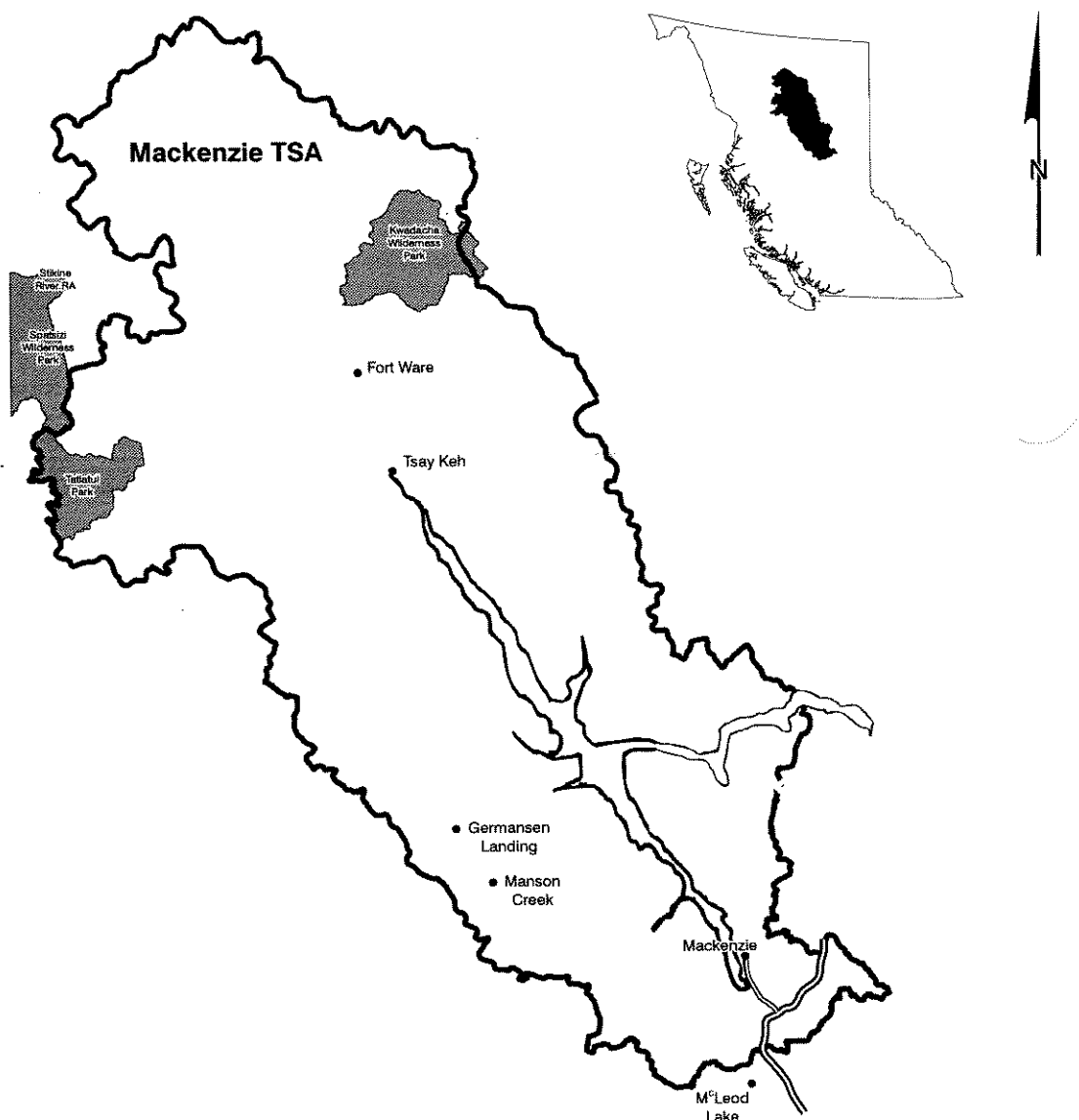




MINISTRY OF FORESTS

# Mackenzie Timber Supply Area

Timber Supply Review Discussion Paper  
September 1995



Province of  
British Columbia  
Ministry  
of Forests



# Mackenzie Timber Supply Area

## Timber Supply Review Highlights

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- The British Columbia Forest Service is reviewing the timber supply in all timber supply areas\* and tree farm licence\* areas in the province. This review examines the impacts of current forest management practices\* on the timber supply\*, economy, environment and social conditions of the local area and the province. Based on the results of this review, the chief forester may decide to adjust the allowable annual cut\* for the Mackenzie Timber Supply Area.
  - The current allowable annual cut in the Mackenzie Timber Supply Area, set in 1989, is 2,951,121 cubic metres per year. This harvest provides wood to four large sawmills, a pulpmill and a pulp and paper complex all in the town of Mackenzie. (page 4)
  - The timber industry is the most significant employment source in the area. Harvesting and processing timber from the Mackenzie Timber Supply Area supports approximately 2,394 person-years\* of employment in the local area. An additional 4,106 person-years of employment are created provincially. (page 5)
  - Based on the best information available on forest management practices being implemented in 1994 when the Timber Supply Review was initiated, the timber supply analysis indicates the current allowable annual cut may be maintained for 30 years. This is followed by a projected decline of approximately five per cent per decade over the next 20 years to 2.64 million cubic metres. This level is projected to continue for 60 years until the timber supply rises to the estimated long-term sustainable level of 2.81 million cubic metres. (page 7)
  - Several factors suggest that the short-term timber supply may be lower than predicted:
    - the number of harvesting entries required to meet integrated resource management objectives may be greater than estimated
    - the amount of merchantable timber in the existing mature forests may be overestimated
    - the regeneration delay may be longer than estimated (pages 7-8)
  - The short-term timber supply could be either greater or less than projected because:
    - unsalvaged timber losses may be higher or lower than estimated
    - several factors may interact to change the estimated size of the timber harvesting land base
    - minimum harvest ages may be different than estimated (pages 8-10)
  - There may be opportunities to partially offset projected reductions in timber supply by:
    - harvesting deciduous forests
    - intensive silvicultural treatments
    - commercial thinning (page 10)
  - The impact of adjustments in the timber supply on communities in the Mackenzie Timber Supply Area is an important consideration in this review. Mackenzie is particularly vulnerable because of its high dependence on the forest sector. (page 11)
  - The chief forester must determine an allowable annual cut as part of a strategy to achieve the projected long-term sustainable timber supply level. The base case forecast provides one alternative, but the chief forester may select another harvest level based on his consideration of the factors required under Section 7 of the *Forest Act*.
  - Another review of the timber supply in the Mackenzie Timber Supply Area will be completed within five years to incorporate updated forest inventory data, land-use decisions and new information on the impact of different forest management practices.
- \* Throughout this document, an asterisk at the end of a phrase indicates the phrase is defined in the definition section on the back of this page.

