Code of Practice
For Timber Management Operations
In Riparian Areas

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The area where land and water meet is called the riparian zone. It is a transition zone, containing elements of both upland and aquatic ecosystems. Because of this, it is the most productive environment in the forest.

A. INTRODUCTION

A primary objective for forest management practices in the vicinity of water bodies is to minimize soil and site disturbance and that is the intent of this code. The careful choice and implementation of harvest and renewal practices, as part of day-to-day operations, will minimize the occurrence of erosion and the potential for eroded material to enter nearby lakes and streams (sedimentation). (see Endnote 1)

This code of practice was developed as a result of a need identified by MNR and MOE to expressly protect water quality. Therefore, the objective of this code is to protect water quality through describing good, on-the-ground forest management practices that are to be undertaken in riparian areas. This code is to be used in conjunction with the “Timber Management Guidelines for the Protection of Fish Habitat” and the Fisheries Branch Policy FI .3.03.01. Riparian areas are those areas surrounding the waters which are identified in the Fisheries Branch Policy (Figure 1).

Figure 1. *The Code of Practice is to be used in conjunction with the "Timber Management Guidelines for the Protection of Fish Habitat", and applies to all headwater lakes, lakes greater than 10 ha or which possess significant fisheries values, permanent streams and intermittent streams which provide spawning habitat for fish.*

The practices, which are described in this code, are to be applied to all planned and approved harvest and renewal activities in riparian areas. They set out, with respect to the protection of water quality, how operations are to be conducted. These practices are to be followed during the implementation of the activities. Therefore, the primary audiences for this code are the local forester, local forest technician, area supervisor and the machine operator.

Permanent Stream

Intermittent Stream

Factors such as slope, soil characteristics, vegetative cover, season of operation and equipment should all be considered when operational decisions are made. It is realized that since site conditions vary, some flexibility in using the code is necessary (Figure 2). The choice of the operational practice must also consider equipment availability, safety factors, economics, and environmental concerns not directly related to water quality.

Figure 2. *Flexibility in using the Code is necessary. Slope, soil characteristics, vegetation cover, season of operation, equipment availability, safety factors, economics, and environmental concerns must all be considered when operational decisions are made.*

Sensitive riparian areas are those sites adjacent to water bodies, which are steeply sloped and prone to soil erosion and soil compaction.

This code of practice is essentially based on "common sense" and the application of professional expertise which has been gained through practical experience. The practices are simply expressed so that clear, on-the-ground instructions can be given to equipment operators.
The objectives of the practices are to avoid areas of high erosion risk and to avoid excessive exposure of mineral soil and excessive soil compaction.

B. THE CODE

1. SLOPE

Harvest and renewal equipment must be used in such a way as to minimize the removal of residual vegetative cover and to avoid excessive exposure of mineral soil on steep slopes in order to prevent the establishment of erosion channels.

Discussion

As indicated in the Timber Management Guidelines for the Protection of Fish Habitat, the potential for soil erosion increases with increasing steepness of slope. Consequently, operations on steep slopes must be conducted with particular care.

Slopes over 40% are generally inoperable with conventional equipment. Slopes between 10% and 40% pose a relatively high potential for the entry of eroded material into a water body if the surface organic layers are removed.

When operating on these slopes, measures designed to reduce the risk of erosion should be taken (Figure 3), such as:

- using extra-long winch cables
- careful selection of skid trail location or locations
- skidding along the slope contours where safety allows
- avoiding repeated use of the same skid trail
- following slope contours when using heavy site preparation equipment.

