FOREST ANALYSIS AND INVENTORY BRANCH

Urgent timber supply review for the Williams Lake timber supply area

Public Discussion Paper

B.C. Ministry of Forests and Range
1520 Blanshard Street
Victoria, B.C.
V8W 3J9

Public Discussion Paper

Introduction

The British Columbia Ministry of Forests and Range regularly reviews the timber supply* for all timber supply areas (TSAs)* and tree farm licences (TFLs)* in the province. This review, the third for the Williams Lake TSA, examines the impacts of current forest management practices on the timber supply, the current mountain pine beetle epidemic, economy, environment and social conditions of the local area and the province. Based on this review, if necessary, the chief forester will determine a new allowable annual cut (AAC) for the Williams Lake TSA.

By law, the chief forester must review and set new allowable annual cuts for all 37 timber supply areas and 34 tree farm licences at least once every five years. The chief forester can postpone a timber supply review for up to five more years if the annual cut level is not expected to change significantly.

The chief forester may also set a new harvest level earlier than five years to deal with abnormal situations such as damage from severe wildfires or catastrophic insect infestations.

The objectives of the timber supply review are to:

- **Examine** relevant forest management practices, public input, and economic, environmental and social factors;
- **Set** a new allowable annual cut for the next five years; and
- **Identify** information to be improved for future timber supply reviews.

Urgent timber supply review in the Williams Lake TSA

Mountain pine beetles (MPBs) are the most damaging insect that attack lodgepole pine in Western Canada. Beetles attack pine trees by laying eggs under the bark. When the eggs hatch, the larvae mine the phloem area beneath the bark and eventually cut off the tree's supply of nutrients.

The beetles also carry a fungus that causes dehydration and inhibits a tree's natural defences against beetle attacks. The fungi stains the wood blue or grey. Despite the discoloration, the wood remains structurally sound and can still be used for high-quality products such as sawlogs for a number of years after the tree has been killed.

Forests of mature lodgepole pine* are prime habitat for the mountain pine beetle, and the beetle thrives under warm weather conditions. The Interior of British Columbia has an abundance of mature lodgepole pine, and has experienced several consecutive mild winters and dry summers. As a result, mountain pine beetle populations have reached an unprecedented level in British Columbia's recorded history. Provincial aerial survey data show the beetle had affected about 8.5 million hectares of British Columbia's Interior in 2005. This includes areas with light or trace mortality, with moderate mortality and with severe mortality.

The Ministry of Forests and Range estimates that the peak in the number of trees killed provincially occurred during the summer of 2005 when about 139 million cubic metres of timber were affected. Mortality projections suggest that the epidemic could last at least 10 more years and under current conditions has the potential to kill more than 80% of the merchantable pine in the province's Interior.

The forests of the Williams Lake TSA are dominated by lodgepole pine although there are large areas of Douglas-fir in the centre of the TSA and spruce and balsam stands that are found predominately in the eastern part of the TSA. Lodgepole pine represents approximately 60% of the total volume within the timber harvesting land base.

Throughout this document, an asterisk after a word or phrase indicates that it is defined in a box at the foot of the page.

Timber supply
The amount of timber that is forecast to be available for harvesting over a specified time period, under a particular management regime.

Timber supply areas (TSAs)
An integrated resource management unit established in accordance with Section 7 of the Forest Act.

Tree farm licences (TFLs)
Provides rights to harvest timber and outlines responsibilities for forest management in a particular area.

Mature lodgepole pine
In this report, mature has been defined as 80 or more years old.

Provincial MPB projections suggest that the annual amount of damaged pine in the TSA increased from about one million cubic metres in 2001 to 12 million cubic metres in 2004 to 19 million cubic metres last year.

While the mountain pine beetle has impacted a significant portion of the timber supply area, and the area impacted continues to expand rapidly, intervention may help to mitigate the economic and environmental impacts. For this reason, the chief forester is considering an urgent review of the timber supply and allowable annual cut in the Williams Lake TSA.

The objectives of this document are to provide British Columbians with an overview of the timber supply review process and harvest implications for the Williams Lake TSA and to encourage them to provide comments. **Public comments will be accepted for 60 days, until September 18, 2006.**

Before setting a new allowable annual cut, the chief forester will review all relevant reports and public input. The chief forester will outline his determination in a rationale statement that will be publicly available upon release. Following the release of the allowable annual cut determination by the chief forester, the Minister of Forests and Range will apportion the allowable annual cut to the various licences and programs.