# Mackenzie Timber Supply Area

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## Definitions

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### **Allowable annual cut**

The rate of timber harvest permitted each year from a specified area of land, usually expressed as cubic metres of wood per year.

### **Base case forecast**

The timber supply forecast that illustrates the effect of current forest management practices on the timber supply using the best available information.

### **Commission on Resources and Environment (C.O.R.E.)**

An independent commission established to develop and test land-use planning processes in consultation with stakeholders.

### **Current forest management practices**

Forest practices that were being approved and implemented in the area when this review was initiated. These practices are described in this paper beginning on page 5.

### **Forest licence**

An agreement with the provincial government which grants a private interest the right to harvest a specific volume of timber each year from Crown land within a timber supply area.

### **Forest Practices Code**

A law which requires better forest practices, with heavy penalties for violators. Implementation of the Code began on June 15, 1995.

### **Green-up**

The time required for regenerated forests to reach a desired condition (usually a specific height) after harvesting to meet integrated resource management objectives and allow harvesting to take place in adjacent areas.

### **Integrated resource management**

The identification and consideration of all resource values, including social, economic and environmental needs, in resource planning and decision-making.

### **Land and Resource Management Plan**

A consensus-building process involving a cross section of the public, interest groups and government agencies, to establish resource management objectives and strategies for a management unit.

### **Person-year**

For the forest sector, a person-year is defined as the equivalent of one person working full-time for nine to 12 months. For example, one person working full-time for five to six months accounts for 0.5 person-years.

### **Protected Areas Strategy**

A provincial initiative to protect representative ecosystems and special features on a regional basis.

### **Riparian areas**

The stream bank and flood plain adjacent to streams or water bodies.

### **Timber harvesting land base**

Crown forest land within the timber supply area that is currently available for timber management and is considered feasible and economical for timber harvesting.

### **Timber supply**

The volume of timber available for harvesting over time, under a particular management regime.

### **Timber supply area**

An area of Crown land defined in accordance with the *Forest Act*, primarily by an established pattern of wood flow from the forest to the primary timber-using industries.

### **Tree farm licence**

An agreement entered into with the provincial government which provides for the establishment, management and harvesting of timber by a private interest on a defined area of Crown land in accordance with the *Forest Act*.

# Mackenzie Timber Supply Area

## Introduction

The British Columbia Forest Service is reviewing the timber supply in all timber supply areas\* and tree farm licence areas\* in the province. The objectives of this three-year review are to:

- identify the economic, environmental and social consequences of existing forest management practices—including their impacts on the short- and long-term timber supply
- identify where improved information is required to make reliable forecasts
- provide the chief forester with information to make necessary adjustments to the allowable annual cuts for the next five years

This discussion paper summarizes the technical reports from the Timber Supply Review for the Mackenzie Timber Supply Area and encourages British Columbians to comment on the findings. Public comments will be accepted until January 5, 1996. You will find a response form at the end of this paper to help you provide input.

## Background to the Timber Supply Review

For at least 20 years, governments have known that British Columbia's timber supply would decline in the future—we could not keep cutting at the rate we've been going. Now there is an urgent need for up-to-date information to review the timber supply and allowable annual cuts throughout the province.

A 1991 study completed by the Forest Service, *A Review of the Timber Supply Analysis Process for British Columbia*, examined the procedures which led to the determination of allowable annual cuts, and confirmed the need for change.

The study found that:

- existing allowable annual cuts were based on outdated information and management practices
- procedures failed to fully account for integrated resource management practices and protection of non-timber values
- procedures were far too time consuming
- analytical techniques had to be strengthened

The study also showed that because of these procedural weaknesses, very few timber supply analyses had been completed since the early 1980s, with few allowable annual cut adjustments.

The Forest Service acted quickly on the study's recommendations. The Timber Supply Review was initiated to assess short- and long-term timber supplies in light of current forest practices and integrated resource management goals.

## The chief forester's responsibility

Determining the allowable annual cuts for Crown forest lands in British Columbia is the responsibility of the province's chief forester. It is one of the chief forester's most important responsibilities since it affects the local and provincial economy and environment—now and in the future. Section 7 of the *Forest Act* requires the chief forester to consider the following factors to determine allowable annual cuts for Timber Supply Areas and tree farm licences:

- a) the rate of timber production that may be sustained from the area, taking into account:
  - the composition of the forest and its expected rate of growth
  - the time in which the forest will become re-established
  - silvicultural treatments, including reforestation
  - standards of timber utilization
  - constraints on the amount of timber produced

## Renewing our forests, securing our future

In British Columbia today, people are wrestling with one of the most complex and compelling issues of our time—the need to protect our environment and, at the same time, sustain our economy for present and future generations.

In addition to the Timber Supply Review, the government has a number of initiatives to create positive change for British Columbia:

- Forest Renewal BC is already creating hundreds of projects across the province to restore and protect the health of British Columbia's forests, create new forest jobs, and increase economic benefits from each tree harvested.
- The Forest Practices Code is ensuring new forestry standards and better management of the resource.
- The Protected Areas Strategy is doubling British Columbia's parks and protected wilderness—expanding parks and preserving pristine wilderness for our children's future.
- Through the work of dedicated British Columbians, the Commission on Resources and Environment and regional Land and Resource Management Plan teams, long-standing land-use debates are being resolved. The government has delivered land-use plans for Vancouver Island, the Cariboo-Chilcotin and the Kootenay-Boundary, and a Land and Resource Management Plan for the Kamloops area which mark important steps towards securing British Columbia's future.

# Mackenzie Timber Supply Area

- from the area due to use of the forest for purposes other than timber production
  - any other information which relates to the capability of the area to produce timber
- b) the short- and long-term implications to the province of alternative rates of timber harvesting from the area
- c) the nature, production capabilities, and timber requirements of established and proposed processing facilities
- d) the economic and social objectives of the Crown for the area, the region and the province, as expressed by the minister of forests
- e) abnormal insect or disease infestations and major salvage programs planned for the timber on the area

Some of these factors can be measured and analyzed—others cannot. Ultimately, the chief forester's determination is an independent, professional judgment based on the best available information. By law, the chief forester is independent of the political process and is not directed by the minister of forests when determining allowable annual cuts. In these determinations the chief forester considers relevant information from any source, including interest groups. However, he cannot allow these determinations to be inappropriately influenced by the advocacy efforts of any group.

## Timber Supply Review process

The Timber Supply Review is an improvement over past methods, with better information and superior analytical techniques. The process was designed to stimulate public discussion through the release of reports and this discussion paper, and to accommodate new information, techniques and ideas. Figure 1 illustrates the five-step process that has been

developed for the Timber Supply Review in Timber Supply Areas. The diagram also indicates the status of the Timber Supply Review for the Mackenzie area and the estimated time required to complete each step in the process.

