

ABORIGINAL FOREST LAND MANAGEMENT GUIDELINES

A COMMUNITY APPROACH

[A Working Document]

**Prepared for
The National Aboriginal Forestry Association**

by

**Peggy Smith, R.P.F.
Grant Scott, R.P.F.
Garry Merkel, R.P.F.**

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Preface

This document was made possible by financial support from the Canadian Forest Service of Natural Resources Canada and Indian Affairs and Northern Development Canada, the advocacy and organizational support of the National Aboriginal Forestry Association (with the special support of Harry Bombay, Executive Director), the technical review carried out by individuals from Aboriginal communities, forest companies, forestry schools and government departments across Canada, and the accumulated experience of the consulting team, Mr. Garry Merkel, R.P.F. (B.C.), Ms. Peggy Smith, R.P.F. (Ontario) and Mr. Grant Scott, R.P.F. (B.C.).

These *Guidelines* are the first of their kind in Canada. They are intended to be a tool to support the improvement of forest management practices on forest land used by Aboriginal peoples. The document is not intended to resolve the intense debate on development versus the environment, but hopefully these *Guidelines* will provide Aboriginal communities with an understanding of good forest management practices and point the way to responsible community decision-making about forest use and management. This is a working document, meant to be reviewed and improved as we learn from our collective and local experience. We hope that you who use these *Guidelines* will:

- thoroughly review the document,
- modify it for your local forest land management environment,
- use it as a basis for your forest planning and management, and
- provide us with suggestions for improvement so that we can incorporate them in future versions.

This is an evolving document that will someday reflect the collective understanding and experience of Canadian Aboriginal groups with respect to forest land planning and management. It is our hope that these *Guidelines* will take us a step closer to a standard of land care that contributes to continued survival of all species.

Good fortune and understanding with your efforts.

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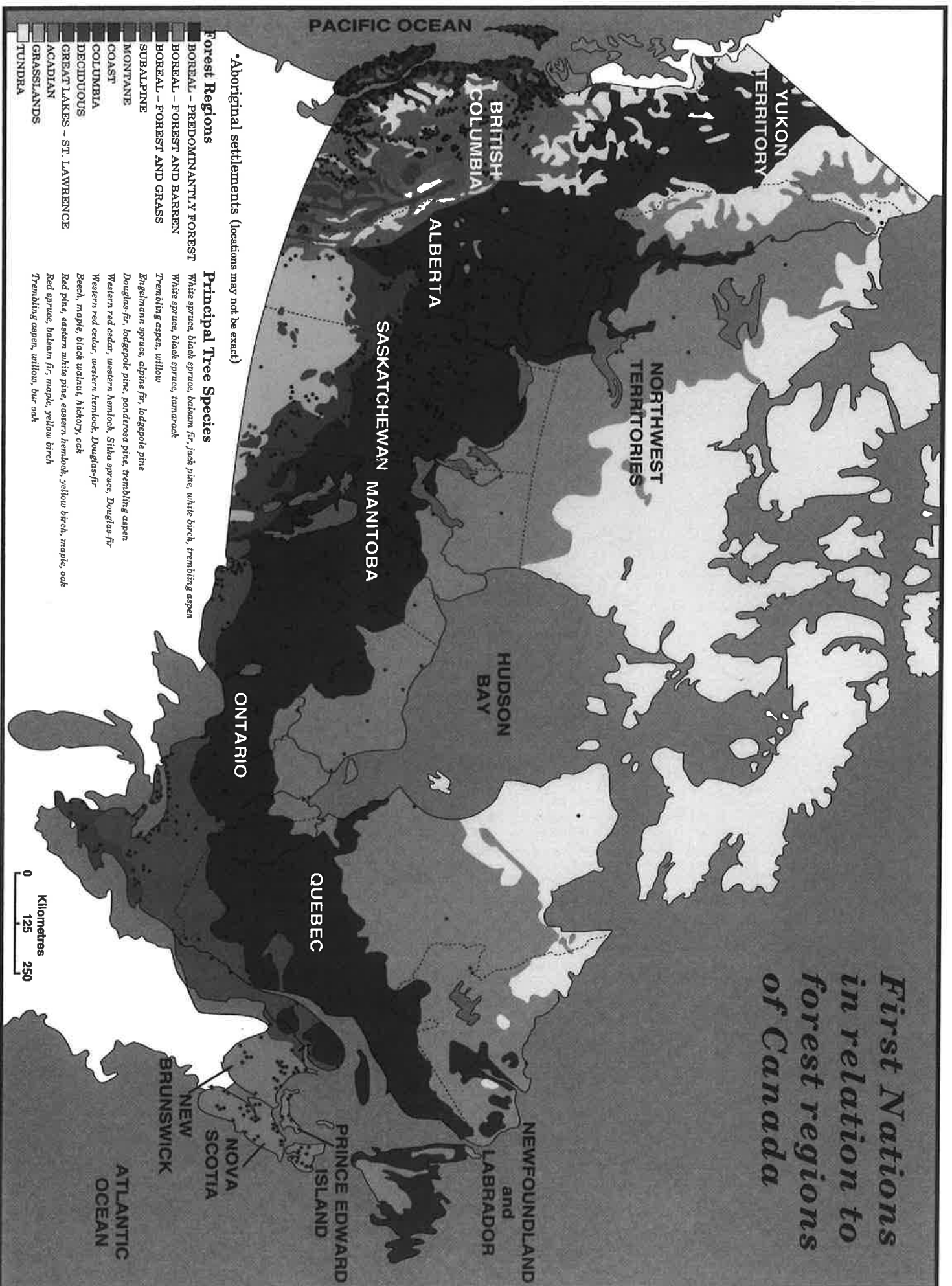
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Thank you to the staff of First Nations Communications for our cover design, dividers and map. Randy Way, Steve Nevins, Lonnie Gallant and Gabe Ermatinger made up the crew who provided creative inspiration and hard work.

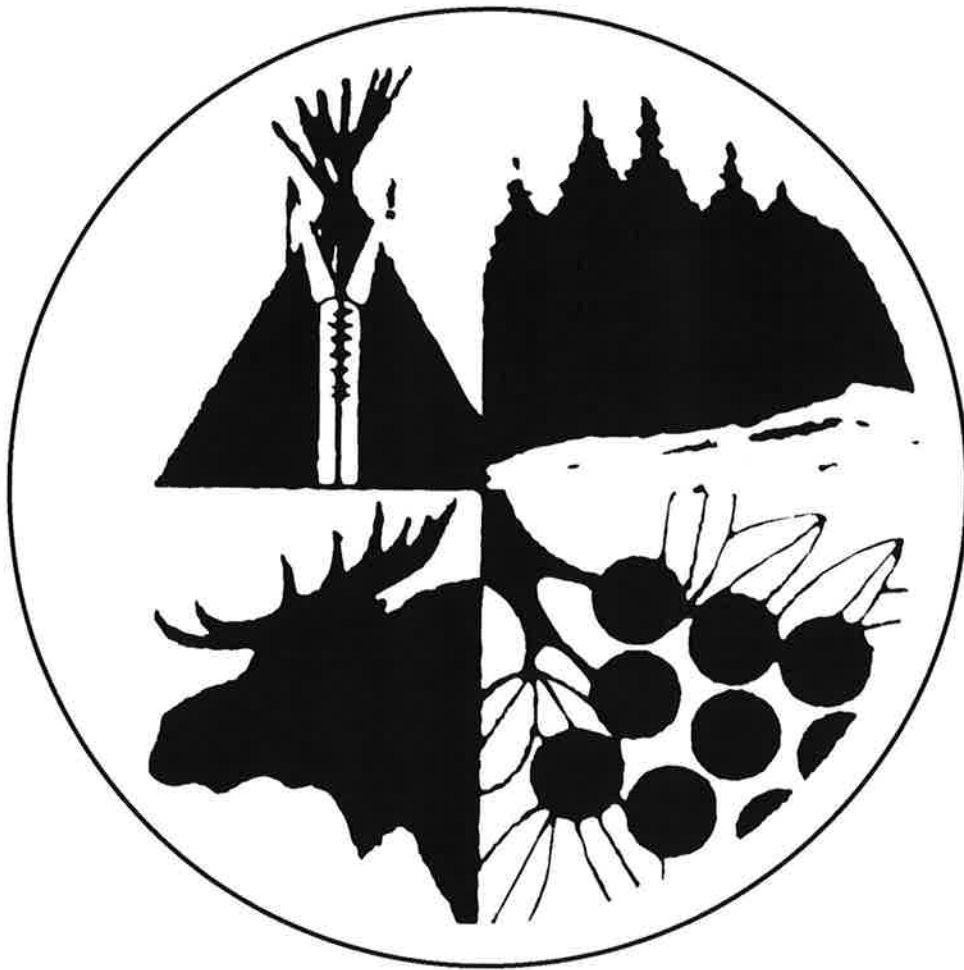
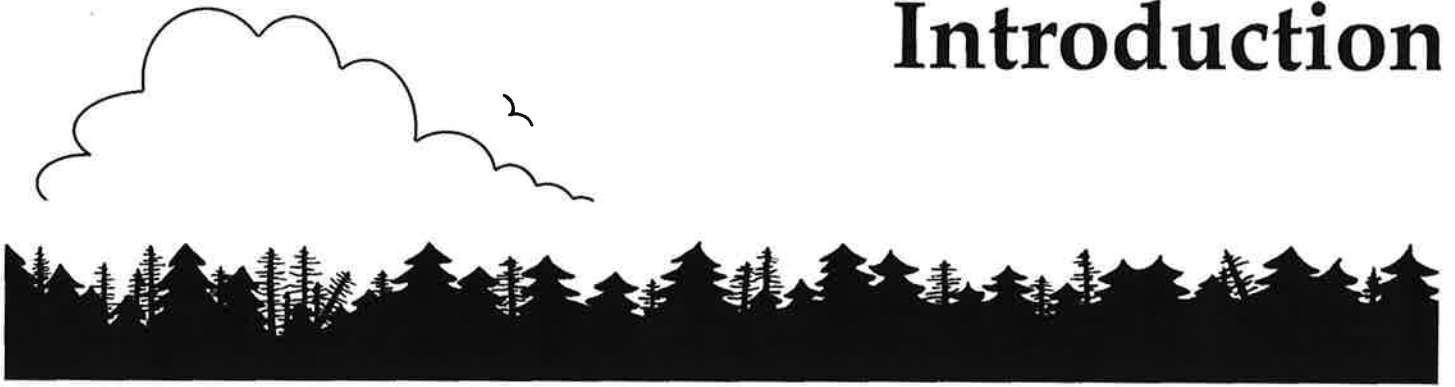
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First Nations in relation to forest regions of Canada



SOURCE: Canadian Forest Services and Indian & Northern Affairs Canada

Introduction



National Aboriginal Forestry Association

I INTRODUCTION

There are a great variety of forests in Canada, ranging from the Boreal forest with its spruce, pine, aspen and birch to the west coast rain forests, the eastern spruce forests and southern hardwood forests. Just as the forests are different and complex, so are the many Aboriginal communities in Canada (Figure 1). These Aboriginal forest land management guidelines (hereafter referred to as the "*Guidelines*") do not attempt to detail what should be done in each individual forest by each Aboriginal community. No one can define how a community will be involved with its forests, only the community can do this.

WHAT ARE ABORIGINAL FOREST LAND MANAGEMENT GUIDELINES?

These *Guidelines* are a tool developed by the National Aboriginal Forestry Association to help plan and carry out activities on forest lands used by Aboriginal peoples. The *Guidelines* outline those things that should be considered when planning and carrying out forest uses, including harvesting and renewing stands of timber, fish and wildlife management, range management, gathering, recreation and other forest-related activities such as spiritual ceremonies.

These *Guidelines* aim to outline a high standard of care for Aboriginal forest lands by describing ways for a community to:

- minimize the negative impact of human disturbances such as logging, cattle grazing, hunting and trapping, recreation and other uses, and
- renew and protect vegetation, wildlife, soil, water, spiritual, cultural, wilderness and other forest values.

These *Guidelines* are not a rigid set of standards. They are intended to provide a framework for Aboriginal communities to develop their own forest land management plan which will guide them in carrying out responsible forest land operations.

WHY DO WE NEED ABORIGINAL FOREST LAND MANAGEMENT GUIDELINES?

Forestry on Indian Reserve land has been governed by the *Indian Act* and administered by the federal government through the Department of Indian Affairs and Northern Development Canada, the Canadian Forest Service of Natural Resources Canada (formerly Forestry Canada) and various job creation programs. The *Indian Act* is inadequate because it covers only the issuing of logging permits; it does not take into account soils, plants, water, fish, wildlife and other forest values. The *Indian Act* also doesn't provide for the involvement of Aboriginal communities in deciding how and when their forests should be used. These *Guidelines* take into account all forest values to allow communities to protect the integrity of the forest while

using it for industrial and nonindustrial activities.

Aboriginal communities are assuming more responsibility for forest land management, both on and off-Reserve. These *Guidelines* will assist Aboriginal communities to practise environmentally sensitive, sustainable forest land management.

Over thousands of years Aboriginal people developed a way of life and spirituality based on respect for the land and all living things; these practices are still very much alive. Traditional knowledge and the respectful practices associated with this way of life can provide the roots for forest land management. These *Guidelines* attempt to recognize the use of traditional knowledge in forest land management.

These *Guidelines* can be used by Aboriginal communities to:

- establish a high and sustainable standard of forest land management for Indian Reserve land,
- encourage outside agencies (e.g., federal, provincial, industrial) to integrate their practices into a holistic forest land management framework,
- negotiate with provinces and forest industry companies a high standard of forest land management on traditional lands (Crown land) through land claims negotiations, joint ventures, licences, leases, stewardship contracts or other means, and/or
- demonstrate an acceptable forest land management planning model to negotiate forest land management programs or funding.

WHAT ARE THE *GUIDELINE* PRINCIPLES?

The following principles are the basis of these *Guidelines*:

1. Ensure that the community guides and accumulates wisdom about all aspects of forest land care.
2. Ensure that Aboriginal forest lands are protected and their management enhanced so as to optimize long term social, spiritual, environmental and economic values.
3. Ensure that forest land management embraces all parts of the forest, including plants, animals, soil, air and water, and all forest users.
4. Ensure that the diversity of Aboriginal communities as distinct societies with their own languages, cultures, values and customs is respected.
5. Be acceptable and optional to Aboriginal communities.

HOW TO USE THE *GUIDELINES*

- Read Chapter II, **Community Participation**, and plan how to involve your community in forest land management planning.
- Read Chapter III, **Administration**, and develop a proposal for your community on a structure to administer forest land management planning and implementation.
- Read Chapter IV, **Forest Land Management Plan**, to choose the steps to take to develop a forest land management plan for your community.
- Read Chapter V, **Inventories and Mapping**, which explains how to gather the information needed for sound forest land management decisions and begin to gather that information.
- Both the **Community Participation** and **Forest Land Management Plan** chapters discuss the importance of monitoring and evaluation. To improve forest practices and learn from experience, the community should establish a system of monitoring and evaluation which can be used to update and improve its forest land management plan.
- After the community has decided on what they want to do with their forest land (goals and objectives), read the **Forest Values** chapters (XIII-XVIII) for guidelines on managing particular forest values such as fish and wildlife, range, non-timber vegetation, recreation and timber harvesting and renewal.
- Read the **Forest Protection** chapters (VI-XII) and keep these environmental protection issues in mind while planning for forest use.
- Provincial forest land management guidelines and other important information sources are listed in the Reference section at the end and contact addresses and numbers are listed in the Appendices.