Description of the Williams Lake TSA

The Williams Lake TSA is located in south-central British Columbia and covers approximately 4.9 million hectares of the Southern Interior Forest Region. It is administered by the Chilcotin Forest District in the west and the Central Cariboo Forest District in the east.

The timber supply area is bounded on the west by Tweedsmuir Park, on the east by Wells Gray Provincial Park, on the north by the Quesnel TSA and on the south by the 100 Mile House TSA.

A 2006 community profile showed that the population of the South Cariboo region has remained stable at approximately 25,000 from 1996 to 2004. Williams Lake is the largest community in the TSA with a population of approximately 11,900. Smaller communities include Alexis Creek, Horsefly, Likely, Anahim Lake, Tatla Lake, Riske Creek, Big Creek, Nimpo Lake, 150 Mile House, Big Lake and McLeese Lake. As well, there are ten First Nations communities within the TSA: Xats'ull (Soda Creek), Xatl'tem/Stwecem'c (Dog Creek/Canoe Creek), Esketemc(Alkali Lake), T'exelc (Williams Lake), Tl'esqox (Toosey), Tletinqox–t'in (Anaham), Yunesit'in (Stone), Xeni Gwet'in (Nemiah Valley), Tsi Del Del (Alexis Creek) and Ulkatcho Bands.

Land-use planning

The Cariboo-Chilcotin Land Use Plan (CCLUP) was approved by government in October 1994 and included 11 new Protected Areas in the Williams Lake TSA. In March 1995, the 90-day implementation process report was released and, effective January 31, 1996, the targets and strategies relating to operational planning were declared as a higher level plan direction under the Forest Practices Code.

A sub-regional planning process was started in 1996 to provide more detailed spatial representation of CCLUP values at the district level. The five Sub-Regional Management Plans (SRMPs) that contribute to the Williams Lake TSA are the Anahim Round Table, Chilcotin, Williams Lake, Horsefly and South Chilcotin. These plans will further refine the implementation of the CCLUP targets and provide additional direction to operational planning.

The natural resources

Numerous natural resources are associated with the forests of the Williams Lake TSA, including forest products (timber and non-timber), forage, minerals, recreation and tourism amenities, as well as a variety of fishery and wildlife habitats.

The Williams Lake TSA includes three general landscape types. The Chilcotin Plateau, west of the Fraser River, is characterized by a drier climate with extensive lodgepole pine forests and some Douglas-fir, and is bounded on the west by the Coast Mountains. The central portion of the TSA, both east and west of the Fraser River, has mixed species forests, primary leading in Douglas-fir and lodgepole pine, interspersed with open range lands. To the east of the Fraser River, the rolling plateau gently increases in elevation to meet the Cariboo Mountains and Quesnel Highlands where forest of spruce, pine, western redcedar, western hemlock and subalpine fir predominate.

About 61% of the total Williams Lake TSA land base is considered Crown forest land managed by the Forest Service (approximately 3 million hectares). Currently about 62% of the Crown forest land is considered available for timber harvesting (1.86 million hectares, or about 38% of the total TSA land base).

The diverse landscapes of the Williams Lake TSA provide a variety of wildlife habitats, including grasslands, lakes and wetlands, forested slopes, and alpine areas. Large mammals in the TSA include mule deer, moose, mountain goat, caribou, California bighorn sheep, cougar, black bear, grizzly bear, coyote and wolf. Many smaller furbearing species such as snowshoe hares, pine marten and squirrels are also common. The TSA has numerous rivers, lakes and streams that support many species of non-sport fish and sport fish such as sockeye and chinook salmon, steelhead, sturgeon, rainbow trout, kokanee and bull trout.

Environmental values

Current forest management follows the standards set in the *Forest and Range Practices Act*, which are designed to maintain a range of biodiversity and wildlife values. In the Williams Lake timber supply area, about 38% of the productive forest land is not considered available for timber harvesting and will provide for additional environmental values.

Forest areas both inside and outside the timber harvesting land base will help to maintain critical forest habitats for many species. Forest cover requirements for biodiversity, visual quality, community watersheds, recreation features, riparian management, and protection of unstable terrain will be included in the analysis.

The *Forest and Range Practices Act* outlines a process for identifying species at risk and designated wildlife habitat areas with specific management practices. Currently, a number of species identified as ‘at risk’ may be found in the Williams Lake TSA, among them the American white pelican, sandhill crane, grizzly bear, mountain caribou and northern goshawk.