As the legal mandate for allowable annual cut determinations for tree farm licence areas is the same as for timber supply areas, the timber supply review process for tree farm licences is based on similar principles, but it has been designed to reflect the management role of these licensees. In the past, tree farm licences have not included specified timelines for licensees to prepare the information needed by the chief forester to determine allowable annual cuts for these areas. To reflect changing forest management standards, replacement tree farm licences specify timelines for preparing information.

## A commitment to incorporate change

The *Forest Act* requires the chief forester to reassess the allowable annual cut for each timber supply area and tree farm licence area at least every five years after this review is completed to incorporate new information, new practices and government policies. Implementation of major government initiatives such as the Forest Practices Code, Protected Areas Strategy, and Land and Resource Management Plans may have significant impacts on the timber supply in specific timber supply areas and tree farm licences. In these cases, the chief forester may decide to determine the allowable annual cuts more frequently than every five years.

## Forest Practices Code

The *Forest Practices Code of British Columbia Act* became law on June 15, 1995 and is now being implemented.

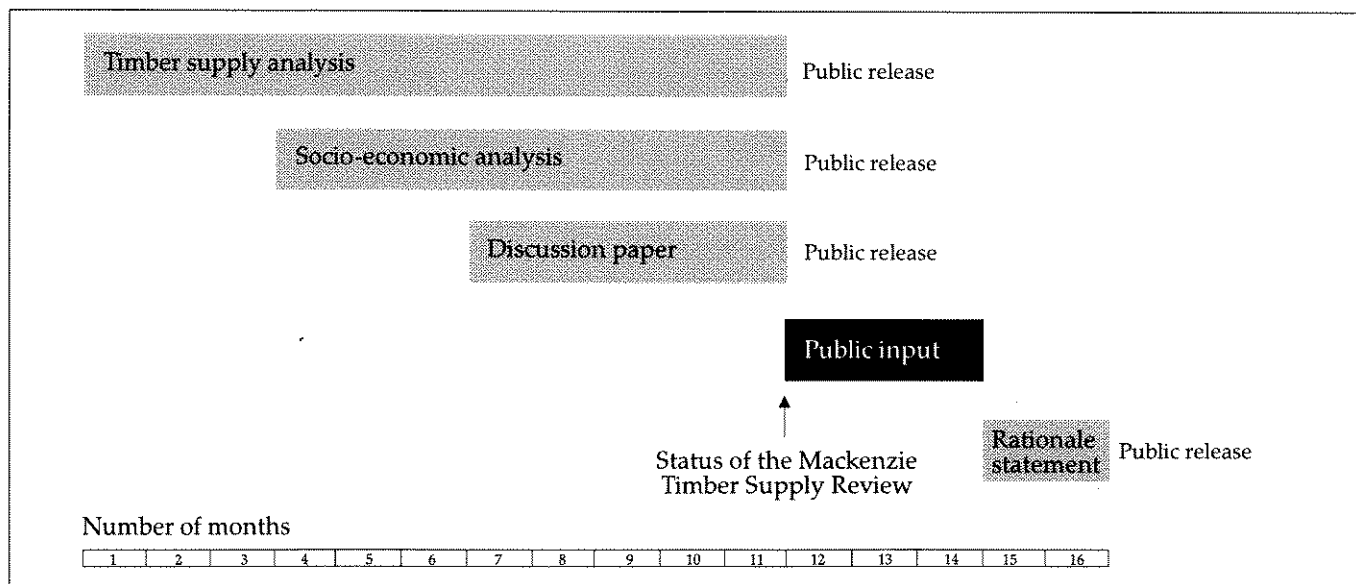


Figure 1 Steps in the Timber Supply Review process

# Mackenzie Timber Supply Area

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The Code requires better forest practices throughout the province, and establishes heavy penalties for violators. As the Code is implemented, forest management practices will be changed to meet its requirements. These new practices may influence both short- and long-term timber supply.

Since the information was prepared for this Timber Supply Review, some practices have been implemented in the Mackenzie Timber Supply Area to meet the requirements of the Code. Information about these practices will be provided to the chief forester for consideration in this allowable annual cut determination. It is expected that further implementation and experience with the Code will be required before all the timber supply effects of the Code can be properly assessed, making it necessary to incorporate these factors in future allowable annual cut determinations.

## Land and Resource Advisory Table

In anticipation of the initiation of a Land and Resource Management Planning process in the future, a Land and Resource Advisory Table has been created which includes representatives of local interest groups and government agency staff. This group is currently focused on assessing the candidate protected areas for the Protected Areas Strategy. Currently approximately 12.4 per cent of the total area of the Mackenzie Timber Supply Area has been identified as study areas for possible protection. Harvesting has been deferred in these areas until land use decisions are made by government.

## Timber Supply Review in the Mackenzie Timber Supply Area

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Forest Service staff finalized data used for the timber supply analysis of the Mackenzie Timber Supply Area in September 1994. These data are available for public review at the Mackenzie Forest District office. The Forest Service then conducted and released a short- and long-term timber supply analysis (*Mackenzie Timber Supply Analysis*, September, 1995). A consultant also completed a socio-economic analysis of the timber supply forecasts (*Mackenzie Timber Supply Area: Socio-Economic Analysis*, September, 1995). Both reports are available from the Mackenzie Forest District office, the Prince George Forest Region office and the Timber Supply Branch in Victoria.

This discussion paper summarizes these two reports and highlights critical factors that the chief forester must consider to determine the allowable annual cut for the Mackenzie Timber Supply Area. In conjunction with the release of this discussion paper, Forest Service staff will actively solicit public input to ensure the information in the Timber Supply Review

is correct. Input will be accepted until January 5, 1996, and will be summarized in a report to the chief forester and the minister of forests.

The chief forester will weigh all of the factors and, in early 1996, will determine the allowable annual cut for the Mackenzie Timber Supply Area. This determination and a *Rationale Statement* for the determination will be released along with the *Summary of Public Input*.

Throughout this discussion paper the page numbers from the technical reports are provided so that you can refer to them for additional information (TSAR is the *Mackenzie Timber Supply Analysis Report*, and SEA is the *Mackenzie Timber Supply Area: Socio-Economic Analysis*).

## Description of the Mackenzie Timber Supply Area

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The Mackenzie Timber Supply Area covers 6.1 million hectares in northeast British Columbia. There is a wide variety of topography in the Mackenzie Timber Supply Area. The Rocky Mountain Trench, with its flat to gentle terrain, runs north south through the center of the timber supply area, with the rugged Rocky Mountains on the east side and the more rounded Omineca Mountains to the west. Williston Lake, a narrow 360 kilometre long lake created by the W.A.C. Bennett Dam on the Peace River, is one of the most prominent geographical features in the area. The lake serves as a major access route to the interior of the timber supply area and is used to transport logs to the mills in Mackenzie.