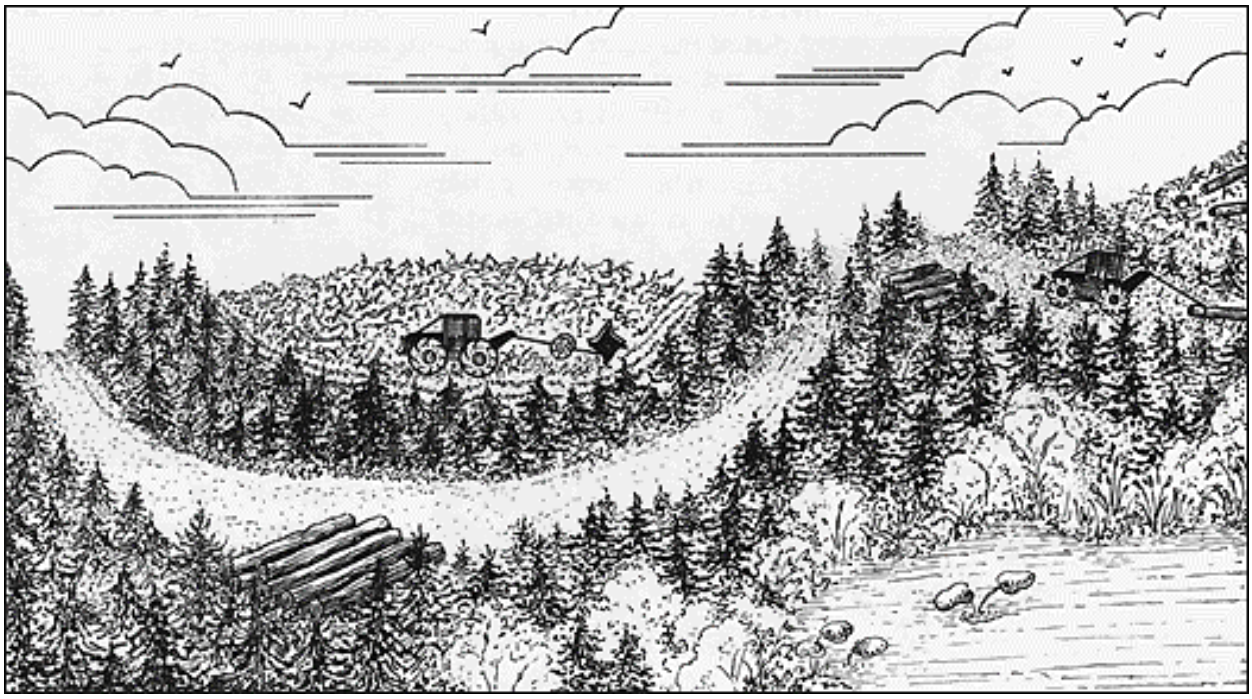

Figure 3. *Soils on slopes between 10% and 40% are sensitive to erosion. Careful selection of skid trail location and operating equipment along slope contours reduces the impact of erosion and sedimentation.* Slopes less than 10% pose less erosion potential. Nevertheless, operations on these slopes should also be carefully conducted so as to maintain the residual vegetative cover and surface organic layers.

2. SOIL

Soil texture and moisture must be considered in carrying out operations. Activities that cause excessive exposure or compaction on erosion-prone soils or on soils that are prone to compaction, must be avoided.

Discussion

Fine-textured soils, and fine sands are prone to erosion if exposed to wind or water by the removal of surface organic layers. Excessive exposure of these soils must be avoided.

Soil moisture also influences the choice of operational method. Wet soils and fine-textured soils are more susceptible to disturbance (e.g. rutting) than dryer, medium or coarse soils.

Soil compaction is a function of soil texture and moisture as well as the type of equipment and amount of repetitive travel. Fine-textured soils are more prone to compaction than coarse textured soils. Therefore, care must be exercised during operations on fine soils. The greatest compaction occurs on skid trails and may result in concentration and channelization of run-off. Severely disturbed or compacted soil may interrupt soil moisture movement and thereby affect the success of renewal operations.

3. SEASON OF OPERATION

Equipment that is appropriate for the season must be used on sites that are susceptible to rutting and compaction.

Discussion

Season of operation is critical under certain combinations of soil and slope characteristics. On sites which are susceptible to rutting and compacting, summer logging requires use of high flotation equipment. Use of standard equipment on poorly drained sites, that may be susceptible to rutting and compaction, should be limited to dry periods or frozen ground. Operations during extremely wet periods of the year may also cause rutting on some fine-textured soils and must therefore, be avoided.

4. EQUIPMENT

Equipment type and function are necessary considerations when choosing the equipment which is to be used in riparian areas. Careful practice by machine operators to avoid site damage must be employed when operating in the vicinity of water bodies.

Discussion

Harvesting and renewal equipment and operating methods vary across the province. Careful practice by responsible machine operators is the key factor in preventing site damage in all operations in the vicinity of water bodies. Poor operating practices increase the potential for site damage especially on sensitive sites.

The selection of equipment and systems is based on local site conditions. If the appropriate machinery is not available at the stipulated time of year for the existing terrain conditions, or should operations become too costly, a decision not to permit operations or to postpone them should be taken. High flotation harvesting equipment should be used on unfrozen ground on sites where erosion, rutting and compacting potential is high *(Figure 4)*. The use of normal, rubber-tired machinery on these sites should be limited to dry periods of the year or in winter after adequate freeze-up. Heavy equipment used for renewal should be used in acceptable patterns (e.g. following slope contours) and on sites not prone to erosion and compaction. Careful use of lightweight site preparation equipment may be acceptable on sensitive areas.