Community Participation



*Meeting at Eel Ground First Nation, N.B., October '95
- discussing future forest land
management for First Nations*



Photo by Peggy Smith



II COMMUNITY PARTICIPATION

Those who are closest to the land and experience the direct consequences of land use decisions should be the ones who are consulted first and last. By providing informed consent, community members will help to ensure that those who carry out forest land use activities care for the land properly. The community has a responsibility to see that the forest remains healthy and productive. This chapter describes the options for community participation in the modification, approval and monitoring of these *Aboriginal Forest Land Management Guidelines* (hereafter referred to as the *Guidelines*), the Forest Land Management Plan and forest land operations.

Community members must be involved at each step to direct forest care. Communal awareness, wisdom and accountability in forest land management will help build healthy and sustainable forests for future generations.

Community involvement should build understanding and commitment. Community members' knowledge and experience, with the assistance of professionals, can be used to define issues, develop common beliefs, articulate a vision and develop plans for forest land management activities. This may require team-building sessions to encourage working groups from the community to present their concerns. The general steps followed in most community-based planning are:

- learning and ownership,
- documenting beliefs,
- developing a vision,
- identifying goals,
- developing strategies and plans, and
- monitoring and updates.

Adequate time and money should be allowed for community involvement. It is often a slow and expensive process.

LEARNING AND OWNERSHIP

An extensive education program will provide the foundation for effective community participation. Community members need to know about community planning, forest land management and the forest operations and techniques that will be used.

The community must have a form of authority to ensure accountability for decisions made during planning. This might be encouraged by having a community vote or ratification of the Forest Land Management Plan and a community-based monitoring system. Many Aboriginal

communities may choose to use a consensus approach to decision-making which requires full discussion within the community until the community approves the approach. Rules may have to be developed to resolve conflicts, but in the end decisions should be made by the community, not imposed by outsiders.

DOCUMENTING BELIEFS

The community should approve in principle their common beliefs and how to document them. Some communities will write their beliefs in a Statement of Beliefs on which they all agree; other communities may choose to keep to an oral tradition. Some common beliefs may include:

- how people have seen their relationship to the forest in the past, how they see it now and how they would like to see it in future,
- what forest land management includes: for example, people, timber, range, fisheries, recreation, wildlife, acceptable and unacceptable forest practices,
- how much effort should be put into protecting forest values and sites from damage caused by fire, disease, insects and human use, especially sacred sites, and
- who should be involved in deciding how the forest is used at a broad planning level and at the day-to-day forest land operations level.

DEVELOPING A VISION

Based on the community's documented beliefs, the community should articulate a vision for forest land management. The vision should be sufficiently developed to create specific strategies and plans. This vision should include:

- how the community will use forest land, including how they will maintain and enhance traditional activities and beliefs,
- how the forest will be managed on behalf of the community,
- how decisions will be made,
- how the community will participate in each stage of planning and forest land operations,
- consultation with elders, and
- what the land will look like under their forest land management program.

IDENTIFYING GOALS

Goals are created by stating how the vision will be implemented. Goals establish what the community hopes to achieve, both in quality and quantity, through forest land management. These goals include traditional forest activities such as gathering plants for medicine and using

sites for spiritual ceremonies. The community should identify these goals through community meetings or workshops.

HOW TO ACHIEVE GOALS

Strategies are the means to achieve goals. The community can help develop strategies. Examples of forest land management strategies include:

- focusing efforts on the economic development of a valuable forest resource while making some concessions for other values (this is how forest land management is presently practised),
- taking only those resources that are over and above what is needed to maintain, for present and future generations, the integrity of the land and the resources and values it supports (popularly called "sustainable development"), or
- preserving a traditional Aboriginal forest land activity first (eg. fishing, trapping), then developing any remaining resources over and above what is needed to maintain the integrity of the land as a whole.

Plans are detailed tasks, responsibilities, resources and time frames that follow a strategic direction. In forest land management planning, these strategies take the form of the overall forest land management plan for a 20-25 year period taking into account how the forest will evolve over the next few hundred years, an operating plan for a shorter period, usually five years and annual plans that include details of forest land operations to be carried out the following year.

Plans are developed with the assistance of skilled professionals. The community's involvement in plan development might include providing background information, giving general direction, reviewing it and approving the final plan.

MONITORING AND UPDATES

Ways in which community members can voice their concerns about forest land management and be a part of monitoring forest land operations should be in place prior to the approval of the Forest Land Management Plan and the start of forest land operations. Community participation should provide for both immediate feedback and regularly scheduled assessments of the Forest Land Management Plan and community priorities. Community members who are living on the land can provide valuable observations about forest land operations. The information brought forward by community members can then be used to change the forest land management plan and improve operations.

COMMUNICATIONS PLAN

A communications plan outlines how the collection and distribution of information relevant to forest land management planning will be handled, ensuring full community participation. The following might be included in the communications plan:

- an outline of the type of information which will be shared with, and asked from, community members,
- a description of how information will be exchanged,
- a description of levels at which the community will be involved for each part of the plan,
- a description of the community's role in approving the Forest Land Management Plan and forest land operations, and
- a description of the means by which community members can question or appeal decisions made about forest land use. Ways to resolve conflicts could include using community justice systems or bylaws which govern referenda.

Information Sharing

Information must be presented so that is easily understood by community members using as full a range of methods as is needed, including visual, written and oral presentations. Translation may also be needed. Keeping the community well informed and up to date on what is happening will allow community members to make good decisions and to monitor the implementation of the forest land management plan. The following are some ways to share information within a community; the methods chosen should serve the special needs of the community:

- seeking the advice of elders,
- circle discussions,
- circulation of written articles through community bulletins or newsletters,
- workshops,
- seminars and conferences,
- surveys and questionnaires,
- "Information Centres" or "Open Houses,"
- videos,
- radio programs and announcements,
- posters,
- school activities,
- town hall meetings,
- informal discussions, including door-to-door visits,
- community advisory committees (established on a geographic, family and/or interest

- basis),
field trips.

COMMUNITY EXPERTISE

The community possesses a wealth of information that can help to guide forest land managers. Community members, particularly elders, knowledgeable senior people and those involved in forest-based activities, possess unique traditional knowledge of the workings of the forest not available elsewhere. This knowledge will be crucial in identifying traditional forest uses, historical land use patterns, cultural and environmentally sensitive sites and forest habitat, plants and wildlife. Community knowledge will provide ongoing support for improving forest land management and operations.

Community members may be involved formally or informally in forest land management through community meetings, workshops and policy and technical forest land management committees or boards.

Aboriginal communities may also turn to neighbours who share common problems for assistance in forest land management planning. Decisions made about forest land management activities on Aboriginal lands may well have an impact on surrounding lands. Aboriginal communities are well aware of the impact on their land of forest land management decisions made off-Reserve.

Administration



*Janet Pronovost,
Administrative Assistant
for the National Aboriginal
Forestry Association*



Photo by Peggy Smith



III ADMINISTRATION AND TRAINING

This chapter describes what an Aboriginal community will need to consider to set up a structure to look after forest land management planning and operations in its community, including organization, regulation and staffing. Also described are the present roles and jurisdiction of provincial and federal governments.

ABORIGINAL GOVERNMENT

Aboriginal governments are severely restricted in their ability to carry out forest land management on Reserve land because authority for issuing timber permits still rests with the Minister of Indian Affairs and there is no provision for forest land management under the *Indian Act*. Self government discussions will require the development of legislation to give authority to Aboriginal communities to manage their own lands. The National Aboriginal Forestry Association has been drafting legislation designed to do this, but it will be some time before any such legislation is in place [see the Appendices for NAFA's legislative proposal]. With legislation in place, Aboriginal communities will then have the power to pass and enforce bylaws governing forest land operations on Reserve land using methods chosen by the community. Until such a time as new legislation is in place, First Nation governments will have to continue to operate under the limited scope of the *Indian Act*.

To carry out forest land management, an Aboriginal community should:

- use these *Guidelines* to establish local standards,
- develop a forest land management plan,
- develop an organization and hire and/or train personnel,
- carry out forest land operations based on the forest land management plan,
- establish a system to collect rents, stumpage and other fees from forest land operations on Reserve land,
- establish a system to regulate forest land operations, including enforcing the standards established and levying fines or shutting down operations which do not comply with standards,
- monitor, evaluate and revise local standards, the forest land management plan and operations.

Once an Aboriginal community has decided to become involved in forestry and to use the *Guidelines* as its framework document, **What are the Steps in Planning?** in the **Forest Land Management Plan** chapter can be used as a checklist.

OTHER LEVELS OF GOVERNMENT

The British North America Act of 1867 assigned responsibility for "*Indians and lands reserved for Indians*" to the federal government, but responsibility for natural resources was assigned to provincial governments. This means that negotiations for access to provincial "Crown land" or participation in the management of natural resources on provincial Crown land will involve the provinces. Each province has developed its own regulations to cover natural resource management.

Treaties signed by Aboriginal communities and the federal Crown usually include continued rights to hunt, fish and gather. Because these rights are recognized in the Canadian *Constitution*, the highest law in the land, provinces must consider treaty rights when managing natural resources. Recent legal decisions have indicated that both federal and provincial governments have an obligation to maintain natural resources promised under treaty, since the right to continued hunting, fishing and gathering means little if there is nothing left to harvest.

Federal government

Although Indian Affairs and Northern Development still has responsibility for issuing timber permits for logging on Reserve land, since 1986 the Canadian Forest Service of Natural Resources has provided technical and administrative support for forest land management on Reserve lands. The Canadian Forest Service (CFS) requires that forest land management plans on Reserves follow a *Manual of Forest Management Plan Guidelines for Federal and Indian Lands*. These *Guidelines* are intended to expand the scope of the existing guidelines and will replace that manual for those Aboriginal communities which adopt these *Guidelines*.

The federal department of Fisheries and Oceans is responsible for fisheries through the Fisheries Act. The act states that the department must be involved in any activities on forest lands within drainage areas which might have a detrimental effect on fish-bearing waters.

International affairs, taxation, environmental assessment and navigation are other areas of federal responsibility which may have an indirect impact on forestry.

Provincial Government

While provincial governments have no direct power over forestry matters on Reserve lands, provinces have responsibility for natural resources on provincial Crown land. Much land that Aboriginal communities consider traditional territory is within provincial Crown land and many Aboriginal communities do not recognize provincial jurisdiction of their treaty lands. In some provinces Aboriginal communities are working more closely with provincial governments than the federal government on forest land management projects. Provincial

governments have no legal obligation to follow any but their own forest management standards. However, if an Aboriginal community adopts these *Guidelines*, a provincial government has the option to agree to adopt the standards set by the Aboriginal community. With changing recognition of Aboriginal and treaty rights in the *Constitution* and courts of Canada, provincial governments may agree to adopt the standards set by the Aboriginal community. These *Guidelines* may be recognized by provincial governments as setting good forest land management practices and may be used as a standard of care for lands covered under joint Aboriginal-provincial natural resource management agreements ("co-management").

Provincial guidelines for forest land management and provincial natural resource departments' addresses can be found in the **References** section and Appendices of these *Guidelines*.

ABORIGINAL ORGANIZATIONAL STRUCTURE

As an Aboriginal government becomes more involved in forestry, it will require an organization that can carry out forest land management work. A community may have to rely on outside help until it has built its own structures and has community members trained in forest land management. This outside help may come from other Aboriginal communities who have experience in forest land management, consultants, government agencies, forest industry companies, academic institutions and/or non-governmental organizations with a special interest in forest land management.

The Aboriginal community may set up a forest land management organization in a number of ways, including:

- through its leadership and elders,
- delegating duties to one of its councillors or a paid technical person,
- delegating duties to an existing committee, or creating a new committee(s),
- through an economic development corporation,
- creating or adding a department to an existing government, such as a Natural Resources or Environment Department,
- with other Aboriginal communities through a tribal council or treaty organization, especially when the Reserve land base is too small to warrant forest staff in the community, and/or
- contracting out to consultants.

These *Guidelines* offer a framework for the management of multiple uses of the forest, understanding how each use affects others. Organizational structures should reflect this integrated approach, avoiding overspecialization and fragmentation. For example, some forest management structures treat logging separately from fish and wildlife to the detriment of both.

It will not be easy to achieve integrated natural resource management in a system which still relies on specialization and single use management.

Regulation of Forest Land Operations

Forest operations on Reserve land should be governed by a contract between the Aboriginal community and the operator, whether the operator is a body of the Aboriginal community itself, a community member or an outside contractor. The contractual terms may cover:

- clear identification with maps of the land area on which forest land operations are to be conducted,
- permits and licences for the sale of timber, firewood, recreation camping sites, range lands, hunting, fishing and trapping and other uses and activities described in the forest land management plan,
- regulations for conduct of operations, including requirements for environmental protection and fire protection responsibility,
- a system of penalties and fines for not following regulations,
- stumpage or royalties payable to the Aboriginal community from the sale or rent of forest products or forest use,
- a performance bond payable in advance and held in trust until all work is satisfactorily completed with a method of cost recovery for damages,
- time limits for the contract with start and end dates and schedule of payments,
- a clear line of command so that the contractor knows who he has to deal with throughout the operation, and
- a method of mediation or arbitration in case of contractual disagreements.

The Aboriginal community will also need a system to monitor and regulate forest land operations to deal with those not authorized or permitted to carry out forest land operations.

STAFF REQUIREMENTS AND TRAINING

The number and type of staff needed will depend on the amount of forest land the community controls and the complexity of its operations. A community may choose to develop an inventory of skilled people available to work. Such an inventory will help in planning for and determining training needs. Different specialists may be required, such as a forester or forest technician, wildlife, range, water or forest protection experts. If a community's forest land area is too small to warrant hiring professional staff, several communities may decide to share staff. As with any other staff, a clearly defined job description that describes functions, duties and reporting relationship is very important.

There are few Aboriginal professional foresters in Canada. The need for Aboriginal natural

resource managers and technicians is critical. Aboriginal communities should encourage their own people to get the necessary training to fill forestry positions at all levels. Until there are qualified Aboriginal forestry professionals and workers, communities will have to rely on outside help. The following are brief descriptions of the different levels of training in forestry and the roles and responsibilities required of professionals.

Professional Level Education and Training

Professional level forest land managers are university-trained, but local experience and knowledge are essential for a forest manager to be successful. A professional forestry degree takes four to five years at a university. Where an Aboriginal community has control over a large area of forest lands containing a wide range of different resources such as range, water, fish, wildlife and recreation, the services of more than one professional expert may be required to develop a forest land management plan. The federal government and most provincial governments require that forest land management plans be certified by a Registered Professional Forester. One of the most important criteria in hiring will be the professional's ability to work with Aboriginal communities.

The role and responsibilities of a professional forest land manager include:

- reporting to the Aboriginal government, elders and community members,
- assisting Aboriginal communities with the development and approval of forest land management plans,
- assisting communities to better understand all aspects of forest land management,
- monitoring and evaluating all forest land operations, and
- assisting in worker training for people from the community.

Technical Level Education and Training

Forest technicians are usually trained through community college courses either at a post-secondary institution or through a distance learning program where the student can stay in their own community. Aboriginal communities with a small forest land area may need only technicians with a professional forester limited to consulting as needed.

The role and responsibilities of a forest technician include:

- Conducting and mapping an inventory of forest land resources and keeping this information up to date,
- working in the field to implement and monitor forest land operations according to the community's forest land management plan,
- reporting to the Aboriginal government, elders and community members,
- assisting the community to better understand all aspects of forest land management through an ongoing community education program,

- assisting in training people from the community to become skilled forestry workers.