Steep terrain and sensitive soils are widespread in the mountain areas. The climate and ecology are very diverse because of the mountainous terrain and the high precipitation common in interior mountain areas. These conditions create a variety of ecosystems ranging from rich, moist, floodplains in valley bottoms to high-elevation alpine meadows.

## Forest resources

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### Timber

Mountainous terrain in much of the Mackenzie Timber Supply Area limits the area where harvesting is feasible using current methods. Figure 2 illustrates that most of the land base is not suitable for timber harvesting either due to lack of forest cover or because of environmental sensitivity, rough terrain, difficult access or unmerchantable timber. Nineteen per cent of the total area (1,160,581 hectares) is suitable for timber harvesting based on current land

# Mackenzie Timber Supply Area

management objectives and harvesting methods. (TSAR page 8)

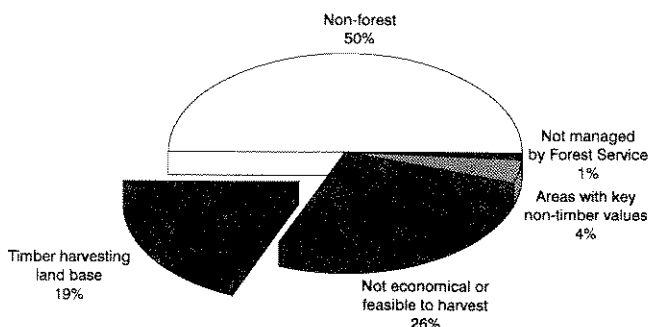


Figure 2 Classification of the land within the Mackenzie Timber Supply Area

Figure 3 shows the commercial tree species in the forests of the Mackenzie Timber Supply Area. Due to the relatively short harvesting history within the timber supply area, approximately 77 per cent of the forests in the timber harvesting land base\* are at or above the minimum harvestable age. (TSAR page 10)

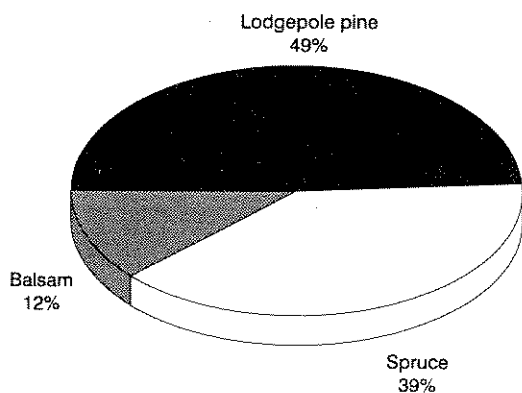


Figure 3 Area occupied by the dominant tree species in the timber harvesting land base

## Fish and wildlife

The Mackenzie Timber Supply Area contains an abundance of land and aquatic wildlife species, ranging from large mammals such as caribou, moose and grizzly bears to fish species including arctic grayling, rainbow trout and bull trout, as well as many birds and amphibians. The area supports a number of plant and animal species that require special consideration due to their rarity, restricted ranges or special habitat requirements. (SEA pages 7-10)

## Recreation and tourism

The mountains, valleys, lakes and streams in the area provide local residents and tourists with opportunities for a variety of recreational activities such as camping, hiking, swimming, boating, snowmobiling, skiing,

hunting, angling and canoeing. Due to the remote location of much of the Mackenzie Timber Supply Area, many activities can be enjoyed in wilderness settings. (SEA pages 7-10)

## Current allowable annual cut

The current allowable annual cut for the Mackenzie Timber Supply Area was set in 1989 at 2,951,121 cubic metres per year. Approximately 90 per cent of this allowable annual cut is allocated to two timber companies in two long-term forest licences. Six per cent is harvested through the Small Business Forest Enterprise Program administered by the Forest Service, three per cent is allocated to woodlots and other small licences, and one per cent is unallocated. (SEA page 26)

## Socio-economic profile

### Population

The Mackenzie Timber Supply Area is sparsely populated. Most of the estimated population of 6,200 (1991 figure) live in the community of Mackenzie. Small settlements within the timber supply area include Germansen Landing and Manson Creek, located on the west side of Williston Lake and the aboriginal settlements of Fort Ware and Tsay Keh, located north of the lake. There is very little dispersed rural settlement within the area. (SEA page 11)

### First Nations

Two First Nations — the Fort Ware and the Tsay Keh Dene — reside within the timber supply area. The McLeod Lake and Takla Lake Bands reside just outside the timber supply area but depend on employment from the Mackenzie area and have identified parts of the timber supply area as traditional territory. Two other First Nations have also identified minor portions of the timber supply area as traditional territory. (SEA page 16)

### Local economy

Approximately 71 per cent of employment in the Mackenzie area is generated by the forest sector. The public sector, which accounts for 14 per cent of employment, is the only other significant sector in the area. (SEA page 15)

The hospitality sector depends heavily on business travellers related to the forest industry and the area is constrained in its efforts to encourage tourism by its location off the main highway (SEA page 16). Local businesses often struggle to survive as many residents shop in Prince George, the nearest regional centre. (SEA page 47)

# Mackenzie Timber Supply Area

Native and non-native trapping and guiding in the area depends on the maintenance of adequate forested land.

## Timber industry

Two large timber companies operate milling complexes in Mackenzie which include four sawmills, a pulp mill and a pulp and paper plant. There are also several remanufacturing plants in the area associated with the sawmills. The pulp mills and sawmills secure some timber from other sources, but together they rely on the timber supply area for approximately 88 per cent of their supply. (SEA page 25)

Harvesting and processing the current allowable annual cut from the Mackenzie Timber Supply Area generates an estimated 1,713 person-years of direct forestry employment within the area. An additional 681 person-years of spin-off employment are estimated to be created through forest company and employee spending. In total, the allowable annual cut generates approximately 2,394 person-years of employment in the Mackenzie area. (SEA page 30)

## Provincial employment and revenues

In addition to employment within the timber supply area, the current allowable annual cut is estimated to generate a total of 4,106 person-years of employment outside the Mackenzie Timber Supply Area, including 887 person-years of direct forestry employment. Approximately 70 to 80 per cent of the logging and silvicultural activities are completed by independent contractors from outside the Mackenzie Timber Supply Area. In total, harvesting and processing timber from the Mackenzie Timber Supply Area generates approximately 6,500 person-years of employment throughout the province. (SEA page 38)

In 1994, timber harvesting within the Mackenzie Timber Supply Area generated approximately \$82.1 million in stumpage, taxes and other government revenues. This figure is based on the average total fees for harvesting public timber in the area (\$14.19 per cubic metre based on information from 1994), plus estimated personal income taxes and other tax revenues of \$13.89 per cubic metre. These estimates include the increased stumpage being generated to fund the Forest Renewal Plan. (SEA page 39)

## Current management practices

Public forest lands in British Columbia provide recreational enjoyment, fish and wildlife habitat, water supplies, timber resources and many other benefits. The Forest Service manages the forest, range and recreation resources on public lands. The Ministry of Environment, Lands and Parks is responsible for the management of fish, wildlife, water resources and

parks. Both agencies subscribe to the principle of integrated resource management, where all resources are considered before management decisions are made.

