

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.
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.

2.1.3 Caribou Zone

Objective:

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

Standards:

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.

2.1.4 Floodplain Zone

Objective:

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

Standards:

Outside designated watercourse protection buffers, forest harvest proposals on flood plains 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 cut blocks within larger stands should be considered in the flood plain 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.

2.1.5 Special Wildlife Habitat Zone

Objective:

To provide a framework for the special management of special habitat for any wildlife species.³

2.2 Timber Harvesting in 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.

Standards:

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.

2.3 Timber Harvesting and 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).

Standards:

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.

Part 3: Managing Timber for Sustained-Yield

3.1 Timber Harvest Planning for Sustained Yield

3.1.1 Timber Harvest Planning Guidelines

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.
3. 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.
4. 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;
5. 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.

3.1.2 Utilization Standards

Objectives:

To develop harvest designs that make full use of all merchantable

timber from stands that meet or exceed the minimum applicable utilization standards.

Standards:

All timber harvest operations shall be planned and conducted according to the utilization standards specified in the timber disposition, which are described as follows.

1. Coniferous Utilization Standards

(a) 15/11 Utilization

- (1) Merchantable Coniferous Stand: one where the net merchantable volume of trees in the stand is 50 m³ per ha or greater. (See also Standard 1.1.3.1)
- (2) 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).
- (3) 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 50 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

- (1) Merchantable Stand: one where the net merchantable volume in a stand of trees is 30 m³ per ha or greater. (See also Standard 1.1.3.1)
- (2) 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.
- (3) 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.

2. 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 Standard 3.1.3.1)
- (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.

3.1.3 Designing Harvest Layouts

Objective:

To develop a harvest layout design that:

- provides for a balance of timber volume and quality;
- is based on stand, site and resource assessments;
- uses appropriate harvest technology;
- is compatible with the silvicultural requirements of the species to be reforested; and
- 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. 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.
3. Spruce Cutblock Size: Cutblocks in spruce timber may be cleared 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.

4. 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 3.1.3.2 and 3.1.3.3 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 3.1.3.2 and 3.1.3.3.
5. 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.
6. Stream protection buffers shall be retained along watercourses as prescribed in Subsection 1.2. (See Appendix A, Table 2.)

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.¹
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 3 m 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 tree 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.

3.1.4 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.

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.

3.1.5 Planning Harvest Designs for Reforestation

Objective:

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

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.

3.1.6 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 shall be assessed during stand assessments and development of the reforestation plans.

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.

3.2 Timber Harvest Operations

3.2.1 Timber Harvest Operations and Piece Utilization

Objective:

- 1 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 Merchantable trees shall be felled, skidded, decked and handled so that waste of merchantable timber is avoided.
- 2 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.
- 3 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.
- 4 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.
- 5 Breakage or mechanical damage to merchantable logs shall be kept to a minimum.
- 6 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.
- 7 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.)
- 8 Logs that are too long for transport shall be bucked into merchantable log lengths.

3.2.2 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., felling, 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:

Where understories are to be protected, cutblocks should be designed

and operated to minimize the risk of blowdown to understory trees.

3.2.3 Protection of Forests From Wildfire During Harvest Operations

Objective:

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

Standards:

- .1 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 dacked, 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.

- .2 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.

¹ For other standards and guidelines that apply to watershed protection, see Subsection 2.1.1.

² See summarized standards and guidelines for operating beside watercourses, water-source areas and lakes in Appendix A, Table 2.

³ For more standards and guidelines that apply to watercourse crossings, see Subsection 2.1.1

⁴ Other standards and guidelines that apply to the protection of fish habitat are found in subsections 1.2, 1.3 and 1.4.3

⁵ 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.

⁶ For more standards and guidelines that apply to harvest layout design, refer to Subsections: 1.2, 1.4 and 1.5 for environmental considerations; and Subsections: 2.1, 2.2, 2.3 for multiple-use and resource integration considerations.

⁷ For more standards and guidelines that affect timber harvest operations, see Subsection 2.1.

