by burning is proposed, a detailed burning plan shall be submitted with the preliminary harvest design submission, and shall include information about:

- the terrain, watercourses and fuel types;
- the location of cutblock boundaries, roads, landings and skid trails; and
- the burning and control prescription for each cutblock.

Disposal by burning of top, landing debris and access piles does not require an approved prescribed burn plan provided the following criteria are met:

- The Forest Protection Supplement or the Annual Operating Plan (TM 118 A) is completed and approved for all timber dispositions; or
- A letter is signed by the local Forest Protection Officer or his designate approving the burn prescription time line; and
- Land and Forest Services is notified, before ignition, on the day of the burn that the project is to proceed.

During the fire season, a fire permit is required to dispose of debris by burning.

2.3 Insect, Disease and Damaged Timber Management Plan

2.3.1 Major Insects and Diseases of Standing Timber

The following insects and diseases are known to have a significant impact on forests in Alberta:

- spruce budworm (*Choristoneura fumiferana*);
- jackpine budworm (*Choristoneura pinus*);
- mountain pine beetle (*Dendroctonus ponderosae*);
- spruce beetle (*Dendroctonus rufipennis*); and
- dwarf mistletoe (*Arceuthobium americanum*).

When these species are present in abnormally high populations within the proposed harvest areas, the Forest Protection Officer must be consulted during development of the AOP. The following information and management strategy (gathered and developed by the LFS in cooperation with the timber operator) is to be included with the preliminary harvest design:

- a map or aerial photograph of appropriate scale showing the infested/infected areas (provided by LFS);
- a description of damage, causes and future implications (assessed by the timber operator and LFS); and
- a description of proposed treatments, modifications to the harvest areas, and sequence and operational precautions (proposed by the timber operator in consultation with LFS).

2.3.2 Blowdown, Severe Hail Damage, Broken Tops and Fire Damage

When the proposed harvest areas have blowdown, severe hail damage, broken tops or fire damage, the Forest Protection Officer for the Forest must be consulted during development of the AOP. These stand conditions are often associated with bark beetle outbreaks, and it is important to assess the stand before designing the harvest layout.

Where these conditions are found, the following information and management strategy (gathered and developed by LFS in cooperation with the timber operator) is to be included with the AOP:

- a map or aerial photograph of appropriate scale showing the damaged areas and severity (provided by the AFS); and
- proposed modifications to the harvest areas (timber operator in consultation with LFS).

2.3.3 Armillaria Root Rot

Armillaria (Armillaria spp.) can cause significant tree mortality in young regenerated stands. Therefore, infected areas must be mapped and the map attached to the AOP. Blowdown and stand openings are often caused by Armillaria root rot. The mapped information will be used for reforestation planning and young stand management.

2.3.4 Insect and Diseases Causing Reforestation Problems

The presence of the following species should be noted in the AOP for each proposed harvest area:

- Warren rootcollar weevil (*Hylobius warreni*);
- comandra blister rust (*Cronartium comandrae*); and
- western gall rust (*Endocronartium harknessii*).

3.0 THE SILVICULTURE COMPONENT OF THE ANNUAL OPERATING PLAN

The timber operator shall state the silvicultural system (strategy) to be used in the disposition, and the reforestation tactics for each cutblock to be harvested during the operating period, in the silviculture component of the annual operating. This component shall also include the following information.

1.0 Silviculture System:

The silvicultural systems under which the next timber crop will be re-established:

- Even-aged Cutting systems: clearcut; release cut; seed tree; shelterwood; or sanitation or preparatory cut.
- Uneven-aged Cutting Systems: group selection; and single tree selection.

2.0 Reforestation Tactics:

For each cutblock in the disposition, the specific reforestation choice of tactics or combination of tactics are:

- a. leaving for natural reforestation (seed)
- b. leaving for natural reforestation (root suckering);
- c. scarifying and leaving for natural seeding;
- d. no site preparation and artificial seeding;
- e. site preparation combined with artificial seeding;
- f. no site preparation combined with planting;
- g. site preparation and planting;
- h. post-harvest surveying and subsequent tactics; or
- i. other (specify).

3.0 Inclusions

The silviculture component of the AOP shall include a map with the following information (or presented on the final AOP map):

- all cutblocks to be treated; and
- all roads and stream crossings to be constructed or used (designating their season of use).

4.0 THE ROAD MANAGEMENT SECTION

The Road Management Section shall identify the roads and stream crossings that will be constructed, their

life expectancy and their maintenance schedule. Roads that will be retained for reforestation use, and those to be abandoned and reclaimed, must also be identified. A reclamation schedule for abandoned roads is to be provided.