The timber supply analysis was based on management practices actually being approved and implemented in the Mackenzie area in 1994 when the analysis was initiated. These practices are briefly described below. Readers are encouraged to review the *Mackenzie Timber Supply Analysis Report* (Pages 15-16 and Appendix A) for more detailed information.

## Management zones and integrated resource management practices

For the timber supply analysis, Forest Service staff grouped areas where similar integrated resource management practices are implemented into management zones. This approach permits analysis of the different types of forests and the range of practices in the Mackenzie Timber Supply Area. The area in each management zone was estimated from existing plans and guidelines for integrated resource management. The site specific practices implemented in any one area may differ from the practices used in the analysis.

The portion of the timber management land base in each management zone is shown in Figure 4. The information used in the analysis to account for the integrated resource management practices in each zone is described below.

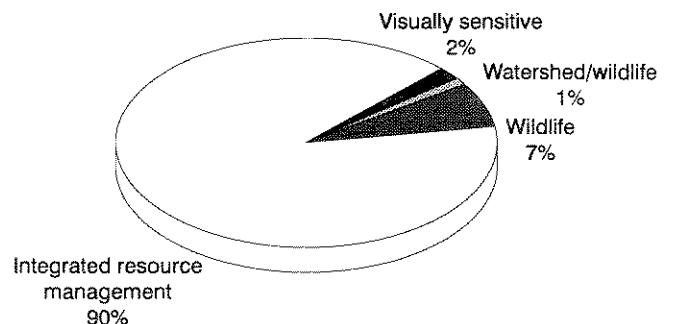


Figure 4 Area in each management zone

- **Visually sensitive zone** (26,709 hectares) — areas that can be seen from major highways, Fort Ware, Wasi, and Estella/Ed Bird and Tutizzi Lakes, as well as from within the Omineca Local Resource Use Plan area. The management objective is to maintain adequate forest cover to limit visible changes to the landscape. Three zones have been identified based on visual sensitivity and visual quality objectives:
  - less visually sensitive (modification) zone (10,016 hectares) - In this zone at least 73 per cent of the area must have trees at least three metres tall (approximately 20 years old) at any time.

# Mackenzie Timber Supply Area

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- moderately visually sensitive (partial retention) zone (12,971 hectares) - In this zone at least 89 per cent of the area must have trees at least three metres tall at any time.
- most visually sensitive (retention/preservation) zone (3,722 hectares) - In this zone at least 97 per cent of the area must have trees at least three metres tall at any time.
- **Watershed/wildlife zone** (9,318 hectares) — areas in the Mackenzie watershed, Germansen Landing watershed, Germansen Lake, Omineca River Valley, Pesika River Valley and Schooler Creek. The management objective is to maintain adequate forest cover in these areas to maintain water quality and quantity, or wildlife values. In this zone, no more than 15 per cent of the area may have forests less than three metres tall at any time.
- **Wildlife zone** (77,111 hectares) — Mt. Selwyn/Canty Lake, Russell Range, Upper Ospika River Valley, Philips Creek, Kennedy Siding Section 12 Caribou Reserve, Carina-Tomas Lakes, Manson Peninsula and Wolverine Range. Caribou are of special management concern in these areas due to their specific forest cover and habitat requirements. Critical core ranges have been identified or zoned within this area. Currently a 10-year harvesting deferral is in place while appropriate practices are developed. For the timber supply analysis it was estimated that a minimum of 25 per cent of the area would be required to have forests older than 150 years at all times.
- **Integrated resource management zone** (1,047,444 hectares) — includes the remaining timber harvesting land base. In this zone, a maximum of 33 per cent of the forests can be less than 2.5 metres tall (approximately 17 years old) at any time.

## Current practices

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The forest management practices that were approved and implemented throughout the timber harvesting land base when the timber supply analysis was initiated are briefly described below.

- **Wildlife/biodiversity** — Riparian buffer areas, where timber harvesting is restricted, are located along waterways to protect fish habitat and provide wildlife habitat. For the timber supply analysis, the timber harvesting land base was reduced by one per cent (11,883 hectares) to account for these buffers. In addition, forests that

were deducted from the timber harvesting land base due to a predominance of deciduous species, environmental sensitivity or infeasibility for timber harvesting contribute to wildlife habitat and biodiversity.

- **Basic silviculture** — British Columbia laws require areas that are harvested and expected to produce timber in the future to be reforested with ecologically acceptable species within a specified time frame. The typical silvicultural practice is to harvest; then site prepare, if necessary; reforest by planting with ecologically acceptable species or relying on natural regeneration; and control competing vegetation. It is assumed that, on average, harvested areas will be restocked within three years of harvesting.
- **Forest health and unsalvaged losses** — Losses of timber to insects, fire, diseases and wind damage are minimized, and damaged timber is harvested whenever possible. The annual loss of timber that cannot be salvaged or recovered is estimated to be 192,000 cubic metres per year, attributable to:
  - insects - 90,000 cubic metres per year
  - windthrow - 70,000 cubic metres per year
  - wildfire - 32,000 cubic metres per year
- **Harvestable ages** — Minimum harvestable age is defined as the time it takes for forests to grow to harvestable size. For the timber supply analysis, minimum harvestable ages for existing forests were based on species and timber productivity, and ranged from 60 to 140 years. For regenerated forests, minimum harvestable ages were defined as being between 55 and 170 years.
- **Timber utilization** — Within cutblocks, all timber that meets or exceeds the following size limits and is suitable for manufacturing lumber or pulp chips must be utilized:
  - diameter at stump height: 15 centimetres
  - diameter at top: 10 centimetres
- **Soil conservation** — Harvesting and road construction follow regional and provincial guidelines. For the timber supply analysis, approximately 4.7 per cent of the timber harvesting land base with forests less than 25 years old (6,767 hectares) was deducted for existing roads and landings that have become non-productive through harvesting. To account for future roads and landings, the remaining land base was reduced by six per cent (61,620 hectares).

# Mackenzie Timber Supply Area

## Timber supply forecasts and critical factors

It is important to note that the timber supply forecasts presented in the analysis report and in this paper do not represent either a short-term allowable annual cut determination or a long-term strategy to adjust harvest levels. The base case forecast and the critical factors described below are part of the information that will be used by the chief forester to determine the allowable annual cut for the next five years.