Protecting water quality and quantity is an important management objective of the TSA. Significant demands are placed on water resources for domestic and agricultural purposes, as well as maintenance of fisheries values and aquatic ecosystems.

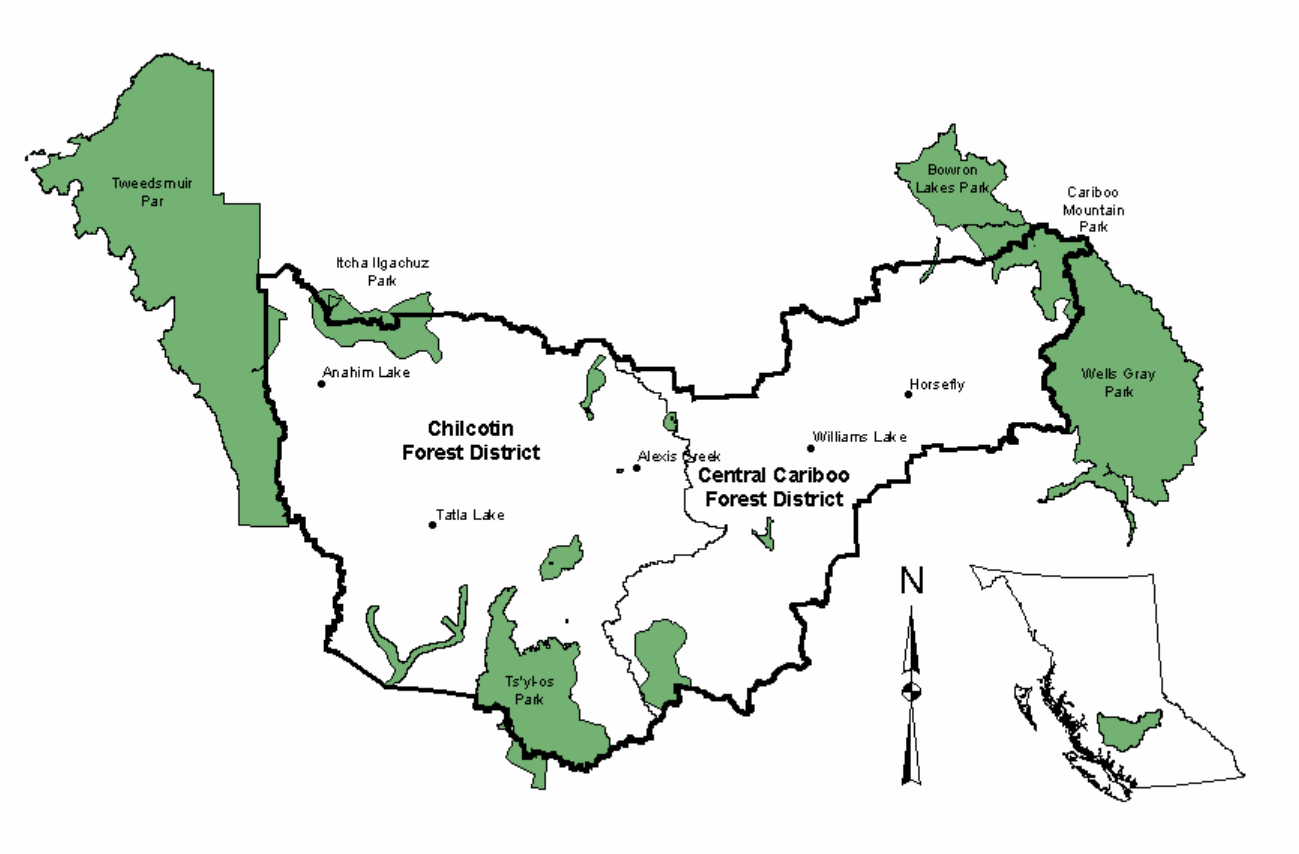

Figure 1. Map of the Williams Lake TSA.

Regional economy

The city of Williams Lake is located in the heart of the Cariboo Chilcotin region with a population of 11,872. The city is the principal centre in the region for transportation, trading, financial, educational, healthcare, travel, and administrative services. Many residents from the outlying communities commute daily to jobs or to use the services available in Williams Lake.

Leading employers in Williams Lake include Tolko Industries Ltd., Provincial Government and West Fraser Mills Ltd.

The forest industry is the main economic driver in the region, accounting for 30% of total after tax income in the region. The public sector is the secondary source of income, accounting for 24% of the income. Other important industries include mining, agriculture, tourism and construction.