Watercourse Classification

Table 1

Watercourse Classification	Mapping Designation	Physical Description	Portion of Year Water Flows	Channel Development	Fish and Wildlife Concerns	Land Use Impact
Large Permanent	* Solid heavy line or double line	* Major streams or rivers. * Well defined flood plains. * Valley usually exceeds 400 m in width.	* All year.	* Unvegetated channel width greater than 5 m.	* Resident fish populations. * Important over-wintering habitat. * Important feeding and rearing habitat.	* Water quality often reflects all upstream land use impacts and natural processes. * Primarily sedimentation of stream channels.
Small Permanent	* Usually solid although some are heavy broken lines.	* Permanent streams. * Often small valleys. * Bench (floodplain) development.	* All year but may freeze completely in the winter.	* Banks and channel well defined. * Channel width 0.5 m to 5 m.	* Significant insect populations. * Important spawning and rearing habitat for many fish populations. * Overwintering for non-migratory species.	* Primarily sedimentation of stream channels. * Water quality. * Fish populations sensitive to siltation. * Loss of streambank fish habitat.
Intermittent	* Usually broken light line. * Should be identified on the ground.	* Small stream channels. * Small springs are main source outside periods of spring runoff and heavy rainfall.	* During wet season or storms. * Dries up during drought.	* Distinct channel development. * Usually channel is unvegetated. * Channel width to 0.5 m. * Some bank development.	* Food production areas. * Potential spawning for spring spawning species. * Drift invertebrate populations in pools and riffles.	* Sedimentation from bank and streambed damage will destroy fish habitat downstream.
Ephemeral	* Not normally mapped.	* Often a vegetated draw.	* Flows only during or immediately after rainfall and snowmelt.	* Little or no channel development. * Channel is usually vegetated.	* Siltation may impact fish habitat.	* Sedimentation downstream due to ground disturbance.
Water-source Areas (except muskegs)	* N/A	* Areas with saturated soils or surface flow. * Scaepages.	* All year. * May or may not freeze in the winter.	* N/A	* Potential high value to fall spawning. * Potential high-use areas for terrestrial wildlife.	* Disturbance may cause stream sedimentation. * Interruption of winter flow may disrupt fish egg incubation.
Lakes	* Solid line outline a waterbody. * Reserved areas will be noted on referral map.	* Large water collection areas permanently filled with water.	* Normally frozen in the winter.	* N/A	* Important fish-bearing habitat.	* Aesthetic values may be disrupted. * Potential for wildlife disturbance. * Local sedimentation.

Appendix A

Standards and Guidelines for Operating Beside Watercourses

Table 2

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 within 60 m of the high-water mark or from water-source areas within that buffer. May be permitted within 60-100 m of the high-water mark. 	<ul style="list-style-type: none"> No disturbance or removal of merchantable timber within 60 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 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 60 m is approved, no machinery is to operate within 20 m of the high-water mark. Timber within 20 m shall be removed by winching or other means such that the machine stays outside of the 20 m 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. 	<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 30 m is approved, no machinery shall operate within 20 m 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 20 m 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 from water-source areas within that buffer. 	<ul style="list-style-type: none"> Buffer of brush and less vegetation to be left undisturbed along the channel. Width of buffer will vary according to soil conditions, water-source areas and fisheries values. Treed buffer is not required unless specifically requested. 	<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 a 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, structures 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 watercourse or a water-source area. 	<ul style="list-style-type: none"> Buffer of lesser vegetation in wet qualities to be left undisturbed. 	<ul style="list-style-type: none"> Large accumulations of slash or debris progressively be removed. 	<ul style="list-style-type: none"> Random skidding through watercourse permitted only during frozen or dry ground periods. Temporary crossings are to be removed on completion of operations.

Table 2 (Continued) Standards and 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
Lakes (little or no recreation, waterfowl or sport fishing potential)	<ul style="list-style-type: none"> Not permitted within 100 m of the high-water mark. 	<ul style="list-style-type: none"> On lakes exceeding 16 ha in area, there will be no disturbance 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 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 20 m of the high-water mark.
Lakes (with recreation, 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. 	<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 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 for 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 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 disturbance, 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 road areas, unless a separation layer is incorporated or the road is on 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.

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.

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.

Department, The: The Department of Environmental Protection

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.

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.

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.

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.

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:

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

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 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 Operator: The person responsible for controlling timber harvest planning and operations and those persons working on his behalf.

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 year.

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.