Worker Level Training

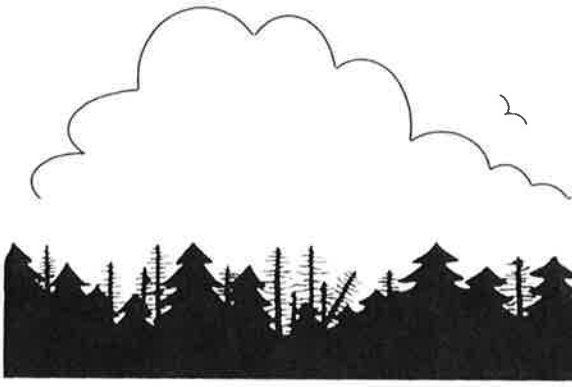
Forest worker training usually takes place on the job by supervisors and skilled co-workers. However, outside professional trainers may be brought in to teach courses in specific areas such as fire fighting or pesticide application. There are a variety of training materials and manuals available through provincial forest ministries, organizations and private training schools. There are a few forestry worker training programs offered by technical schools, but most training is done by private firms and consultants. The provincial and federal governments offer worker training programs for individuals on social assistance and unemployment insurance.

Hiring Consultants

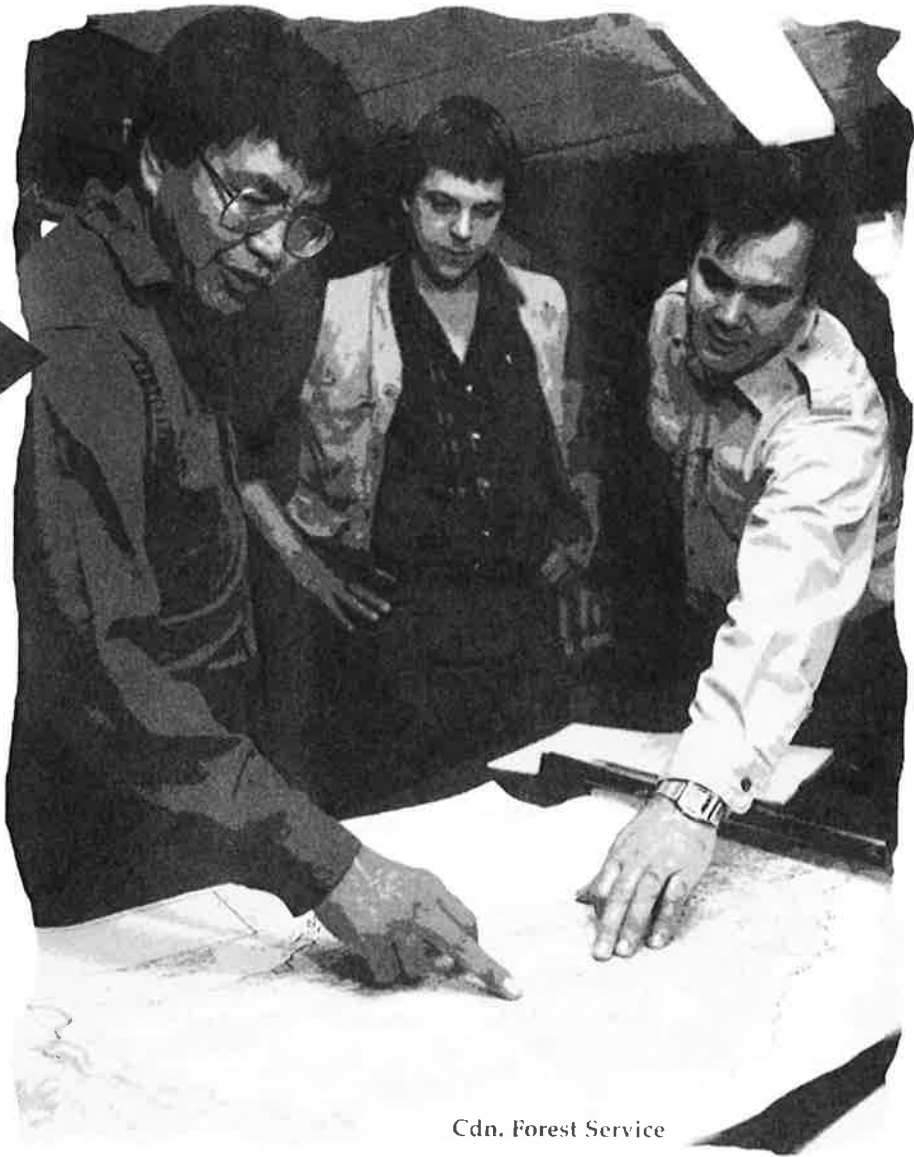
Consultants are often hired on a short-term basis to do specific jobs. When hiring consultants, the following should be considered:

- Is there more than one consultant to choose from?
- Is a competitive bidding system needed?
- Is the consultant the best available at the price?
- Is the consultant's price reasonable?
- Does the consulting company provide all necessary services?
- Is there a more effective way to do the job, such as hiring a forest technician rather than a professional forester?
- Are there clear Terms of Reference set out for the contract? Terms of Reference should include the activities to be carried out, the final product expected, a budget with a clear deadline for project completion.

Forest Land Management Plan



*Forest land
management
planning in
northern B.C.*



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IV FOREST LAND MANAGEMENT PLAN

WHAT IS A PLAN AND WHAT DOES IT DO?

A forest land management plan is a written document which guides proposed forest land operations over a period of time by setting out recommendations for forest development and improvement activities.

The plan should:

- state the community's management goals for forest land,
- identify and describe the forest land to be managed, including its history,
- outline the procedures by which the goals will be reached,
- outline the procedures by which all values of the forest land will be managed,
- be written in language that is easily understood by community members,
- have the approval of the community, and
- be reviewed and updated regularly.

WHAT ARE THE STEPS IN FOREST LAND MANAGEMENT PLANNING?

1. Decide how to involve the community in planning.
2. Use these *Guidelines* to develop a forest land management plan.
3. Identify the forest land to be managed.
4. Decide on how to administer forest land (forestry committee or department, hiring a forest technician, forester or forestry consultant).
5. Appoint people and hire staff or consultants to assist in developing and implementing a forest land management plan.
6. Provide needed tools, equipment and office support to planners.
7. Collect aerial photography, review history, conduct inventory of resources on forest land and map those resources and uses, including sensitive areas.
8. Prepare, review and approve the forest land management plan.
9. For plans prepared for off-Reserve areas, discuss with provincial authorities.
10. Carry out planned forest land operations either as an Aboriginal business or through contracts with individuals or companies.
11. Follow guidelines laid out in the plan, including issuing of permits and licenses, collection of fees and issuing penalties.
12. Monitor and revise the forest land management plan and operations as necessary.

WHAT IS IN A FOREST LAND MANAGEMENT PLAN?

The plan should include the following:

1. Who has authority and responsibility for and who approves the forest land management plan, including how the community participates,
2. Selection and description of forest land,
3. Management goals/primary forest use (for example, deciding to develop campsites for recreation rather than harvesting timber),
4. A time frame,
5. Cost-benefit analysis,
6. Inventories and mapping of all forest values,
7. Things to consider and how they will be treated in implementing the plan, including:
 - Access (roads, trails, water routes, air--helicopter, airstrips),
 - Protection of water and soil
 - Protection of sites with environmental, cultural, spiritual, historical or wilderness significance,
 - Protection of forest health (fire, insects and disease, biodiversity)
 - Fish and wildlife,
 - Range,
 - Vegetation, both timber and non-timber vegetation such as rare and endangered plants, medicinal plants, wild rice, mushrooms and sacred plants like sweet grass,
 - Recreation and landscape.

Plans for timber harvest and renewal of the forest should include:

- Timber volume and rate of cut calculations taking into account areas logged and timber losses due to fire, insects, disease and other uses, such as housing,
 - Volumes, areas, species available for harvest,
 - Method of forest renewal considering the original ecosystem, desired tree species, logging methods and required tending,
8. Operating and annual plans,
 9. How the forest land management plan and operations will be monitored, reviewed and changed.

Authority, Responsibility and Approval of the Plan

Management plans should be prepared by or under the supervision of a professional natural resource specialist. The plan should be certified and approved by a forester. In Alberta, British Columbia, Ontario, Quebec and New Brunswick, a forester must be a Registered

Professional Forester (R.P.F.) within the respective province to approve forest land management plans on provincial Crown lands. The Canadian Forest Service currently requires that forest land management plans for Reserve lands also be approved by an R.P.F.

The forest land management plan should identify:

- owners/holders of the forest land,
- administrative responsibility for forest land,
- who prepared the plan,
- who approved the plan, and
- the agency to whom the forest land manager reports.

Selection and Description of Forest Land

The forest land to be managed will be selected and described, and should include:

1. Geographic location, including legal boundaries.
2. Size/area.
3. History, including:
 - past use, including traditional Aboriginal uses as well as industrial and other uses,
 - past forest land management and surveys,
 - past logging describing area and volumes cut,
 - past wood processing, describing type of operation, (e.g., sawmill, chipping, fuel),
 - scientific studies undertaken,
 - fire,
 - insect and/or disease attacks.Historical uses should be carefully documented and remain the property of the Aboriginal community.
4. Climate, including predominant wind direction and average wind speed, moisture levels and average temperatures and hours of sunlight.
5. Land features, including:
 - soil,
 - vegetation (forest stands, non-timber forest vegetation),
 - hydrology (open water bodies, moisture/drainage systems),
 - elevation,
 - topography (land surfaces),
 - geology (subsurface: earth's crust, rock formations).
6. Existing and potential uses, including:
 - recreation and tourism sites,

- historic, cultural and sacred sites,
 - foods, herbs and medicinal plants (berries, maple syrup),
 - plants and trees used for cultural activities (ash for baskets, spruce roots and white birch for canoes),
 - traditional harvesting sites (hunting, fishing, trapping and gathering),
 - fish and wildlife habitat,
 - commercial timber stands, including lumber, pulp and Christmas tree plantations,
 - range,
 - roads and trails.
7. Areas to be excluded from forest land use or to be designated as restricted use areas.
8. Influences outside of the designated area which may have an impact on the forest land, eg. industrial developments which have air and water emissions.

Management Goals

The community should state what it hopes to achieve through forest land management. After community discussions (see Community Participation), and combined with all the information that has been collected about the forest land, goals for the use of the forest land should be defined. Whether a single forest land use, such as timber harvesting, lakefront development for tourism or management of trapping areas, is chosen, or a combination of uses, the goal statement should be clear and specific.

Time Frame

Most forest land management plans cover a period of 20-25 years and include consideration of at least one rotation of trees in forest stands. This rotation period may range from 50 to 300 years. Some Aboriginal people speak of planning for the next seven generations, a longer time period than that imposed by provincial forest-planning regulations. Other Aboriginal communities exercise caution in planning over long periods and prefer a shorter planning period which allows changes in response to monitoring forest land operations and new information. Whatever the time frame chosen, an operating plan covering a five to 10-year period and an annual plan should be prepared (see **Operating and Annual Plans** below). Annual reviews should be conducted to determine whether the original goals and prescriptions are being followed and to revise both the operating and management plans.

Cost-Benefit Analysis

This section of the plan should:

- state the financial goals of the forest land management program,

- identify the methods and sources of financing,
- set priorities for expenditures,
- show potential financial gains,
- show anticipated cash flows,
- outline non-monetary benefits and costs of natural resource development, including social and environmental costs.

Operating and Annual Plans

The Operating Plan should include:

- a summary of any forest land operations carried out in the past 5-year period,
- a list of proposed forest land operations in order of priority for the next 5-year period to achieve forest land management goals and meet each harvest level,
- a rate of cut for proposed timber harvesting operations,
- details of access work (eg., road building) to be undertaken during the plan period.

The Annual Plan should include:

- a summary of forest land operations from the previous year, including a map of operating areas,
- details of proposed forest use activities for the upcoming year, including maps of areas to be developed.

MONITORING AND REVIEW OF THE PLAN

The management plan should describe how forest land management activities will be reviewed and monitored and how changes will be made to the plan based on these reviews. This may be the most important part of planning because it allows the community and forest land managers to learn from practice and changing information, improving on successful forest land operations and changing those which do not meet the community's goals.

Some communities may wish to carry out independent audits of forest land operations to ensure that there is no conflict of interest in assessing whether these operations meet forest land management goals.

Keeping Good Records

Essential to improving forest land operations is keeping records of what has been carried out and how operations have affected forest lands. Records will also ensure continuity if there are changes in staffing, administration and political organization. Records should thoroughly

document the state of forest land prior to operations and assessments should be carried out following forest land operations to gauge their impact on forest land.

Scientific Studies

Communities can also improve their forest land operations by carrying out research in areas where the community wants to build knowledge or expertise. Aboriginal communities can benefit from research initiated by government, industry and academic institutions and can co-operate with these agencies to gain access to specialized equipment, train their own members and share information. Aboriginal communities can also learn from each other by sharing scientific information.

A network of eleven Model Forests has been established across the five ecoregions of Canada to explore integrated natural resource management, develop and apply new techniques in forest land management and test and demonstrate the best sustainable forestry practices. Aboriginal partners are involved in many of these Model Forests which will provide research and lessons to improve forest land management. The Waswanipi Cree Model Forest was established in September of 1997 and contains management units divided according to previously existing traplines in the area.

Inventories

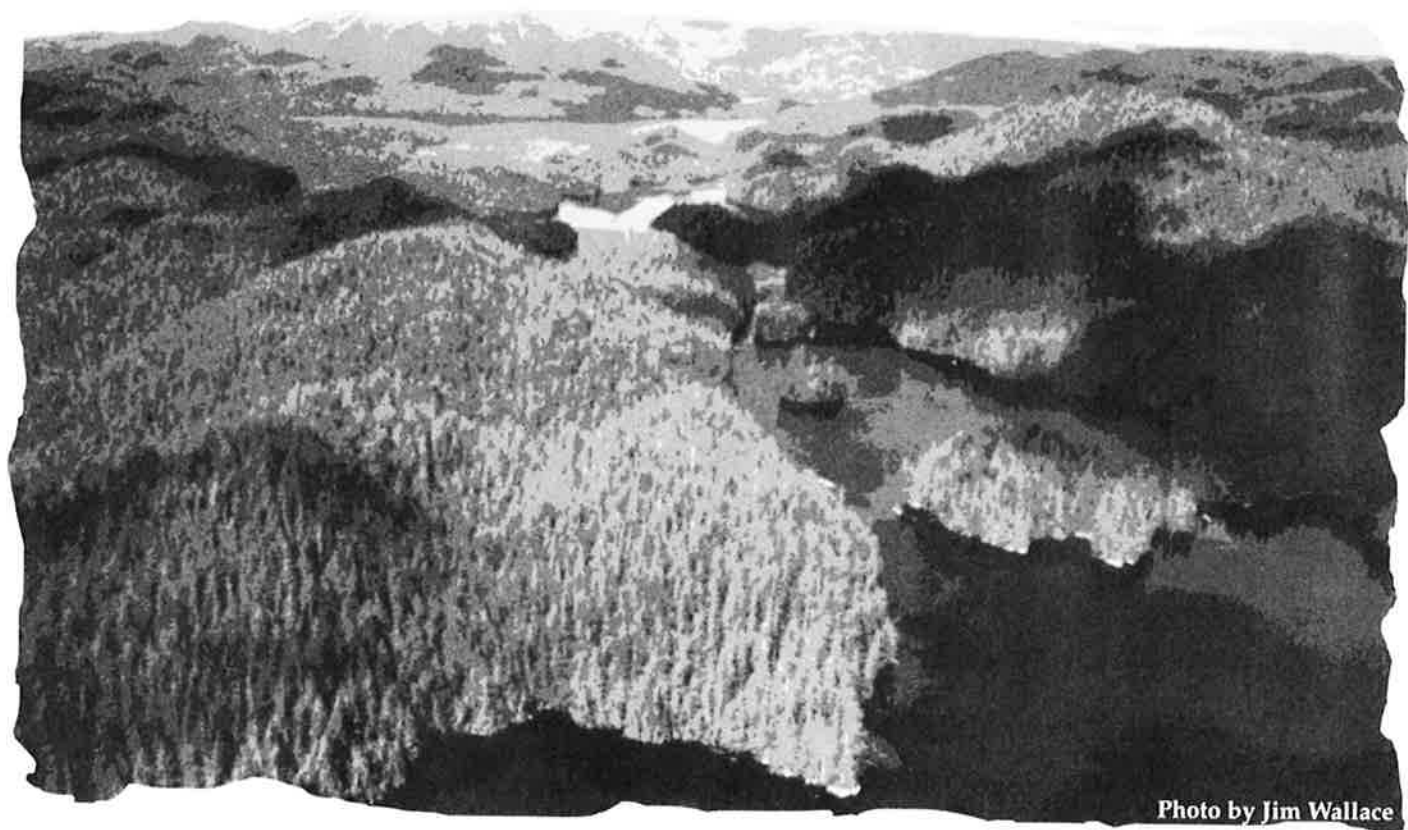


Photo by Jim Wallace



V INVENTORIES AND MAPPING

Planning must be based on sound information. The basis for good forest land management planning is knowledge of the quantity and quality of forest values. An inventory is a list and description of land features or natural resources. An inventory helps managers to make informed decisions about the amount of a forest resource which can be harvested or developed and provides a way to monitor changes in that resource.