Figure 4*. Fine textured soils, and deep, wet organic soils are more prone to soil disturbance than other soils. High flotation harvesting equipment should be used on sites where the potential for erosion, rutting, and compaction is high.*

5. OTHER

The following specific practices are to be followed:

a) Trees must not be felled into water bodies at any time of year. No debris of any description is to be deposited in water bodies (Figure 5).

b) No logging debris is to be left on the banks of streams, rivers or lakes.

c) Trapline trails and portage routes used for recreational purposes should be rehabilitated and cleared of logging debris following timber operations. [Amended consistent with Term and Condition 76 in the Decision of the Environmental Assessment Board for the Class Environmental Assessment by the Ontario Ministry of Natural Resources on Timber Management on Crown Lands in Ontario, released April 20, 1994.] (see Endnote 2)

d) Equipment operating adjacent to water bodies shall not cause destruction or slumping of banks.

e) Equipment is not to travel within streams or rivers during harvest or renewal operations so as to cause damage to banks or beds. Stream crossings are to be kept to an absolute minimum.

f) Establishment of tertiary roads within riparian areas is only permitted in exceptional cases, where no reasonable alternative exists.

Figure 5. *Fell trees away from water to avoid debris loading. The use of extra-long winch cables allows the surface vegetation to remain intact, an important consideration on sensitive soils.*

g) A narrow filter strip of approximately three metres of undisturbed forest floor or vegetation (not necessarily tree species) is to be left on the banks of water bodies except where necessary to cross a stream *(Figure 6)*.

h) Equipment is not to be refueled or lubricated in riparian areas. Gasoline and oil for such equipment are not to be stored in riparian areas *(Figure 7)*.

Figure 6. *Forest operations have left a minimum 3 metre filter strip of undisturbed vegetation along the shore to serve as a protective barrier and filter from upslope activities.*

Figure 7. *Equipment maintenance (refueling, lubricating, washing, etc.) should be undertaken on stable soil away from riparian areas. The greater the distance from the watercourse, the more opportunity harmful substances have to break down.*

C. IMPLEMENTATION

The responsibility for implementing this code rests with the industry or Crown forestry staff. In the case of the Crown, it will be the local area forester. Some of the practices, where appropriate or where warranted, must appear in the Forest Management Plan, or as a special condition in the harvest approval document. The actual on-the-ground practice is in the hands of the equipment operator. The forester and the equipment operator must jointly carry out the operations in riparian areas so as to protect water quality. Training and communication of the objectives and good practices are the responsibility of company staff and the Crown forester. The MNR will undertake to conduct training sessions for staff, or joint sessions with company staff, on this topic and produce a booklet for educational purposes.

D. MONITORING AND ENFORCEMENT

Practices in riparian areas will be monitored regularly for compliance by the area inspector as part of the inspection of harvest and renewal operations. Should water quality be adversely affected, the normal enforcement process will occur through application of relevant legislation which includes: *the Lakes and Rivers Improvement Act, the Water Resources Act, the Crown Forest Sustainability Act, the Fisheries Act,* and *the Environmental Protection Act*.

E. SUMMARY

When operations are conducted in riparian areas, the factors of slope, soil characteristics, vegetation, season and equipment type must all be considered. They cannot be considered separately as all are interrelated. The results of the operations must be to minimize site damage.

Practical standards of conduct that are easily learned will prevent, in conjunction with the "Timber Management Guidelines for the Protection of Fish Habitat" and the Fisheries Branch Policy, erosion and sedimentation of waterbodies.

Endnotes

1. A Manual entitled "Environmental Guidelines for Access Roads and Water Crossings" provides comprehensive and specific direction with respect to practices during the consturction and maintenance of access roads.

2. Term and Condition 76 (T & C 76) of the EA Board's Decision on the Class Environmental Assessment of Timber Management states:

   "MNR shall provide in the Code of Practice for Timber Management in Riparian Areas, that operators ensure that trails used for accessing and working traplines and portage routes used for recreational purposes be rehabilitated and unobstructed following timber operatons. MNR and operators shall consult with affected trappers and recreationists prior to operations in order to identify such trails and portages".

   The recently approved Forest Management Planning Manual (FMPM) provides direction on public consultation, including consultation related to T & C 76, as part of the planning process (page A-148). Appendix II of the FMPM provides direction on identifying trapline areas and recreational trails such as portage trails on values map(s) for the management unit.

By using skill, knowledge, sound judgement, and common sense, these vital resources can be protected for their own benefit and the benefit of all those who use and enjoy a healthy forest resource.