There are four major lumber manufacturing companies (Tolko Industries Ltd., West Fraser Mills Ltd., Sigurdson Bros. Logging Company and Linde Bros. Lumber Ltd.), two Plywood and Veneer mills (West Fraser Mills Ltd.), one chip mill (Tolko Industries Ltd.), one major remanufacturing company, three value-added manufacturing facilities, and numerous smaller producers located in Williams Lake.

Locally, lumber mill companies alone employ about 4,800 people directly and contribute $190 million in compensation and benefits to these employees.

The forest sector supports numerous other jobs in the area through companies and employees purchasing goods and services. Each 100 full-time direct wood manufacturing jobs in the timber supply area is estimated to support another 43 indirect and induced jobs; each 100 full-time direct logging jobs in the timber supply area is estimated to support another 24 indirect and induced jobs.

The TransCanada (Williams Lake) power plant, completed in 1993, is a $150 million wood waste-fuelled electric generating plant. Each year it consumes over 600,000 tons of wood waste from local sawmills to generate about 67 MW of electricity for sale primarily to BC Hydro. The plant is the largest biomass power plant in North America.

Recent industrial growth in the area has been significant, with major capital investments in the local forest industry.

Current annual cut

In January 2003, the chief forester established an allowable annual cut in the Williams Lake TSA of about 3.768 million cubic metres. The AAC included partitions of 2.36 million cubic metres for the "main" TSA; 450,000 cubic metres for the three western supply blocks; 107,000 cubic metres for lower-quality timber under a 25-year, non–replaceable forest tenure called Pulpwood Agreement 16; and finally 850,000 cubic metres to salvage stands damaged by a mountain pine beetle infestation that ended in the mid-1980s. The AAC excludes the harvest associated with woodlot licences issued at the time of the determination. While these partitions are not explicitly described in this report, the partitions will be examined in greater detail when the chief forester determines a new AAC later this year.

Innovative Forestry Practices Agreement

Lignum Limited (now held by Tolko Industries) entered into an Innovative Forestry Practices Agreement (IFPA) with government in 1997, and a forestry plan associated with the agreement was approved in 2000. The forestry plan outlines the innovative forestry practices to be undertaken in the area covered by the agreement.

Once a forestry plan is approved, the holder of the agreement may make a request to the Forest Service regional executive director that the allowable annual cut associated with its licence be increased based on the innovative forestry practices. The process for reviewing harvest levels for licences linked to an IFPA is not part of the timber supply review process.

Timber supply analysis and forecasts

Taking a different approach

Traditionally, several timber supply forecasts would be provided for the Williams Lake TSA spanning the next 250 years. This approach assumes a good understanding of the forest and how it will respond to forest management. It would offer reasonable estimates of the future based on careful observation of the past. This understanding of the forest has been severely challenged by the current mountain pine beetle epidemic that is historically unprecedented in scope and severity.

There are many uncertainties regarding the mountain pine beetle epidemic. It is unknown whether the epidemic will affect all the mature lodgepole pine in the TSA and how susceptible young immature stands are. Previously it was thought that the beetles only attacked mature lodgepole pine stands, however, they have been observed in stands less than 35 years of age.

It is also difficult to predict how fast surviving trees will grow, how susceptible they will be to windthrow, how long it will take regeneration to become established under an overstorey of dead trees, and how long dead trees will retain commercial value.

Given these and other large uncertainties, a different approach to assessing short-term timber supply has been designed to provide timely allowable annual cut determinations in TSAs impacted by the mountain pine beetle. The first 20 years has been modelled in far greater detail than previous Ministry of Forests and Range analyses.

The projected spread of mountain pine beetle, shelf life and harvesting was tracked at the stand level on an annual basis. Exploration of mid-term timber supply was more general and analysis was limited to projecting how long the remaining inventory might sustain the desired harvest level after the uplift ends.

Long-term timber supply was not examined. This removed the need to speculate on regeneration under residual overstoreys and other major uncertainities and focused the analysis on the short term and on leaving the largest amount of inventory for harvest in the mid term.