In Canada, most inventories have been done on timber, mainly by federal and provincial governments and large forest companies. The quality and accuracy of these inventories vary and information should always be checked by on-the-ground sampling. Wildlife population counts are more difficult to do because animals move, sometimes over vast distances. The amount of attention devoted to inventories is influenced by the dollar value assigned by governments and industry to a particular species. With computerized mapping systems, more values are being inventoried.

Sources outside the community can provide essential information. Provincial and federal governments, the forest industry and unions, conservation and environmental groups and academic institutions hold valuable technical knowledge and expertise that can be used in gathering data.

TRADITIONAL ECOLOGICAL KNOWLEDGE

Traditional knowledge can be incorporated into a forest land management plan by documenting this knowledge through discussions with elders and community forest users. The areas identified by community members can then be mapped and inventoried as part of the plan and decisions made about how to maintain and ensure continued traditional use. Many Aboriginal communities are now conducting traditional and current land use studies as a basis for land claims or participation in forest land operations.

Traditional Aboriginal forest practices can also be incorporated into forest land operations. For example, some Aboriginal communities have traditionally used fire to renew the forest or to encourage clearings where berries grow.

Aboriginal people have lived in harmony with nature for centuries and it is this relationship with the land that makes traditional Aboriginal culture unique. From this relationship has developed what some people call traditional ecological knowledge. Georges Erasmus (1989) describes it as:

a profound and detailed knowledge of species and ecosystems, ways of sharing and managing resources that have stood the test of time, and ethics that reconcile

subsistence and co-existence. We recognize that people are an integral part of nature, and express spiritual bonds with other species, including those we harvest.

This knowledge is passed by word of mouth from generation to generation by some elders, spiritual leaders and traditional harvesters. This knowledge is also being revived by cultural schools and is documented in Native Studies and Anthropology courses and traditional and current land use and occupancy studies. Traditional ecological knowledge may include not only an awareness of physical environmental relationships, but also stories with a moral lesson, survival techniques, spiritual beliefs, indeed the very culture passed from one generation to another.

The problem of using traditional ecological knowledge is to use and balance it with the professionally-prepared forest land management plan and to do this without subordinating traditional ecological knowledge to western scientific knowledge. Both systems have strengths and weaknesses; integrating the two may be the best approach for Aboriginal forest land management, if this integration can be achieved.

An ever-present problem with the inclusion of traditional ecological knowledge is the language and cultural barriers of usually non-Aboriginal professionals who, while finding traditional knowledge fascinating, may ultimately discard it as unusable.

What will make Aboriginal forest land management unique is using this traditional knowledge in combination with the Aboriginal view of the land and how it should be cared for.

TYPES OF INVENTORIES

Inventories can be conducted on any land feature or resource that is measurable, such as:

- trees to be used for non-timber products, such as maple syrup, Christmas trees, medicines or crafts,
- trees to be used for pulp or lumber products (by forest stand),
- vegetation other than trees,
- water bodies, including significant wetlands,
- soil types,
- non-renewable natural resources such as minerals, oil and gas,
- scientifically or ecologically significant sites,
- rare and irreplaceable natural areas, including old growth and wilderness,
- treatments carried out on forest land, such as harvesting and renewing trees, recreation site construction, road or trail networks.

As much information should be collected and mapped as is possible. The following sections

describe in more detail some of the categories and values that can be inventoried.

Ecosystem Classification

Natural resource managers use a system of site classification which recognizes the relationships between plants, climate, moisture and soil. These systems of site classification also make it easier to take into account other values on a site such as wildlife or water. There are no legal requirements to use these systems and because they are under development, the systems may not apply in all areas or they may need improvement or adjustment to suit an area. For example, some provincial systems describe plant succession following timber harvesting while others do not. The following are the systems that are under development in Canada, some of which are more advanced than others:

- Newfoundland, Forest Site Classification
- New Brunswick, Forest Site Classification
- Quebec, Ecological Land Survey & Forest Ecological Classification Program
- Ontario, Forest Ecosystem Classification
- Alberta, Biogeoclimatic Classification
- British Columbia, Biogeoclimatic Ecosystem Classification
- Yukon, Ecological Land Survey

Heritage and Cultural Values

- traditional and current land use patterns,
- old village and burial sites,
- spiritual places and ceremonial grounds,
- individual trees that are used for special cultural purposes, such as canoes or medicine (sometimes called "culturally modified trees"),
- pictographs and petroglyphs,
- old trails and campsites,
- archaeological values, and
- other special Aboriginal features.

Fish and Wildlife

Forest land areas providing a specialized habitat to fish and wildlife which should be inventoried and mapped might include:

- riparian areas (water and shorelines) which are an important wildlife habitat,
- habitat for domestic animals, such as cattle,
- threatened and endangered animal species,

- feeding, resting and watering sites,
- migratory and travel routes of birds, fish and animals,
- important reproduction areas, including mating sites, nesting, birthing or spawning areas and areas for rearing young.

Timber Inventories

Timber inventories are conducted to determine the area, species, volume and quality of standing timber in order to prepare plans for harvesting, renewal and sales. The data are obtained in a variety of ways, including:

- interpretation of existing stand maps,
- interpretation of aerial photographs,
- sampling on the ground,
- statistical analysis and volume estimation,
- growth and yield projections.

Recreation and Landscape

Forest land which has potential for recreation and tourism development might include:

- areas used by the community for camping, fishing and other recreational activities,
- landscapes which provide a good view from communities, roads and waterways.

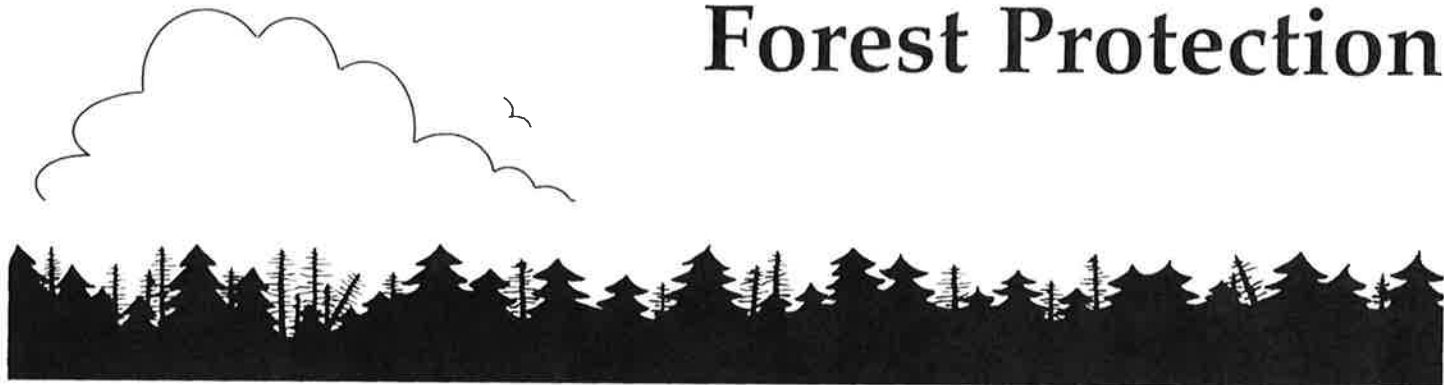
TYPES OF MAPPING

All the features and values identified in the Selection and Description of Forest Land (see **Forest Land Management Plan** chapter) should be identified visually by placing them on a series of maps. Maps can be done by hand, which is an adequate and cheap method, or by computer.

Geographic Information Systems (GIS)

Maps can be done using computer technology called Geographic Information Systems (GIS) which allows data from satellite imagery and on-the-ground sampling to be stored on a computer and translated into maps. This technology requires sophisticated and expensive equipment and adequate training for technicians who use these systems.

Forest Protection



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Photo by Catherine M. Senecal



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VI FOREST PROTECTION

The following chapters, **Access, Water and Soil, Protected or Special Management Areas, Fire Protection, Biodiversity and Insect and Disease Protection**, should be reviewed and considered during any forest development planning. Establishing and following standards for forest protection will sustain forest health by maintaining forest biodiversity and minimizing the risk of damage from fire, windfalls, insects and diseases. Although a community may make decisions to protect forest land for various reasons, it must be recognized that forests are constantly changing. Understanding and then allowing or imitating a forest's natural cycles may also sustain forest health.

ENVIRONMENTAL ASSESSMENT AND PROTECTION

Federal and provincial governments require environmental assessments for development projects of a certain size, but jurisdiction and procedures are currently unclear and are being changed. Aboriginal communities should be aware of the legal requirements for environmental assessment in their area.

Forest lands and related resources are deemed environmentally significant either because:

- certain activities are likely to degrade forest land or the values that are part of the forest, or
- activities carried out in these areas are hazardous to life and property.

Environmentally sensitive areas that may require special consideration because of the damaging impact of human activity include:

- shorelines of oceans, lakes and streams,
- wetland and water source areas,
- rare geologic formations,
- irreplaceable woodland areas,
- critical fish and wildlife habitats, including: fish spawning beds, nesting, staging and migratory grounds,
- areas of rare and endangered plants and animals,
- areas of high concentrations throughout the year of seasonally harvested plants and animals,
- areas of high diversity of plants and animals,
- aquifer recharge zones,
- mineral deposit areas,
- unstable areas which may threaten communities, such as flood plains, steep and unstable slopes or areas prone to landslides.

Access

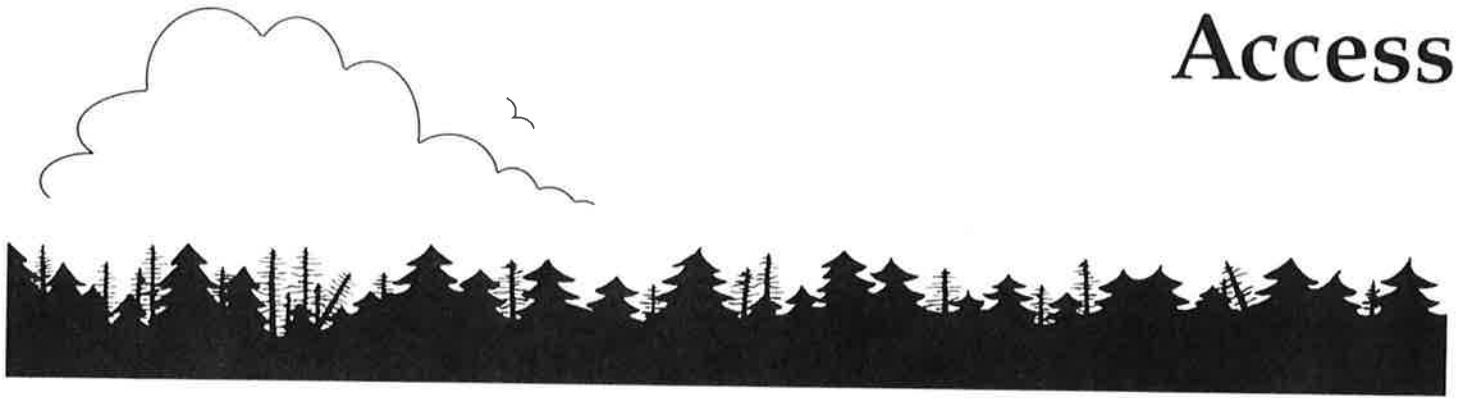


Photo by Catherine M. Senecal



VII ACCESS (ROADS, TRAILS, WATERWAYS AND AIR)

How people get to the forest can have a major impact on the forest ecosystem and its use. Building roads to cut timber may make commercial harvesting of other forest resources possible. However, poorly planned or poorly executed road construction can greatly harm the forest environment. Providing access where none existed before may cause a fragile resource to be depleted by over harvesting. Limiting access may be necessary when the community wishes to restrict impacts on certain areas such as spiritual sites, traplines or environmentally sensitive areas. Poor road construction can greatly harm the forest environment. Therefore, careful planning and construction of forest access trails and roads are critical parts of responsible forest land management.

More environmental damage can be caused to forest lands by poor road building than by harvesting timber. Poor road construction may cause irreversible damage to critical soils and water courses.

ACCESS PLANNING

The purpose of access planning is to determine the effects of access on an area and to choose a means of access that will minimize damage to the largest number of values in the area while still allowing development.

Access planning should consider:

- sensitive sites, including sacred and burial sites,
- fish and wildlife habitats,
- traditional Aboriginal activities of hunting, fishing and gathering,
- special treatments required for of water bodies,
- archaeological sites,
- soil erosion,
- the feasibility of restricting access (seasonally and/or by area),
- the timing of road construction,
- the location of access areas,
- the duration of access, whether permanent or temporary,
- the desired level of motorized access,
- unforeseen changes once land is accessible because once an area has been opened, there is no turning back,
- road maintenance, including grading, plowing and sanding,
- slopes,
- landscapes which provide a view,
- the change to the ecosystem from increased sunlight and potential introduction of new

- plants and animals,
the safety of users.

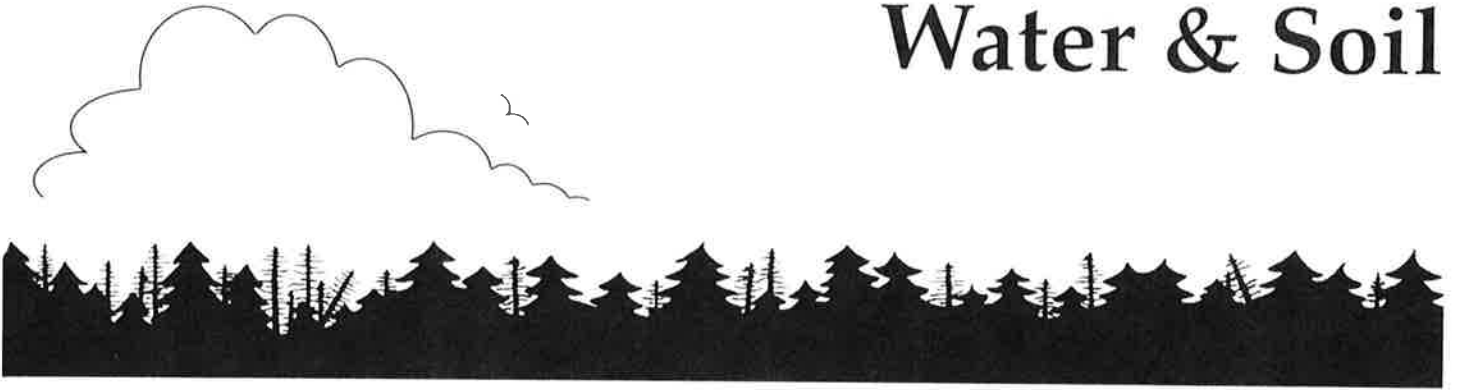
Road Planning

Because roads potentially cause more environmental damage than other forms of access, road planning should consider:

- the type and design of roads--primary and secondary roads, skid roads and landings--based on proposed, seasons of, length of and future use,
- full information on climate, terrain, permafrost and other environmental considerations along the proposed route,
- rehabilitation of roads and landings when no longer needed,
- methods to control erosion,
- removal of construction debris, and
- protection of waterways.