### Base case forecast

To complete the timber supply analysis for the Mackenzie Timber Supply Area, a computer model was used to produce a base case\* timber supply forecast based on the following principles:

- maintain the current allowable annual cut, or if this is not possible, find the maximum initial harvest level
- if the predicted long-term sustainable timber supply is lower than the initial harvest level, reduce the timber supply within a defined range of eight to 12 per cent per decade, until the long-term level is reached
- if possible, maintain the timber supply level at or above the predicted long-term sustainable level at all times

The base case forecast for the Mackenzie Timber Supply Area, which was produced using the best information that was available about forest practices when the analysis was conducted in 1994, and which meets the conditions described above, indicates the current allowable annual cut may be maintained for 30 years (Figure 5). Subsequently, timber supply is projected to decrease by approximately five per cent per decade over 20 years to 2.64 million cubic metres. This level is projected to be maintained for 60 years until the timber supply rises to the estimated long-term sustainable level of 2.81 million cubic metres per year. (TSAR pages 18-19)

### Examining critical factors

Since 1994 when the data was prepared for the timber supply analysis, Forest Service staff have been collecting more information for some of the factors in the analysis. Also, tests completed during the timber supply analysis identified which factors had the greatest effect on the timber supply forecasts. These critical factors are discussed in this section.

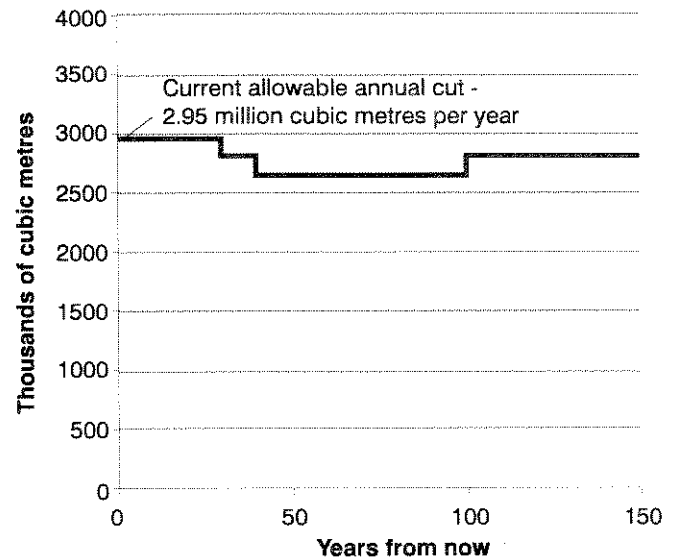


Figure 5 Base case timber supply forecast

The chief forester must carefully evaluate this information when he assesses the allowable annual cut and identifies where improved information is needed. We encourage you to do the same.

### Factors indicating the short-term timber supply may be lower than predicted in the base case

#### • Number of harvesting entries

In the timber supply analysis, it was estimated that forests within the integrated resource management areas would be harvested in three separate entries. A maximum of 33 per cent of the timber harvesting land base in specific areas would be permitted to have forests less than 2.5 metres tall at any time. It is possible that this practice will not provide the forest cover conditions required to meet the range of integrated resource management objectives.

If four harvesting entries are required to meet management objectives, the area permitted to have forests below 2.5 metres would be reduced to 25 per cent of the timber harvesting land base. This change is not projected to affect timber supply over the next 30 years, and has a minor impact on long-term supply. If five harvesting entries are required, the impact on timber supply is more substantial (Figure 6). (TSAR page 32)

# Mackenzie Timber Supply Area

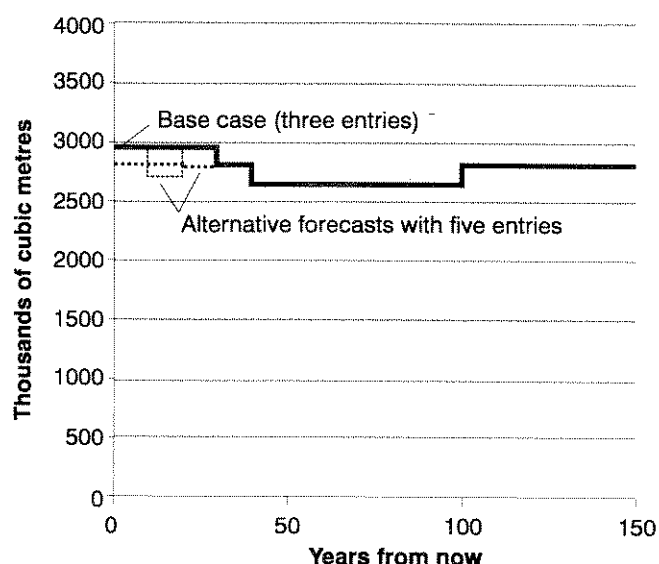


Figure 6 Timber supply effects of five harvesting entries

- **Regeneration delay**

Regeneration delay is the time between harvesting and the establishment of a new forest either by planting or natural regeneration. Current

management practices require planting of most harvested sites to achieve a three year regeneration delay on average. There are concerns that this regeneration delay may be extended on some sites because of plantation failures.

The timber supply analysis showed that if the regeneration delay period doubled to six years, the allowable annual cut could be maintained for 20 years rather than 30, and the long-term timber supply level would be reduced by 4.5 per cent. (TSAR page 45)

- **Estimate of merchantable timber in existing mature forests**

In the base case forecast, the average timber volume projected to be harvested from existing mature forests over the next 30 years is 278 cubic metres per hectare. Although a recent assessment of the forest inventory for the entire timber supply area indicates this inventory is accurate, Mackenzie Forest District staff are concerned that the timber volume projections may not be accurate for areas which will be harvested in the future. Although staff agree that the average timber volumes projected to be harvested in the timber supply analysis are close to historical timber harvest levels, they are concerned that past harvesting has been concentrated in higher volume spruce timber, and that timber volumes may be less in the remaining forests within the timber harvesting land base. A new inventory scheduled for the near future is expected to address this concern.

Figure 7 illustrates that reduced estimates of mature timber result in more substantial timber supply reductions in the future. (TSAR page 48)

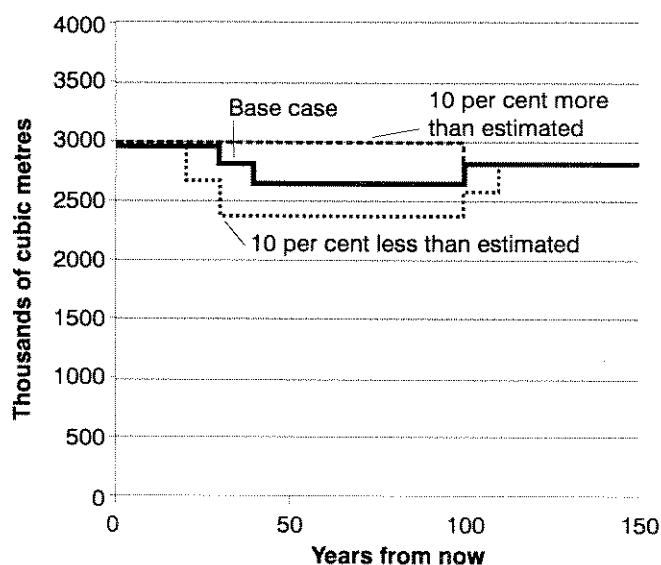


Figure 7 Effects of changes in estimated mature timber volumes

## Factors that may either increase or decrease the short-term timber supply

- **Estimated unsalvaged timber losses**

For the timber supply analysis it was estimated that 192,000 cubic metres of timber become unsuitable for harvesting each year due to damage by insects, fire and wind. This estimate is substantially larger than for most other timber supply areas.