The Road Management Section shall include maps, schedules or tables with some or all of the following, as required:

1.0 A 1:15 000 scale map showing:

- all roads to be constructed and all existing roads to be used (including all LOC roads);
- the "as-built" location of temporarily abandoned Class IV permanent roads to be used for reforestation access;
- the class of road;
- all stream crossings (including type, size and an inventory identification for follow-up monitoring);
- where access control is required, the proposed locations and method of vehicle access control; and
- identified erosion and mass-wasting areas on abandoned roads, road cuts and streambanks.

2.0 A schedule, cross-referenced with the map, showing:

- the proposed tenure of road and stream crossings;
- a proposed schedule for inspections;
- an inventory of maintenance work to be completed on actively used roads;
- a list of roads and stream crossings to be either temporarily or permanently abandoned;
- an inventory of stream crossings to be maintained on temporarily abandoned roads;
- an inventory of roads to be retained for reforestation access;
- a description of problem areas and an inventory of reclamation work required;
- a schedule of proposed activities to reclaim damaged, soils and abandonment and/or reclamation of roads and stream-crossing structures; and
- a summary and status of work completed in the past year.

5.0 THE FOREST RESOURCES INTEGRATION SECTION

Timber operators are expected to consult with those people who may be directly affected by harvest operations in areas in or bordering the timber disposition. The intent is to ensure the timber operator has made a reasonable effort to resolve any conflict caused by his proposed harvest operations.

This section shall contain:

- a. a description of how and when AOPs were referred to trappers affected by the proposed harvest operations, their concerns and how the AOP has addressed these concerns;
- b. a description of referrals, conflicts and resolution of other resources and activities that may be directly affected by the proposed harvest operations; and
- c. a fish and wildlife checklist that describes how the design of the AOP and implementation of the harvest operations meets the fish and wildlife requirements identified in the Cruise Report.

The timber operator may be requested to provide proof that he has contacted other resource users to determine their concerns.

APPENDIX 3 - Fish and Wildlife Checklist

The disposition holder should complete and submit this checklist along with the Preliminary Harvest Design. The purpose is to demonstrate how the harvest design satisfies the fish and wildlife requirements identified in the Cruise Report. It is not a request for the disposition holder to collect wildlife and fisheries data. The checklist is an important component of AOP preparation that will help to integrate fish and wildlife resource management with forest management. Alternative formats may be used where agreed to by the Habitat Biologist/Technician.

- 1. Do stream-crossing structures satisfy upstream fish passage requirements? ____
- 2. Will instream work avoid resident fish migration, spawning and incubation periods? Yes No

If you answered "No", what precautions are planned to minimize the extent and duration of instream activities, and avoid stream sedimentation?

- 3. Have locations of mineral licks been identified to the Habitat Biologist/Technician? Yes No
Note: lick locations should not be shown on AOP maps.

- 4. How will areas be managed that are near licks and springs which have direct drainage into creeks?

- a) Buffer size: _____
- b) Other management: _____

- 5. If timber harvesting is proposed in floodplain areas, what special actions will be taken to enhance wildlife habitat and maintain watershed and fisheries values?

- 6. In cutblocks with areas exceeding 150 m from winter hiding cover, what measures have been incorporated to improve wildlife habitat?

- 7. On the AOP map, identify areas to be managed as wildlife travel corridors, as described in the Ground Rules.

- 8. Has a special cutblock design been used along permanent roads? If so, what are the cutblock numbers?

- 9. In ungulate zones, will operations avoid disturbance during the critical late winter period (i.e., January 1 to April 30). Yes No

If you answered "No", what procedures will you follow to minimize or localize access and disturbance?

Appendix 3

10. For second or third-pass logging in ungulate zones, identify stands on the AOP map that will satisfy the need for ungulate thermal cover after timber is removed from the area.

11. Will the harvest and reforestation operations allow for retention of snags while still maintaining worker safety? Yes No

On the AOP map identify areas with high concentrations of snags or very large snags (i.e., 50 cm dbh).

If snags are not being left, how will tree management be carried out to maintain/enhance habitat for cavity-dependent wildlife species?

12. In deciduous areas, identify locations on the AOP map where understory protection is being used for thermal cover enhancement (See Section 4.3.2 Guideline 2).

13. On the AOP map identify the areas of mature/overmature forest being managed for old forest wildlife. If active management of these areas is proposed, describe proposed activities.

14. Have access closure locations been identified on the AOP map? Yes No Not Required

15. If "special" wildlife habitat zones have been designated in the AOP area, provide a map (1:5000) of the location and describe special design and harvest measures proposed.

Checklist completed by: _____