It is important to have trained road builders carry out road construction. In some provinces road design and layout may have to be carried out by a Registered Engineer.

Water & Soil



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VIII WATER AND SOIL

Water and soil are essential requirements for the growth of plant materials. Water is the lifeblood of all living things, commanding a unique place among our natural resources. Water carries cultural, spiritual and traditional importance to Aboriginal people.

Most water required for community consumption, agriculture and industry is supplied by forested watersheds, either directly through streams, rivers and reservoirs, or indirectly through ground water originating in forests. Maintenance of water quality and responsible use of forests go hand in hand.

These *Guidelines* are intended to provide a framework to protect the integrity of water quality and soil in the context of forest land management. Incorporating water and soil protection during forest land management planning will help to minimize any damaging impact of forest development activities on soil and water quality and quantity.

A forest land management plan should outline how water and soil will be protected, developed and/or managed within the context of the overall plan. Water and soil protection guidelines should:

- state specific objectives for water and soil protection within the plan area,
- aim to sustain the natural health and productivity of water and soil systems,
- take into account how all current and anticipated forest land operations will affect soil and water quality and quantity, and
- accommodate all water and soil users within the plan area.

WATER CONSERVATION

The forest land management plan should include the following:

- an inventory and mapping of water courses, lakes, ponds and water sources (springs, wells, source areas) within the planning area,
- current and historical information on water levels, water flow and water quality for both surface and sub-surface water,
- a statement of principle and guidelines to protect water from any damaging impact of forest activities,
- standards for water resource activities throughout the planning area, including:
 - drinking water,
 - irrigation,
 - fish and wildlife habitat,
 - road and trail construction over water courses,

- environmentally sensitive water areas,
- land areas surrounding water bodies (riparian zones),
- tourism and recreation,
- farm and domestic animals,
- waterfront development.
- an assessment of the impact of forest activities on water quality within the plan area (i.e., timber harvesting, range and recreation) and standards to maintain water quality during forest land operations,
- the identification of known or potential sources of pollution, such as dump sites, with measures for preventing such sources from contaminating water,
- a mechanism to monitor the impact of forest activities on water quality.

Storage Areas

Storage areas such as settlement ponds, which temporarily store water, help to replenish ground water, filter impurities and reduce sedimentation. Wetlands are natural storage areas which provide valuable wildlife and plant habitats.

Protecting wetlands or possibly introducing storage areas downstream from forest land operations such as timber harvesting, road construction or grazing of domestic animals will allow sediments to settle, helping to maintain water quality. Settlement ponds also collect and store water during moist periods and slowly drain during drier periods, playing an important role in regulating water flow, reducing flooding in wet periods and providing water in dry periods.

Construction Standards Near Water Bodies

Forest land operations, particularly timber harvesting, road construction and tourist resort development, will affect water quality and often quantity. Improper road construction, timber harvesting techniques and recreation developments can cause flooding, affect fish movements and migration, increase siltation and alter the course of streams and rivers.

To maintain water quality, stringent construction and operation standards must be established, covering:

- fuel handling and secure storage,
- waste disposal,
- restricted access to sensitive water areas,
- timber harvesting considering orientation, size and method of cut near water bodies,
- engineering and design standards for road construction and stream crossings,
- standards for range activity near water bodies, including rotation of foraging cattle,

- seasonal restrictions on activities (eg., prohibiting road construction at stream crossings during spawning periods, limiting the number of people in a recreation area),
- restrictions on the type and intensity of recreational activities (limiting campground size),
- restrictions on winter/frozen ground operations,
- standards for equipment to prevent damage (eg., wide tracks or tires on vehicles).

Maintaining Water Levels

Water fluctuations should be natural, that is, generally higher in the spring from melting ice runoff and lower as the summer continues. Most northern rivers are controlled by dams, or may be in future, so water fluctuations must be taken into consideration. Furthermore, flooding of previously dry forest land can cause logs to rot releasing mercury into water. Mercury that naturally occurs in soil is released during rotting and becomes methyl mercury. This highly toxic metal is absorbed by fish and other water creatures causing severe health problems to people who eat large amounts of contaminated fish.

SOIL CONSERVATION

Soil contains nutrients and animal and plant organisms; soil conducts and holds water. The interaction of soil, water and organisms ensures that nutrients are made available to forest vegetation. Information on soil types, slope, climatic effects and erosion hazard must be collected and mapped so that forest activities can be planned to minimize any damage to soil. Compaction by heavy equipment, removal of forest cover and the forest floor by site preparation are all potentially damaging activities. Damage over the long-term may lead to a decline in the soil's ability to furnish nutrients and sustain plant growth.

The forest land management plan should outline how to minimize soil disturbance during forest activities. The following are special soil considerations:

- culverts must be placed to minimize erosion and follow natural water courses,
- roads should be built with a minimum of soil disturbance,
- roads may be closed and returned to a natural state once forest activities are completed,
- heavy machinery should be adapted for shallow and wet soils,
- timber harvesting can be restricted to certain seasons to protect soils,
- mechanical site preparation should avoid damaging removal of the forest floor,
- Timber harvesting methods should be chosen which maintain soil nutrients.

Protected or Special Management Areas



Parks Canada

Fort Kitwanga, B.C.



IX PROTECTED OR SPECIAL MANAGEMENT AREAS

Protected areas are those parts of the forest landscape which have special significance. These areas may require some special attention such as restricting access or limiting or prohibiting development. Areas may be chosen because of their environmental, cultural or wilderness significance.

Guidelines to follow in establishing protected areas should consider:

- community values,
- scientific information,
- mapping the identified protected areas,
- establishing a buffer zone around the area,
- rating the areas according to their sensitivity, significance and likelihood to be affected by forest land operations (a scale, for example HIGH, MEDIUM and LOW, could be developed and applied),
- regulating activities within the area,
- detailed cut block planning if timber harvesting is the chosen forest land use.

CULTURAL PROTECTION

Culturally sensitive areas may include:

- areas of spiritual or religious value such as grave sites, spirit caves, vision quest areas, ceremonial grounds,
- sites from which ceremonial material such as pipestone, bark or sweet grass is gathered,
- lands containing unique historical, archaeological and architectural sites,
- areas of traditional use such as trapping, hunting, berry picking or medicinal plant gathering,
- areas of outstanding scenic value and recreational potential.

When a community decides to designate a site as culturally significant, the area should be mapped and given a buffer zone. The community may decide to keep knowledge of these sites restricted.

WILDERNESS PROTECTION

"Wilderness" is a concept coined by people living in urban areas. For Aboriginal people who live in and are a part of the forest, wilderness is a foreign concept. However, with increasing access to previously inaccessible forest areas, Aboriginal communities may decide to designate

parts of their forest land and limit the number of people using these areas and how they are used.

Wilderness areas may include:

- areas protected for their intrinsic character, such as old growth forests, unique ecosystems or sites identified for their natural beauty,
- corridors sufficient to retain ecosystem viability.

Fire Protection



Cdn. Forest Service



X FIRE PROTECTION

Fire is essential to the health of most forest landscapes. In some types of forests, such as the coastal rainforests, naturally occurring fires rarely alter large parts of the forest landscape. In other forests, such as the Boreal forest, large-scale, periodic fires are normal. Often, fire helps to regenerate forest growth by preparing sites for new growth, reducing fuel loads (dry underbrush), maintaining old growth forests and producing diverse patterns across the forest landscape. In the Boreal forest, fire often eliminates old growth and encourages the regeneration of a single species, such as jack pine or black spruce.

Although fires are often beneficial to overall forest health, fire prevention and suppression are sometimes needed to protect community areas, important watersheds, commercial timber stands and other values. The forest land management plan should rate areas for protection from fire and include a fire protection plan which identifies, maps and ranks the risks of fire. For example, high risk areas may be old growth stands or recently logged areas with dry slash on the ground. The fire protection plan should be based on an understanding of the role of fire as a natural part of forest renewal. This may mean permitting fires, which may promote forest renewal or enhance hunting or gathering activities, such as berry picking, to run their course.

The forest land management plan should also consider activities which will minimize the risk of large-scale fires, such as:

- maintaining species diversity,
- maintaining leaf litter to retain moisture,
- constructing key fire access roads in areas where increased access will not be harmful,
- controlling access,
- in logged areas, summarizing slash hazard and debris disposal for all cut blocks harvested during the year as well as all work planning in cut blocks scheduled to be harvested the following year,
- prescribed burning to reduce fuel loads (an option to be used with caution in remote areas and which should consider safety, wildlife and traditional harvesting activities),
- developing terrain buffers and ditches perpendicular to the general wind direction to protect high fire risk areas.

FIRE SUPPRESSION

Fire suppression includes the plans, actions and agreements undertaken to suppress a forest fire once detected. A suppression plan or fire suppression agreements will:

- establish fire weather stations and assess fire danger using, for example, the Canadian Forest Fire Danger Rating System,

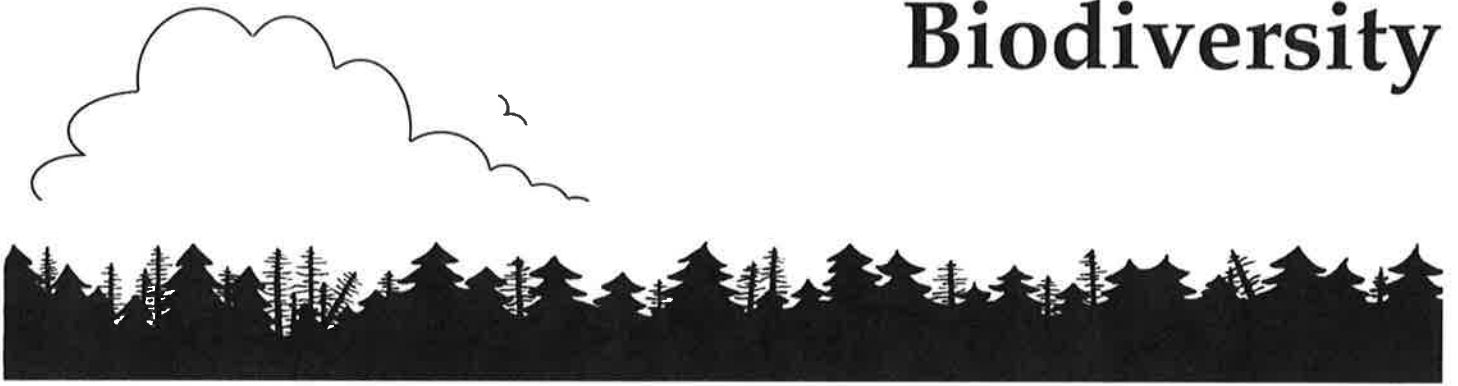
- specify initial attack targets which include fire suppression resources required and response times by zone, depending upon fire danger.

A local fire suppression and initial response plan should be established to identify:

- fire suppression tools to be purchased for the community, their storage and maintenance,
- methods, equipment and other resources needed for the initial attack of forest fires,
- an emergency response plan for the community,
- training for local fire crew members.

Agreements with other governments (i.e., provinces) may be negotiated in order to access and gain assistance from larger fire suppression programs.

Biodiversity



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XI BIODIVERSITY

Forest ecosystems are complex webs of interrelated parts and each part has a role to play in maintaining the whole system. Biodiversity is the biological diversity or variety of life in a forest. Biodiversity includes all life forms at differing scales, from the genes which make each individual in a species unique to all the different kinds of plants and animals to the different areas in which species live, whether it be a water body, a jack pine-black spruce biome or a west coast rainforest. Understanding the interactions between life forms and the forested areas in which they live and keeping these ecosystems healthy may help to limit the risk of fire, insects and disease and may contribute to proper forest maintenance and renewal.

There are three principles in managing for biodiversity within a forest land management plan:

1. Management for diversity must take place at a variety of scales from large forest landscapes to trapline areas to stands of trees to individual trees,
2. Management cannot provide for all species on every hectare of forest,
3. The variety of life makes it impossible to manage for each species individually.

Maintenance of the connections among all parts of a forest ecosystem is crucial to the integrity and health of the forest. Water, vegetation and animals are channels between various parts of the forest landscape. Diverse patches of forest habitat are important, but they will only remain healthy if they are connected.

Many forest activities threaten biodiversity by promoting over harvesting, loss of habitat, introduction of pollutants and exotic species. A forest land management plan should consider how biodiversity might be affected by forest activities.

Insect & Disease Protection



Cdn. Forest Service



XII INSECT AND DISEASE PROTECTION

Insects and disease are important parts of a forest ecosystem. These organisms play an important function in regenerating a forest, contributing to natural succession and in forming soils from dead trees. However, measures may be necessary to protect forest vegetation from insect and disease infestations. The Forest Insect and Disease Survey (FIDS) of the Canadian Forest Service has in the past identified major forest insects and diseases considered significant because of their potential or present economic, sociological or environmental impact. Some of these surveys are contained in the Reference section.

The following guidelines may help to minimize damage by insects and disease:

1. Identify areas susceptible to significant damage or mortality due to disease and insects, such as:
 - large forested areas containing only one species (monoculture) or trees of the same age (even-aged). These are more susceptible to insect infestation and disease than forests with varying aged (uneven-aged) trees and species diversity,
 - stands of trees under high levels of stress (i.e., acid rain, drought), and
 - stands of trees which are the favoured food of insects (eg., pine beetle/spruce budworm).
2. Maintain natural forests next to timber farms (monoculture commercial stands) as habitat for predators of insects and disease.
3. Introduce a variety of tree species into a monoculture to increase diversity.
4. Ensure biological and genetic diversity when regenerating the forest.
5. Thin and harvest forest stands to control infestations by removing susceptible tree species and age classes.
6. Evaluate the use of chemicals or biological sprays based on their potential harmful effects on human, fish and wildlife health, and using them only when their use has been endorsed by the community.
7. Establish a regular monitoring program to identify the beginnings of infestations and disease and to track changes; signs of infestation and disease should be reported immediately to protection experts.