Estimated unsalvaged losses are relatively high in the Mackenzie Timber Supply Area because of a combination of related factors. Spruce, the major timber species in the area, is shallow rooted, making it prone to being blown over by high winds, particularly along the exposed edges of cutblocks. A naturally occurring root disease also makes older spruce trees susceptible to windthrow. It is estimated that 70,000 cubic metres of timber annually are blown down and not salvaged.

Once this timber is blown down, it becomes prime habitat for spruce beetles, which quickly make the timber unsuitable for manufacturing and which often spread from the blown down timber into healthy forests. For the timber supply analysis, it was estimated that each year approximately 90,000 cubic metres of timber are attacked, primarily by spruce beetles, and are not salvaged. This estimate is based on seven years of insect impact surveys. This estimate may be low because it is often difficult to inventory infected forests, and if harvesting is not conducted soon after an area is infected, the remaining merchantable timber may not be adequate to economically justify salvage operations.

# Mackenzie Timber Supply Area

Based on historical data, it was estimated that 32,000 cubic metres of timber are damaged by wildfire and are unsalvageable.

Given the difficulty of estimating these losses, it is possible that future losses could be much higher or lower than the estimates used in the base case forecast. Increased salvage of damaged timber may also reduce these losses. An increase in the estimated losses would reduce the projected timber supply by an equal amount; a reduction in losses would increase the projected timber supply.

- **Size of the timber harvesting land base**

In the timber supply analysis, the definition of the area that is within the timber harvesting land base was based on the best available information about forest values, the physical and economical feasibility of harvesting particular areas with current technology, and other factors discussed below. Approximately 43 per cent of the productive forest land was not included in the timber harvesting land base either because it is physically or economically unfeasible to harvest based on current technology, or due to low timber volumes. This estimate of the size of the timber harvesting land base may change over time as current sources of timber supply become limited and harvesting practices change.

Several other factors could affect the size of the timber harvesting land base in the Mackenzie Timber Supply Area:

- **feasibility of harvesting in the northern area**

As a detailed assessment of the feasibility of harvesting the northern third of the Mackenzie Timber Supply Area was not available, the timber harvesting land base in this area was estimated using factors developed from representative areas in the southern portion of the Timber Supply Area. These factors may not adequately represent the conditions in the northern area.

- **deductions for non-timber resource values**

Approximately 8.5 per cent of the productive forest land was deducted from the timber harvesting land base to account for environmentally sensitive areas, streamside buffers and areas with very high visual sensitivity. These estimates are based on preliminary inventories and may over or underestimate the actual area with key non-timber resource values where timber harvesting is restricted. Recent assessments in the Prince George Timber Supply Area indicate riparian areas, in particular, may occupy substantially more than one per cent of the timber harvesting land base as estimated for the timber supply analysis. Implementation of the Forest Practices

Code is expected to increase requirements for streamside, lakeshore and wetland buffers in particular.

- **area of roads, trails and landings**

For the timber supply analysis it was estimated that 4.7 per cent of the timber harvesting land base with forests younger than 25 years is now occupied by roads, trails and landings and will not produce forests in the future. It was also estimated that, in the future, six per cent of the remaining forests will become roads, trails or landings. The actual area of roads, trails and landings may be more or less than estimated.

- **natural shift from deciduous to commercial coniferous forests**

There is a general perception that many of the existing deciduous forests will gradually become dominated by commercial coniferous tree species and therefore will become merchantable. This may increase the timber harvesting land base slightly over time.

Considered together, these factors may lead to an increase or decrease in the size of the timber harvesting land base. Figure 8 illustrates the timber supply impacts of changes in the size of the timber harvesting land base (TSAR page 46).

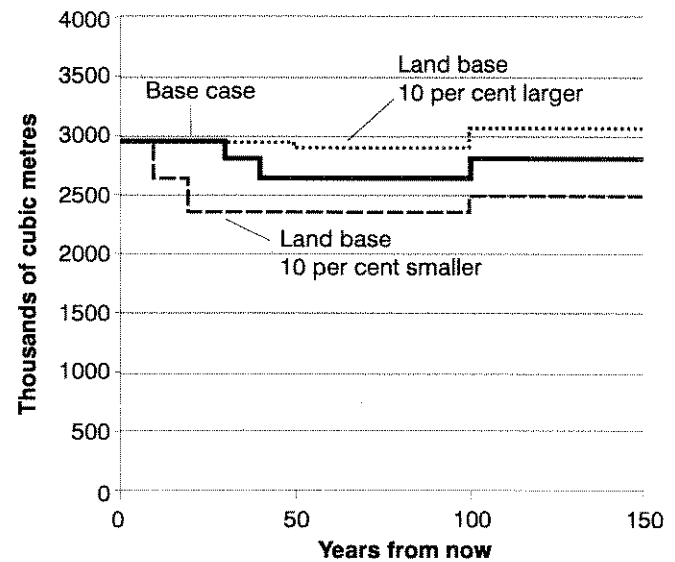


Figure 8 Effects of changes in the size of the timber harvesting land base

- **Minimum harvestable age**

Minimum harvestable age is an estimate of the time it takes for a forest to reach a specified condition. In the base case forecast, minimum harvestable ages for existing forests were estimated to range from 60 to 140 years. These estimates depend on the types of forest products desired, which in turn depends on demands far into the future and on the time needed for forests to

# Mackenzie Timber Supply Area

become suitable for these products. Both of these factors are, to some degree, unknown.

Figure 9 shows how the timber supply is projected to change if minimum harvestable ages are either 10 years longer or shorter than in the base case (TSAR page 42).