Forest Values

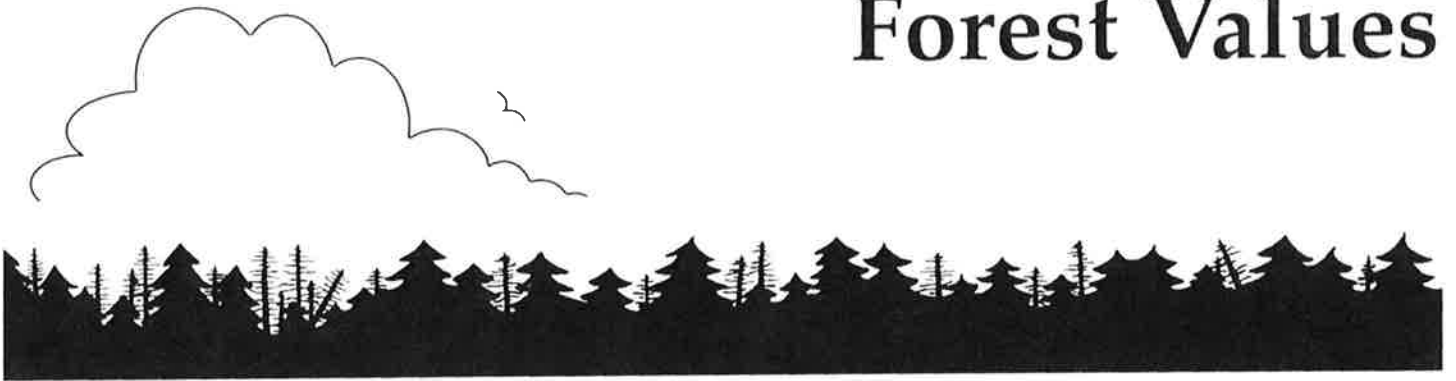


Photo by Jim Wallace



Photo by Peggy Smith



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Photo by Jim Wallace



XIII FOREST VALUES

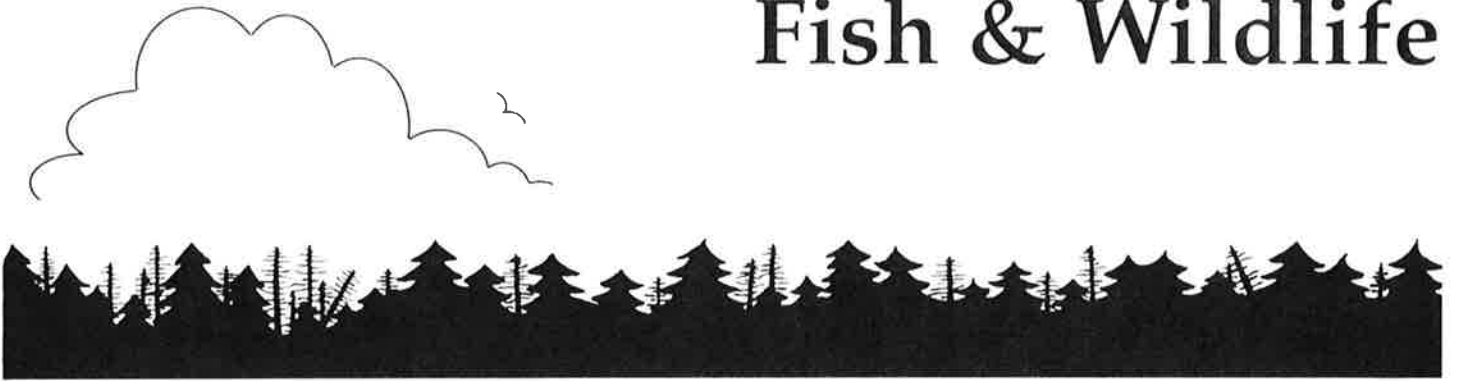
Communities use the forest for many reasons: food, medicine, shelter, clothing, a source of income from harvesting timber, non-timber vegetation, fish and wildlife, grazing domestic animals and recreation and tourism. Forests also have noncommercial values which must be respected.

The following chapters of the *Guidelines* focus on these uses or values outlining considerations to take into account when planning for extraction of these forest resources: fish and wildlife, non-timber vegetation, range, recreation and landscape and timber harvest and renewal.

A community may decide to concentrate on providing economic development from one particular forest resource or a combination of resources. In both cases, how any one resource is used will affect all other resources. Therefore, all forest values must be considered in forest land management planning.

These **Forest Values** (XIII-XVIII) chapters should be reviewed together with the **Forest Protection** (VI-XII) chapters when planning for the use of any forest resource.

Fish & Wildlife



*The Cree of Waskaganish Band,
James Bay*



Photo by Jim Wallace



XIV FISH AND WILDLIFE

Fish and wildlife harvesting has been and continues to be an essential part of the traditional Aboriginal economy. Hunting, fishing and gathering activities are not only economic activities, but also, in large part, define Aboriginal culture and spirituality. Fish and wildlife and the harvesting of them provide a sense of well-being, nutrition, a link to the land, a way of communicating with the Creator; also, clan systems and family relationships are structured around these activities. The Aboriginal right to pursue these traditional activities is recognized in some areas of Canada under treaties signed between the Crown and Aboriginal peoples and by the Constitution of Canada. Recognition of treaty or Aboriginal rights to harvest fish and wildlife means little if there is nothing to harvest.

Fish and wildlife need habitat to survive. The main needs of wildlife are food, water and a suitable habitat mix, requirements which vary with a season. For fish, clean water and spawning sites are part of this habitat mix. Management may focus on the maintenance or enhancement of habitat. A community may also choose to focus on a particular species because of its value to the local economy or because of its special habitat needs. Such species are often referred to as "indicator" species. A management system that combines consideration of individual species and the maintenance of a variety of habitats is best. Wildlife habitat management is a new and developing field. The reference chapter contains a local management guidelines by province and species.

TRADITIONAL ABORIGINAL MANAGEMENT SYSTEMS

Many traditional Aboriginal economies and spiritual and cultural activities were and continue to be based on hunting, fishing, trapping and gathering. This combined practical knowledge and spirituality, based on an intimate relationship with the land, makes Aboriginal culture unique and provides a special source of information for fish and wildlife management.

Every effort should be made to learn and use the knowledge of traditional management systems in formulating guidelines for fish and wildlife management by interviewing elders and community people still pursuing hunting, fishing, trapping and gathering as a way of life.

HABITAT MAINTENANCE

Maintaining or restoring different types of forest stands with trees and other plant life that make up the original forest will ensure that there are many kinds of habitats for wildlife species. The following guidelines are designed to maintain habitats:

1. Carry out an inventory of land types and watersheds [see Site Classification in Chapter IV and Chapter V, **Inventories and Mapping**] considering water body types, terrain,

soils, climate and vegetation.

2. Identify and map fish and wildlife species associated with identified land and water types, including how and when animals use the area.
3. Establish guidelines for forest land operations in or around identified areas. Specialized habitats such as mineral licks, denning sites, watering areas and nesting sites should be included.
4. An assessment of habitat areas according to their importance for the maintenance of fish and wildlife populations (eg., HIGH, MEDIUM, LOW) may be helpful, but should consider individual species requirements, type and season of use. For example, an area may be HIGH for caribou calving but LOW for winter habitat; a stretch of stream may be HIGH for migration but LOW for spawning.
5. Ensure the maintenance of habitat types necessary to support fish and wildlife populations.
6. Ensure a variety of successional stages and ecosystem types of sufficient individual size in the forest including:
 - forest openings containing grasses and herbaceous plants,
 - shrub-saplings,
 - pole timber,
 - mature timber,
 - old growth.
7. Ensure that habitats are not carved up by corridors and access roads.
8. Treat waterways and land surrounding them (riparian zones) to maintain fish, avian and terrestrial species dependent on riparian habitats,
9. Prevent disturbance of individual trees, plants and soil as necessary because of their importance to a particular wildlife species.

Water Bodies or Wetlands and Shorelines (Riparian Areas)

Riparian areas deserve special consideration because they are some of the most fragile and important fish and wildlife habitats, providing food, water and a variety of cover for many different species. The following guidelines should be considered in riparian areas:

- establish buffer zones or special management zones around water bodies,

- avoid excessive changes in the amount of woody debris found naturally in water bodies,
- prevent excessive siltation in water bodies caused by erosion,
- avoid removal of tree cover which would cause extreme temperature changes in and around water bodies,
- prevent the introduction of pollutants into water bodies.

Travel Corridors

Many wildlife species require protective cover when travelling. Travel corridors should be determined and mapped, including migration routes and resting areas. Provisions should be made to maintain protective cover in these areas.

Wintering Areas

Many wildlife species, especially large mammals like moose, deer, caribou and marten, have special winter habitat needs due to cold temperatures, deep snow and food shortages. Also, high visibility and restricted movement makes animals more vulnerable in winter to harassment by snowmobilers, people in small aircraft and unleashed dogs. Therefore, wintering grounds should be given special consideration.

Birthing/Nesting/Spawning Areas

As with wintering grounds, many species have special requirements for giving birth. Riparian areas and tree cover play an important part in fish and wildlife reproduction of fish and wildlife. Consideration should be given to maintaining or creating areas where fish and wildlife birth, nest or spawn.

Migration Staging Areas

Migration requires a large energy expenditure and thus large food intake. Certain areas of high food concentration are crucial to the survival, body condition and reproduction of some migratory species. Protection of such food areas should be ensured.

SPECIES MANAGEMENT

Special measures may need to be taken to protect individual species because of their economic, cultural or spiritual importance to the community. Individual species of particular importance to the community should be identified and appropriate measures taken to protect their habitat requirements. Management may also include setting harvest levels for animals which are hunted or trapped. Population counts, the number of people hunting or trapping, hunting and

trapping methods and available habitat should be considered. Traditional Aboriginal principles of respect for all living things, take only what you need, give back something when you take something and use what you take are important to remember in harvesting wildlife.

Rare, Threatened and Endangered Species

Rare, threatened and endangered species and their habitats should be protected. Species may be plentiful in one location, but rare elsewhere. This is called "extirpation"; species may be more plentiful on Reserve land than surrounding built-up lands off Reserve if the Reserve land is relatively untouched and provides good habitats.

Monitoring Fish and Wildlife Populations and Patterns

Various methods are used for monitoring fish and wildlife populations. Changes in population and/or behaviour may indicate problems which need to be addressed. An early warning system may prevent the depletion of fish and wildlife.

A monitoring system for fish and wildlife populations will act as an early warning system allowing measures to be developed to prevent depletion of these populations. Traditional ecological knowledge may be especially useful to understand trends; such information may not exist in the scientific literature.

Monitoring Contaminants in Fish and Wildlife

Most ecosystems are no longer the pristine wilderness of yesterday and are subject to increasing pollution from local and distant sources. Fish and wildlife should therefore be analysed periodically for chemical and metal substances. These pollutants can accumulate in the living tissues of organs and fat, resulting in glaringly obvious deformities or in subtle, effects found by microscopic and long-term observation. Generally, fish are more susceptible to such pollutants because they are small and constantly passing contaminated water through their gills and skin as well as eating contaminated food. The larger and older the fish, the more contaminants will accumulate.

The toxicity of some pollutants will increase in concentration as they are passed up the food chain. Therefore, people who eat large amounts of contaminated fish may be at risk. Women of childbearing age, pregnant women, breastfeeding mothers and children are at greater risk.

Non-timber Vegetation



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XV NON-TIMBER VEGETATION

Many kinds of plant life, other than trees for timber, are economically, culturally and spiritually important to many Aboriginal communities. Berries, mushrooms, nuts, seeds, roots, bark, maple products, wild rice and a variety of plants are used for food, medicine and ceremonies.

Society is now beginning to recognize the economic importance of forest products other than timber for pulp and paper and lumber sales. Forest products such as wild rice, pine, chanterelle, oyster and other mushrooms and many berries are becoming a commercial success with a very high market price. However, these "trend" foods are dependent on consumers with a disposable income who are always looking for new taste sensations. The market can be unstable.

Planning for the management of forest vegetation other than timber should include:

- an inventory and mapping of non-timber vegetation within the planning area,
- a description of how the vegetation is associated with soils, light, other plants, climate and different stages of forest growth, (eg. blueberries, huckleberries and raspberries are more often associated with early forest growth, such as that after a fire or logging),
- a statement of management principles and guidelines to protect important non-timber vegetation from competing activities.
- standards for harvesting activities of non-timber vegetation throughout the forest land management area, including:
 - acceptable harvesting levels,
 - methods of enhancing and regenerating non-timber vegetation
 - volume,
 - user rights,
 - a monitoring mechanism to determine plan success.

Community involvement, particularly of elders, will be a critical component in managing non-timber vegetation. In most communities, elders hold the key to culturally and environmentally significant information. The inclusion and cooperation of community elders will be critical to gathering as much information as possible. Most tribal groups have extensive knowledge of vegetation used for spiritual, subsistence and medicinal purposes, but not much of this information is documented. Documenting this information may help to ensure the continued growth of this vegetation and its traditional uses.

MUSHROOMS

Commercial harvesting of edible wild mushrooms is increasing steadily as demand and prices

increase. The most commonly harvested species include the pine mushroom in B.C. (*Armillaria ponderosa*), morels (*Morchella* spp.) and chanterelles (*Cantharellus cibarius*). Many other edible species are also harvested in minor amounts.

Mushrooms are the "fruit" of a fungus that lives in the soil or litter of the forest. Mushrooms produce spores which are transferred by wind or animals to create new fungal bodies elsewhere. Some of these fungi (a group called mycorrhiza) are critical to proper functioning of the forest. They live in a symbiotic relationship with most trees, i.e., they help each other. The squirrel is the most important, and sometimes only, transporter of mycorrhizal spores in most northern forests.

In order to produce an annual crop of mushrooms and to retain the proper functioning of the forest, it is very important to preserve the unseen fungi that produce the mushrooms. Suggested practices include:

- pick or cut mushrooms one by one,
- do not rake or otherwise disturb the forest floor,
- pick only the mushrooms you can use (broken or wormy mushrooms may still be spreading spores), and
- do not remove or disturb moss where more mushrooms are continuously growing.

It is possible to identify potential mushroom sites by recording the site conditions of each stand of mushrooms. This varies from region to region and is not well documented. Key site characteristics include soil types, over story species, elevation, aspect and history (e.g., fire or other disturbance).

Factors to consider when planning other forest land operations include:

- the possible harvesting of mushrooms throughout the summer months, depending on species,
- disturbance of the forest floor or soil may destroy the mushroom producing fungi,
- the importance of mushrooms as part of the forest ecosystem.

WILD RICE

Requirements for wild rice growth will vary according to regions, but general requirements include:

- water depth 40 cm to 105 cm (1½ to 3½ feet) deep, depending upon the transparency of the water and the strain of rice,
- moderate and gradual water depth changes throughout the growing season,

- slow water movement to mix nutrients from the bottom (not land locked lakes or stagnant ponds),
- "tea-coloured" waters where you can see to at least 45 cm (18 inches), i.e., not too clear and not too cloudy,
- an absence of competing vegetation, although other plants such as waterlilies and pondweeds may already be present,
- organic soils with a mixture of silt and clay at least 45 cm (18 inches) deep that is not loose mud or doesn't stick to the paddle, and
- protection from strong winds or waves.

Potential wild rice areas should be identified within forest boundaries and examined in more detail for existing wild rice and potential commercial wild rice production. Other factors such as growing stock, accessibility, markets, production costs and business experience should be considered for commercial operations. Traditional Aboriginal wild rice harvesters have often seeded new lakes for both domestic and commercial consumption when existing rice beds have been lost due to flooding.

Factors that should be considered when planning other forest land operations include:

- wild rice harvesting occurs in late August through September,
- wild rice is very sensitive to changes in water levels, flows and quality, particularly at the long leaf stage,
- wild rice markets are subject to extreme fluctuations, and
- wild rice is an important and desired source of food for waterfowl if there is a wish to maintain or attract these populations.

BERRIES, HERBS AND OTHER NON-TIMBER VEGETATION

Berries are the "fruit" of various plants and shrubs. Each plant species has its own set of specific, and often unique, growing conditions. However, there is very little information about growing conditions for forest vegetation other than commercial tree species. The following steps are a preparation guide for managing non-timber vegetation:

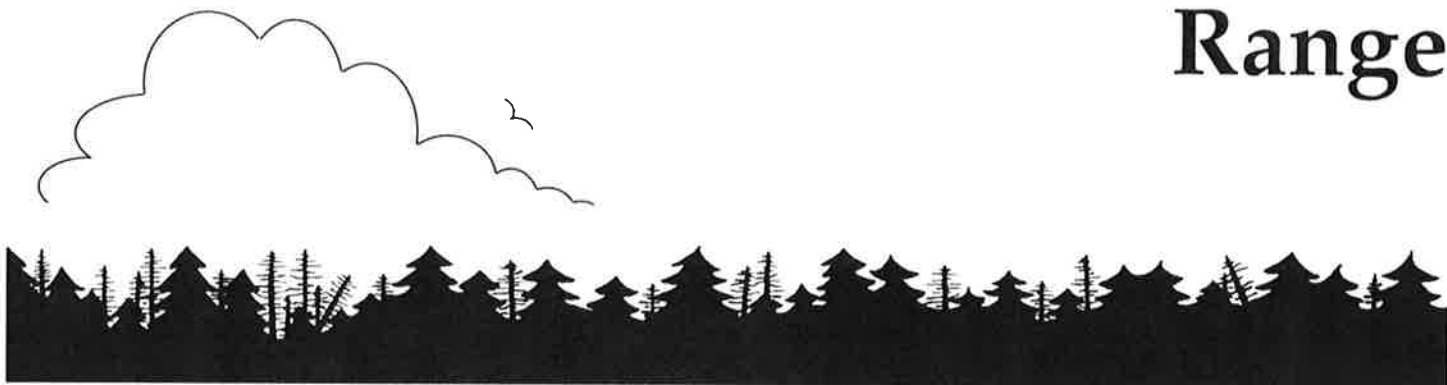
1. Find the scientific name for the plant species (check the local natural resources/forest ministry office, library or science teacher).
2. Do a literature search on the plant using its scientific name. Botanical journals, research papers, medicinal plant documents and plant identification guides are good sources of information to identify site conditions, and more important, growing conditions.

3. Record site characteristics of known areas where the plant now grows, including location, soil type, elevation, aspect, over story and history (e.g., fire or other disturbance).
4. Develop a chart of the growing cycle and required growing conditions for the plant species.
5. Match growth requirements with suitable sites.
6. Collect seeds from plants already growing in the local area, if possible. Caution should be exercised when introducing new species which may invade an area if they have no competition.

Factors that should be considered with other forest land operations vary from species to species. Some species may be eliminated, while others may flourish with disturbance. Potential impacts on the plant from other activities, such as timber harvesting, should be assessed from information collected and modifications made to the operation to avoid altering growing conditions. Rare and endangered plant species should be protected.

Pesticides have been used to get rid of "undesirable" vegetation, often berries, herbs and smaller plants eaten by people or wildlife. If spraying does occur, community members should be informed so that people do not unknowingly eat and get sick from plants sprayed with pesticides.

Range



XVI RANGE

In many Aboriginal communities ranching is an important economic activity. Livestock may be grazed in mature and immature forests and managed with wildlife in timber plantations and within community watersheds. If managed properly, the potential damage livestock grazing may have on wildlife populations, community drinking water, soils prone to erosion and young forests can be reduced.

Timber harvesting can have a beneficial impact on the food supply for domestic animals because smaller plants and shrubs grow well in sunlight let in by openings in the forest canopy. Increased access due to roads and the placement of timber cut blocks may benefit range management, but may also hinder the handling of livestock. The following guidelines should be considered in range management:

- historic travel corridors for livestock such as stock trails and old roadbeds should be maintained through logged areas or alternative trails should be built to replace original corridors,
- the timing of timber harvest and livestock movements should be co-ordinated to reduce damage from overuse (eg., soil disturbance and grazing in young plantations because adjacent timber harvesting removes grazing areas). Livestock may have to be moved or fenced,
- where it may be difficult to control livestock movement when new roads or trails are built, cut block patterns should be designed to maintain natural barriers. In some cases it may be necessary to defer timber harvesting until fencing can be done to control livestock movement,
- livestock watering areas should be protected,
- where possible, roads should be constructed and road banks seeded two years before timber harvesting to allow ranchers time to revise existing range management plans for the area.
- livestock should be free of disease to protect against infecting other wildlife susceptible to the same disease, i.e., rabies, brucellosis, Lime disease.

RANGE MANAGEMENT PLANNING

Range management planning should include:

1. A map showing the range area.
2. The number of animals to be grazed at different times of the year.
3. Roads and trails.
4. The location of fences and natural barriers.
5. Proposed range improvements such as seeding, burning, weed species control, location

- of water sources and predator control.
- 6. Turn out dates.
- 7. Other uses in the grazing area.
- 8. Start and termination of grazing permits.
- 9. Limitations to grazing due to community water, wildlife, erosion prone areas, timber growing areas and other environmental considerations.
- 10. Humane predator prevention or capture methods.
- 11. Type of transportation to range area, such as horse, 4-wheel drive, RV buggy.

Recreation & Landscape



*The Cree of Waskaganish Band,
James Bay*



Photo by Jim Wallace



XVII RECREATION AND LANDSCAPE

The forest is a place of spiritual renewal and identifies our home and place. Forest landscapes provide a beautiful and enriching recreational experience. Hunting and fishing, hiking and skiing, wilderness lodges and cottages can provide Aboriginal communities with sustainable annual revenue. Recreation and tourism are becoming the fastest growing commercial industry in many parts of Canada. The industry can provide an important opportunity for economic development for Aboriginal communities.

The purpose of planning for forest recreation is to ensure that recreation, wilderness and landscape values are considered and protected in overall forest land management. Also, recreation sites, trails and access should be designed so as to minimize the impact on wildlife, water, soil and other forest values. Access roads should be built to the minimum requirements as outlined in Chapter VII.

Recreation management planning should include:

- the Aboriginal community's recreation management goals,
- an inventory of current and potential recreation sites,
- plans for the provision and maintenance of recreation sites and trails conforming to environmental standards,
- protection for spiritual and cultural values, wildlife habitat and biodiversity in recreation areas,
- consideration of landscape views from recreation areas, such as roads, hiking trails and water routes.

SITE PLANNING

The type of recreation facilities will depend on the kind of service the Aboriginal community decides to provide. Ecosystem conditions should be taken into consideration. For example, if the trail is in a wetland with variable water levels, a board walk might be built with material that floats and therefore adjusts to water levels. Facilities could include campsites, picnic sites, boat launches and structures such as tables, toilets, signs and shelters. Consideration should be given to fire and other safety precautions, as well as to whether fireplaces and firewood will be provided. Care should be taken with the finish used on signs and other wooden materials because many wood preservatives are toxic to the soil, water, plants and animals.

Recreation site planning may include input from the following specialists:

- the Aboriginal community's forest land management advisor who will help to integrate

- the recreation component into the forest land management plan,
- a recreation specialist with knowledge of user requirements,
- a local recreation planner who is responsible for the recreation management section of the forest land management plan,
- an operational person who is responsible for the construction, management and maintenance of recreation sites,
- a landscape architect responsible for the visual aspects of recreation site design.

Recreation site planning should answer the following questions:

1. Where will the sites be located?
2. What is on the site?
3. What are the environmental and economic impacts of site development?
4. How will the sites be designed? This should include a site plan which shows the location and design of all roads, trails, facilities and structures, including costs.

Site Construction

Site construction involves:

1. Staking and flagging of the site to mark.
2. Right-of-way clearing including:
 - clearing, grubbing, trimming and removing timber and brush, and
 - removal of dangerous trees which may be subject to blowdown.
3. Construction of roads, trails, campsites and other facilities which must be monitored closely to ensure that design standards are met.
4. Building of structures on sites, such as tables, toilets, signs and buildings.

It is essential that the recreation or forest officer representing the Aboriginal community monitor all phases of construction to ensure that all standards, including environmental protection, are met. The Aboriginal community may decide to provide local training and employment or to contract out site construction.

RECREATION TRAIL MANAGEMENT

The purpose of managing forest trails is to ensure that they are safe, sanitary, socially acceptable and environmentally sound. Where trails have a low impact, such as for hunting, there is little need for trail management, but where trails are for commercial recreation and are heavily used, it is important that they be well designed, built and maintained. Chapter VII contains guidelines for the planning, construction and maintenance of forest trails.

In some areas, it may be desirable to provide educational information, either in the form of permanent trail signs or of pamphlets. Such information tends to encourage respect for the habitat and wildlife.

NATURE-BASED TOURISM

An Aboriginal community may wish to promote nature-based tourism in relatively isolated and undisturbed natural areas. Low-impact recreational uses, such as day hiking or canoeing, would prohibit the use of motorized vehicles to maintain the character of these areas. Employment may be generated by having community members act as guides. Where an Aboriginal community wants to protect an area from trespassing and maintain it in its original state, the area should be defined on a map and use restricted to activities that do not change its original character.

LANDSCAPE MANAGEMENT

Forest roads and timber harvesting operations should be designed to avoid changing the visual landscape which can be seen from communities, recreation sites and travel routes. The objective of visual landscape management is to allow timber harvesting and road operations while maintaining the visual quality of a landscape. Landscapes can be treated according to their visual importance by preservation, full or partial retention or modification of landscape values.

Preservation

Preservation applies to areas where landscape values are very high and outweigh other forest land values. These areas might be near communities, recreation sites, along travel routes or waterways or where there are other special values. The following apply:

- no timber harvesting or road operation within this area should be visible,
- acceptable activities are tree falling and disposal for insect and disease control, fire protection, campsite and trail clearing, hunting and trapping, range management activities and low-impact road and access construction.

Retention

Retention applies to areas where landscape values are high but timber harvesting operations or road building are also important. These areas might include forested lands on steep slopes that are visible from communities, important view sites, recreation sites and shorelines. The intention in the retention area is to allow low-impact forestry activities that are not noticed by the average viewer. Some visual change may be noticed but the forestry operation is

conducted in such a way that it appears to be part of the natural landscape. Visual landscape considerations must be made early when planning is done for road construction, timber harvesting and forest renewal systems and any other forest land operations which will have an impact on the visual landscape. To retain high landscape values the following apply:

- selection timber harvesting or other partial cutting systems should be used, retaining sufficient residual crown closure and cutting along contour lines so that openings made by timber harvesting are not immediately noticeable,
- hidden areas may be harvested by small clearcuts,
- placement of roads and landings should take advantage of topography and vegetative screening to make them less visible,
- roads should be planned and constructed with narrow rights-of-way, debris cleanup and grass seeding on cut-and-fill slopes.

Partial Retention

Partial retention applies to areas where landscape values are moderate to high and where forest development activities can match the landscape character without obviously changing the view. These activities may be noticeable but do not immediately draw viewers' attention. Visual change is evident but generally blends with naturally occurring form, line, colour and texture. Partial retention may apply along travel corridors, in areas of minor forest use by recreationists and where timber harvesting is an important economic activity. The following should be considered to partially retain landscape values:

- selection timber harvesting and other partial cutting systems often best maintain visual quality objectives,
- clearcut timber harvesting may be appropriate where: the size of cut blocks is similar to naturally existing openings and openings do not dominate the view, the shape of cut blocks follows existing form, line, colour and texture, and the size and shape of cut blocks are influenced by surface variation, vegetation patterns, including natural screens, and the viewing angle and distance.

Modification

Modification applies to areas where landscape values are moderate to low and where forest land operations are immediately noticeable and draw viewers' attention. This type of landscape treatment is used away from communities, well-travelled routes and recreation sites. The major emphasis in such areas is on timber harvesting and the following guidelines apply:

- clearcut and selection timber harvesting systems may be used,
- the size, shape and pattern of cut blocks should be designed so as to minimize to

- overall impact,
- the size and shape of cut blocks should be influenced by topographic variation, vegetation patterns, screening, viewing angle and distance,
 - the size, shape and location of cut blocks and the timing of timber harvesting road construction should consider range and wildlife values,
 - other forest-related activities are acceptable but may be restricted by timber harvesting activities.

Timber Harvest & Renewal

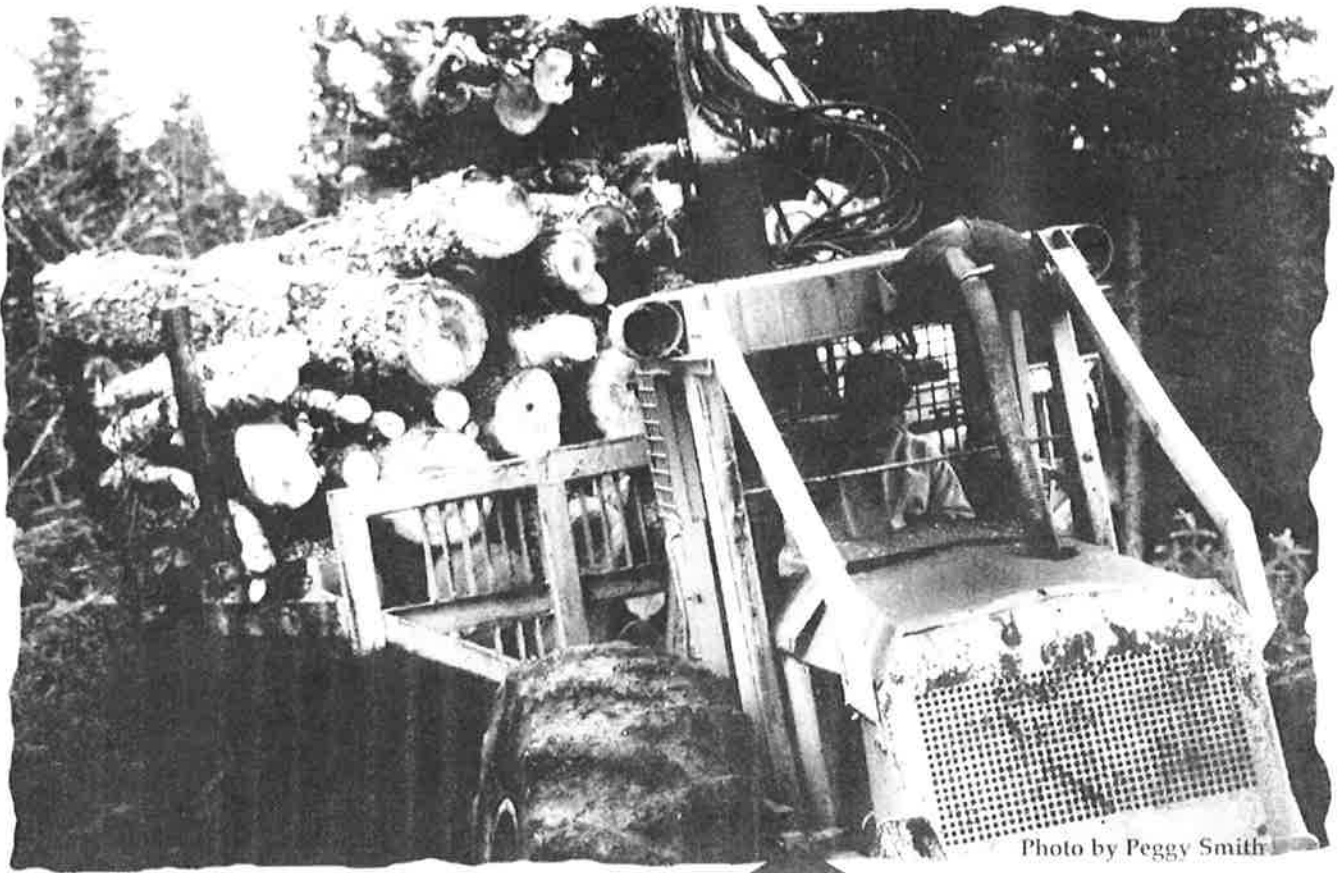
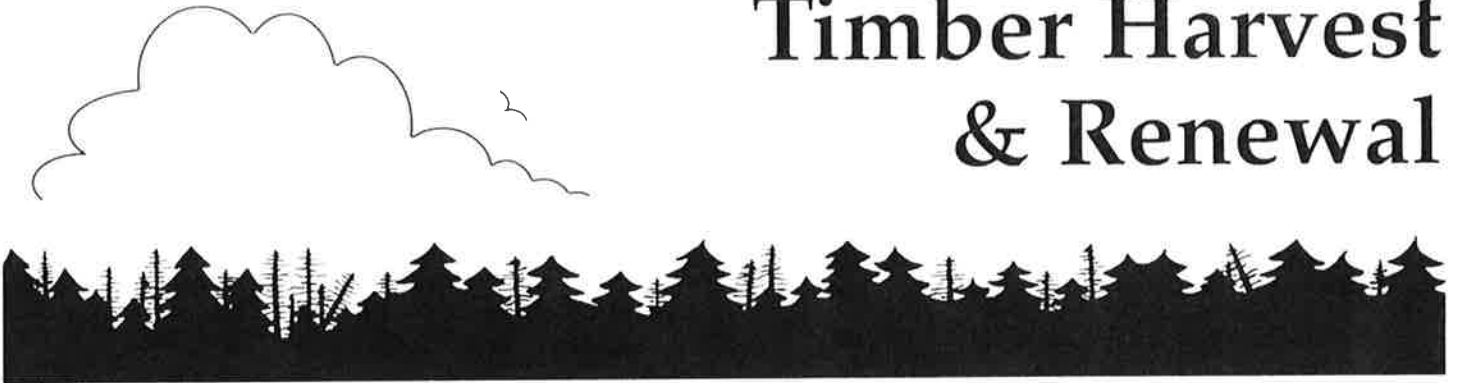


Photo by Peggy Smith

*Improvement cutting at Eel
Ground, First Nation, N.B.*



XVIII TIMBER HARVEST AND RENEWAL

Silviculture is the activity of establishing, tending and harvesting forest stands over a long period of time. It is important to design timber harvesting systems that promote and complement reforestation. Reforestation is the reestablishment of a healthy forest after timber harvesting, fire, disease or insect infestation or some other natural or human-caused disaster. A basic principle of any harvesting operation should be to ensure forest renewal. If reforestation is in doubt, harvesting should not take place. The following types of silvicultural systems are used depending on environmental and economic factors.