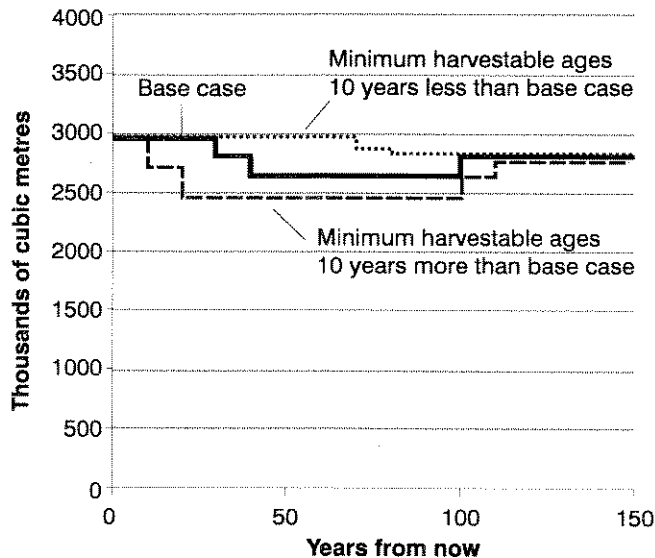


Figure 9 Effects of changes in the minimum harvestable ages

- **Forest cover requirements for visually sensitive areas**

In some areas, forest cover requirements for visually sensitive areas substantially limit the mature timber available for harvesting, and therefore decrease timber supply. A test completed in the timber supply analysis confirmed that because only 2.3 per cent of the timber harvesting land base is within visually sensitive areas in the Mackenzie Timber Supply Area, this factor does not have a significant impact on the projected timber supply. (TSAR page 38)

Changes in the area classified as visually sensitive or the forest cover requirements for these areas may impact timber supply in the future.

## Possible opportunities to partially offset projected timber supply reductions

- **Harvesting deciduous forests**

Deciduous forests, which occupy approximately seven per cent of the productive forest land in the Mackenzie Timber Supply Area, are currently not harvested and therefore were not included in the timber harvesting land base. However markets for deciduous timber are developing, making it possible that these areas will become merchantable in the future. Recently, the local timber industry has expressed interest in expanding their operations to begin harvesting deciduous species.

- **Intensive silvicultural treatments**

In some situations, intensive silvicultural treatments such as juvenile spacing and fertilization, which increase tree growth, also increase the short- and long-term timber supply. However, the Timber Supply Review was designed to assess the timber supply impacts of current practices, which do not include intensive silvicultural treatments. As a result, the range of intensive silvicultural treatments that might be implemented in the Mackenzie Timber Supply Area was not examined. Further analyses are required to examine potential opportunities for intensive silvicultural treatments and the implications of those treatments on timber supply and other resources.

- **Commercial thinning**

The potential for commercial thinning in the Mackenzie Timber Supply Area is restricted by the small area of younger forests—a result of the relatively short history of timber harvesting in the area. Approximately 14.2 per cent of the timber harvesting land base has forests between 40 to 80 old that might be candidates for commercial thinning. However to date, no commercial thinning has occurred in the area. Some opportunities may exist to thin dense lodgepole pine forests.

## Environmental and socio-economic implications

### Environmental concerns

The Ministry of Environment, Lands and Parks reviews harvesting development plans and supports many of the practices now in place to protect fish and wildlife habitat. Implementation of the Forest Practices Code will address some of their remaining concerns about management of this habitat. A land-use planning process is required to resolve remaining issues.

The timber supply analysis indicates approximately 77 per cent of the timber harvesting land base has forests at or above the minimum merchantable age. According to the base case forecast, over the next 50 years the area of these older forests will be significantly reduced (TSAR page 26). This may be detrimental to biodiversity due to fragmentation of habitats and loss of critical wildlife habitats for species that are dependent on mature and older forests, such as caribou and pine marten. (SEA page 49)

The establishment of road access into previously unroaded areas is also a concern. Improved access will likely result in increased hunting and angling pressure on wildlife and fish populations.

# Mackenzie Timber Supply Area

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## Community implications

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The impact of timber supply adjustments on the local communities in the Mackenzie Timber Supply Area is an important consideration in this review. In the *Socio-Economic Analysis*, it was assumed that a change in timber supply would create economic impacts that are directly related to the size of the timber supply change (e.g., a 10 per cent change in timber supply would result in a 10 per cent change in employment).

The community of Mackenzie is particularly concerned about the possibility of any short- or long-term reduction in timber supply because of the lack of economic diversity and high dependence on the forest industry within the community. The base case forecast suggests the community has some time to develop alternative economic strategies to minimize the impacts of future timber supply reductions.

## First Nations implications

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Although relatively few First Nations individuals are employed in the forest industry, this type of employment is an important source of income. The base case forecast indicates short-term employment in the forest sector could continue at its present level for First Nations, with possible reductions in the future. However, the development of First Nations forest enterprises has the potential to maintain or increase this type of employment.

There is concern about the potential impacts of harvesting and road development on forests used for cultural, medicinal and food sources, particularly because of the relatively high reliance on traditional activities by many First Nations people within the Mackenzie area (SEA page 48). First Nations are eager to address their concerns through treaty negotiations.

## Chief forester's determination

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The chief forester must determine an allowable annual cut as part of a strategy to achieve a long-term sustainable timber supply level. The base case forecast provides one alternative, but the chief forester may select another harvest level based on his consideration of the factors required under Section 7 of the *Forest Act*, which are listed on pages 1 and 2 of this paper.

## Your input is needed

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The allowable annual cut is an important determination requiring well-informed and thoughtful public input. We ask you to answer the questions on the response form at the back of this paper. We encourage you to add any additional comments you feel are relevant. If you prefer, additional comments or a detailed submission may be written on separate pages.

Feedback is welcomed on any aspects of this *Discussion Paper*, the *Timber Supply Analysis Report* and the *Socio-economic Analysis Report* and other topics related to the timber supply in the Mackenzie Timber Supply Area. Forest Service staff would be pleased to discuss questions or concerns that would help you prepare your response.

Please mail the completed questions and your comments to the forest district manager at the address below. Your comments will be accepted until January 5, 1996.

You may identify yourself on your response if you wish. If you do, you are reminded that responses will be subject to the *Freedom of Information and Protection of Privacy Act* and may be made public. If the responses are requested, personal identifiers will be removed before the responses are released.

A summary of public comments will be available from the district manager when the chief forester's allowable annual cut determination is announced.

For more information contact:

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Phone: (604) 997-2200  
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# Discussion Paper Response Form

- the rate of timber production that can be sustained from the area
- the short- and long-term implications for the province of alternative rates of timber harvesting from the area
- the timber requirements of established and proposed timber processing facilities
- the economic and social objectives of the Crown, as expressed by the minister, for the area, the general region, and the province
- abnormal pest infestations in the timber on the area and major salvage programs that are planned

### A. Economic and social objectives

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper appears to be a standard notebook page or a sheet of stationery. There is no handwriting or other markings on the page.

Please use the space below to provide any information which you believe may assist the chief forester in considering the technical factors to determine the allowable annual cut for the Mackenzie Timber Supply Area. Further information on the critical factors outlined on pages 7-10 in this paper would be most helpful.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

☐ local business      ☐ timber industry  
☐ outdoor tourism    ☐ environmental conservation  
☐ general public      ☐ other (please define) \_\_\_\_\_  
☐ First Nation        ☐ government agency (please identify) \_\_\_\_\_

Address (optional)

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