HARVEST AND RENEWAL SYSTEMS

Shelterwood and Seed Tree Methods

Both these methods create even-aged stands by leaving trees as a seed and/or shade source. Seed trees may be left standing until a new crop is established. With the shelterwood method, trees are progressively removed through a series of cutting cycles which may be done in two or three passes. Natural reproduction starts under the protection of the older stand, which is finally cut when the new crop needs more sun and nutrients (Smith, 1986).

Selection Systems and Uneven-Aged Management

An uneven-aged stand contains several well-defined age classes, with tree species differing in height, age and diameter. In the selection method of regeneration, mature timber is removed either as single trees or in small groups at relatively short intervals. To maintain three age classes, there should be several cuttings, separated by major intervals of time over the course of at least one rotation (Smith, 1986).

Clearcutting

Clearcutting removes almost all timber from a stand, leaving the growing space available for new trees and plants. It is a method which should be used only with species that are capable of establishment, including planting, in conditions of full exposure to sun (Smith, 1986). Clearcut sites can be reforested by using artificial or natural regeneration.

Clearcutting with artificial regeneration involves replacing removed trees by planting or direct seeding. Clearcutting followed by natural regeneration involves seeding from trees adjacent to the cut or from seed stored in the forest floor. The width or size of the clearcut area must be determined on the basis of the seed dispersal distance and shade tolerance. Strip or patch clearcutting are methods used for natural regeneration. Site preparation of the forest floor is often essential to prepare micro sites for seed germination.

HARVEST AND RENEWAL PLANNING

Harvesting and renewal planning involves collecting inventory data on forest sites before and after natural and human disturbances, and planning treatments to return the site to some form of forest. The goal of harvesting and renewal planning should be to restore forest stands to their original vigour, retaining biodiversity and protecting fish and wildlife and other plant species. Reforestation is a complex activity that requires accurate information on soils, climate, topography and the biological growth and interaction of trees, vegetation, wildlife, insect, bird and other species.

Poor planning may result in failed renewal treatments where goals are not met and there is a subsequent loss of tree species, vegetation, biodiversity, water and/or soil. Accurate surveys, maps and biological data, using tools such as the forest ecosystem classification systems, are essential to harvest and renewal planning. Harvest and renewal treatments may be expensive, so accurate knowledge of human capabilities and contracting costs are important for cost estimates and contract administration.

Details on collecting inventory data are contained in Chapter IV, **Forest Land Management Plan**, Selection and Description of Forest Land, and Chapter V, **Inventories and Mapping**.

TIMBER HARVESTING

The objective of timber harvesting should be to remove timber in an economic manner, but, more important, to ensure that forest stands are regenerated, that all forest values are considered, that biological diversity is maintained and that no environmental degradation occurs. Harvesting and renewal systems should be chosen which are suited to the regeneration of the desired species.

The following should be considered in harvesting plans (modified from Forestry Sectoral Task Force Report, Ontario Round Table on Environment and Economy, 1991):

- the growing characteristics of the species being harvested,
- current stand and forest age-class distribution, including advance growth in the understorey,
- an assessment of stand/forest health, including long-term site productivity and future risks from fire, insects, disease, snow, drought.
- harvesting system economics,
- requirements for wood quantity and quality,
- soil type, quality, nutrient capital, sensitivity, slope and plant succession after disturbance,
- access requirements, including special requirements for sensitive sites, eg. winter

- timber harvesting,
- wildlife requirements,
- degree and type of recreational use,
- impact on indigenous species (plant and animal) and their habitat requirements,
- presence of rare, threatened and endangered species (plant and animal) and their habitat requirements,
- maintaining or improving water quality and water levels,
- maintaining or improving species (plant and animal) diversity,
- presence of historically or culturally sensitive areas, and
- traditional harvesting (hunting, trapping, fishing and gathering) activities.

In addition to the general steps outlined in Chapter IV, **Forest Land Management Plan**, the following steps should be included in timber harvesting planning:

- Decide on harvest and renewal system,
- Determine rotation or cutting cycles,
- Calculate the allowable cut and areas to be cut,
- Determine and schedule regeneration methods and tending,
- Determine appropriate model to use, because decisions concerning harvest and renewal systems, regeneration methods, cutting cycles and volume of cut depend upon the use of a mathematical model.

Detailed Cut Block Planning

Detailed planning should be carried out for areas which have been designated as sensitive or requiring special treatment to address a particular concern.

All cut block plans should include the following information:

- location of roads, landings and main skid trails,
- skidding direction,
- location of drainage, steep slopes, unstable and erodible soils, springs and water source areas,
- location and type of water course crossings to be installed and method of installation and removal,
- location of protective buffers for water courses, water source areas or wildlife habitat features,
- provisions to address historical or archaeological considerations,
- location, description and density of both forest understorey and forest floor, and how these will be protected during harvesting,
- renewal treatments required and proposed.

Surveys

Silviculture surveys promote an understanding of forest capability and provide the information necessary for the planning of harvesting and renewal operations. These surveys should be the most important activity before any reforestation takes place. The impact of timber harvesting and site disturbance on forest succession should be stressed and well understood. The surveys describe the forest ecosystem and recommend treatments such as site preparation, planting, and stand tending treatments based on site capabilities and management objectives.

There are a number of different surveys used which may vary from province to province. These surveys may not be necessarily appropriate or thorough because they may not take into account other users (including trappers and wildlife) and uses of the forest. Provincial natural resources' ministries have forms and guidelines necessary to do these surveys.

Reconnaissance: A survey used in planning the specific types of detailed silviculture surveys that should be done over an area; if for a drainage system, it may be called a drainage survey.

Pre-harvest Silviculture Prescription: Carried out before timber harvesting, this survey develops prescriptions for harvesting and renewal based on an understanding of specific site conditions.

Fertilization and Nutrient: Determines the nutrient needs of an area to plan fertilization operations.

Planting Prescription: Gathers sufficient information to determine the number, location and species of seedlings required over a planting site. Done in conjunction with stocking surveys.

Survival: Determines the number and spacing of seedlings that have survived after planting in order to assess the success of a planting operation and whether more trees need to be planted.

Stocking: Determines the number and spacing of trees in an area to determine whether planting or stand tending is necessary.

Free Growing/Free-to-Grow: Determines whether an area is sufficiently reforested with a healthy forest that will grow to maturity with a minimum of tending. The definition of free-to-grow varies from province to province with definitions considering stocking of acceptable species and/or height.

Pest and Disease: Determines the extent and infestation of insects or disease in an area.

Pre-spacing: Determines species and stems per area and recommends spacing treatment.

Brush and Weed: Determines the extent of competing vegetation on an area and recommends silviculture treatment.

Commercial Thinning: Determines whether an area has the species composition and volume required for an economic thinning operation.

Rotation Age or Cutting Cycle

The rotation age is the time from harvest to the next harvest age. A cutting cycle is the time between cuts. Depending on the silvicultural system chosen, a rotation age for even-aged management (clearcutting, seed tree and shelterwood methods) or cutting cycle for uneven-aged systems must be determined. The rotation should be based on:

Allowable Cut

The calculation of the allowable cut is often a complex mathematical calculation based on area or volume, age and time. The method used to calculate the allowable cut depends on the silvicultural system chosen. Calculation of Allowable Cut should be done with the assistance of a qualified Registered Professional Forester.

FOREST RENEWAL

Following harvesting, and dependent on the silvicultural system used, artificial (planting or direct seeding) or natural regeneration (by seeding or suckering) will follow. The following principles apply:

- a pre-harvest silvicultural prescription must be prepared before any harvesting operation which details the condition of the stand prior to harvesting, the expected forest growth following harvesting and how and when reforestation operations will occur,
- silvicultural operations should take into account the biodiversity of the original forest, water, soil, wildlife, range and recreation values,
- a diverse forest should be reforested that provides for the needs of all forest life.

Seed Collection

The objective of a seed tree collection operation is to provide a supply of high quality seeds of

the required tree species. Most Aboriginal communities will purchase seedlings from established nurseries. Many Aboriginal people are involved in cone collection for commercial seeding. Where an Aboriginal community operates a forest nursery, it may choose to either purchase seeds from a seed-collecting company or collect the seed. Seed should be gathered from areas which ecologically match planting areas. Most provincial natural resource ministries have appropriate standards and guidelines for seed collection and storage.

Site Preparation

Site preparation is the preparation of soil and site for natural or planted regeneration. The goal is to achieve a soil mix (mineral and organic) suitable for the species being planted. The choice of site preparation is dependent upon the requirements of the species being planted, seeded or naturally regenerated. Site preparation may coincidentally reduce timber harvesting debris which is a fire hazard, give easier access to planters and/or control competing vegetation and pests.

Methods used in site preparation are:

Prescribed Burning: Fire is used to imitate natural conditions. For example, Boreal forest spruce and pine require high heat to release their seed, naturally regenerating in mineral soil exposed by fire. Burning may also produce a short-term increase in forage for wildlife and cattle and give a site a quick burst of fertilizer.

Mechanical Site Preparation: Designed to create a favourable growing site for seedlings by mixing mineral soil and organic matter through a variety of methods including scalping, trenching, plowing, mixing and mounding. The equipment and method chosen should meet the requirements of the species being regenerated. Care should be taken not to create excessive soil disturbance.

Chemical Site Preparation: Kills competing plant species with a chosen herbicide. Care must be used because chemicals may also kill vegetation and insect species eaten by wildlife, pollute water bodies and harm human health. Aboriginal communities may choose to ban the use of chemical control.

Hand Site Preparation: Often done at the time of planting to expose mineral soil for seedling planting and reduce competing vegetation.

Planting

Planting is a very complex renewal operation that involves surveying potential planting sites, preparing maps and prescriptions, planting, monitoring and evaluating seedling survival and

health and tending as necessary. All provinces and territories with forestry operations have detailed planting guides for the species and climate in their area. Aboriginal communities may decide to follow these provincial procedures and guidelines, but they should be aware that existing guidelines may not be reliable for their local area. Many provinces are very extensive in size, particularly in a north-south direction. In general, the quality and quantity of information decrease further north. As a result, some forestry models tend to lose their reliability for northern areas. As with other aspects of forestry, Aboriginal communities have the opportunity to lead the way in setting standards, since present standards are often minimal.

Planning: Planting times vary depending on geographical location, tree species requirements, climatic conditions and the availability of planting stock. Planning must take into account:

- planting objectives with an understanding of site and species characteristics,
- assessment of sites to be planted,
- road access,
- type and size of planting stock,
- ordering, transportation, delivery and storage of planting stock,
- living conditions for planting crews,
- assessment of planting quality, and
- monitoring and administration of planting operations.

Plans, including maps and prescriptions, must be prepared by a qualified forester in a form useable by planting crews.

Care and Handling of Seedlings: Seedlings must be ordered from the nursery and shipped based on species desired, size, type and age of seedlings and considering the rate of planting by the crew. The species planted must be ecologically suited to the planting area. Seedlings must be transported and stored in a cool, damp, but not wet, environment to ensure survival.

Planting Standards: Planting standards vary with species, site conditions and the objective of the silviculture operation. Each province has standards for different purposes and climatic zones.

Planting Procedures: Similar to planting standards, each province has established procedures taking into account such things as worker safety, camp and working conditions and planting techniques.

Planting Evaluation: Survival or regeneration surveys must be done to ascertain the success of the planting operation, determine further planting requirements and to calculate payment to contractors.

Stand Tending

This aspect of regeneration involves tending the young forest once it has been established by natural regeneration, seeding or planting. Often there are too many young trees competing for available water, light and nutrients in the soil. Stand tending changes the species composition of the new forest by removing unwanted vegetation. The objectives of stand tending can be to improve tree growth for commercial harvesting purposes, stand value based on projected markets, wildlife and cattle habitat and/or water retention and soil stability. Stand tending methods range from mechanical removal of competing vegetation with brush saws, chemical control

In general, labour-intensive methods should be favoured for stand tending, as for all aspects of forestry, because these methods provide maximum employment with minimal environmental disturbance (with some exceptions).

Pre-Stand Tending Surveys: As outlined under silviculture surveys, pre-stand tending surveys are done to determine the stocking of an area so that treatments can be planned to reduce the number of young trees in an area to meet forest land management objectives.

Brushing and Weeding: Removes competing vegetation during the seedling stage of forest growth. Care must be taken to leave vegetation species for other than timber harvest purposes and to leave species for wildlife, fish and to protect riparian zones. This treatment can be done with mechanical, manual or chemical means. In recent years, experiments have been carried out using animals to control vegetation and more emphasis has been placed on finding nonchemical means to control vegetation.

Juvenile Spacing: Reduces the number of trees in a given area (density) to improve tree growth, species composition and crop tree quality in young forests. It can also encourage forage production and open up otherwise inaccessible stands to wildlife and cattle. Spacing can be done with power saws, brush saws or clippers.

Sanitation Spacing: Removes trees that are endangering the health of other trees in the stand. An example of sanitation spacing is removing trees infected by disease or insects. This may involve burning or otherwise removing infected trees to reduce the spread of the disease or insects.

Commercial Thinning: This operation has a similar objective as spacing: to improve tree growth and stand characteristics. Trees are thinned when they have a commercial value.

Fertilization: Done to improve soil fertility and tree growth with natural or chemical substances. It is often done at the time of juvenile spacing or commercial thinning to get the

maximum effect.

Conifer Release: Removes larger, less desirable species that overtop or compete with more desirable conifer species.

Site Rehabilitation: Rehabilitating unproductive forest land to desired species. Rehabilitation may include an improvement cut or salvage timber harvesting, site preparation and planting. Site rehabilitation can be an expensive operation.

Seed-Tree Control: Removes parent trees of undesirable species that spread seed into a new generation. This can be done by mechanical, manual or chemical means. Seed-tree control may not be desirable, because it is often practised in order to obtain stands of one species (monoculture) which run a greater risk of disease and insect infestation.

Pruning: Removes lower branches of crop trees to produce clear, knot-free wood, increasing the value of final wood products. Pruning should leave a sufficient live crown.

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