Further, unlike traditional analyses, no base case is presented. Instead, a number of possible scenarios are presented that the chief forester will consider along with many other sources of information when setting the allowable annual cut. These scenarios demonstrate:

1. over the next twenty years, mountain pine beetle is projected to kill almost 100 million cubic metres on the timber harvesting land base;
2. almost all of the pine damage is projected to occur in stands with at least 70% pine content;
3. most of the pine damage is projected to occur in stands west of the Fraser River;
4. harvesting will be unable to salvage all of the pine that is projected to die;
5. the length of an uplift and how effective it is at salvaging and/or reducing the damage caused by the mountain pine beetle will be determined by how stands are scheduled for harvest;
6. protecting mid-term harvest levels requires not salvaging some dead pine to retain live trees; and
7. harvesting stands that contain less than 70% pine for the next fifteen years will reduce the mid-term timber supply.

Major assumptions

Key assumptions common to most of the scenarios presented in this public discussion paper are discussed in the sections that follow.

Species composition

This review is focused on addressing the damage to pine stands caused by the mountain pine beetle and reducing both the volume loss and the loss of productivity on the timber harvesting land base by stands becoming unmerchantable.

Strategically this entails focusing harvest in pine dominated stands. A map of the dominant tree species in the Williams Lake TSA is provided in Figure 2.

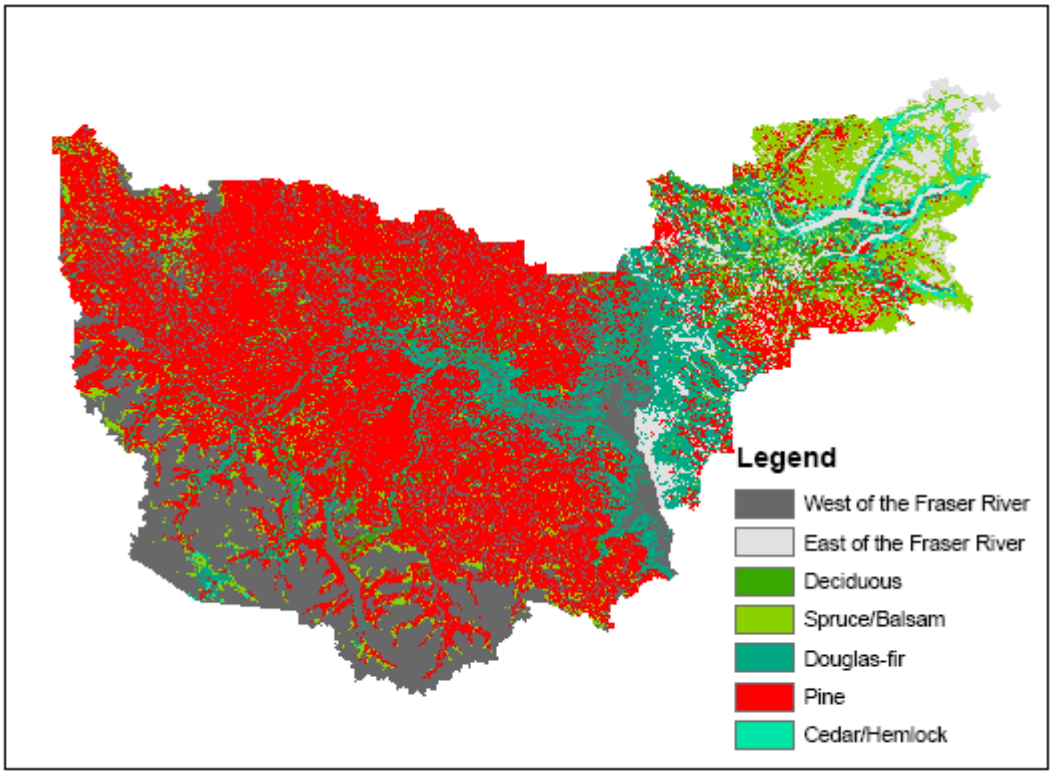

Figure 2. Dominant tree species in the Williams Lake TSA.

Shelf life

A major assumption impacting any salvage program is the shelf life of the dead lodgepole pine, or the length of time dead trees remain commercially viable. After that time, the dead pine is considered a non-recoverable loss (NRL)*****. To date there have been no definitive studies about shelf life specific to mountain pine beetle in British Columbia.

The previous infestation in the Chilcotin occurred mainly in the dry ecosystems west of the Fraser River and harvesting continued for about 15 years after the infestation collapsed due to a cold weather event. Many of those stands harvested still had a significant green component.

For sawlogs, the shelf life was assumed to be five, eight and 14 years with moister areas receiving a shorter shelf life and drier areas a longer shelf life. For example, this means that in moister areas the impacted volume is harvestable for five years, and is assumed to be useless thereafter. A map depicting the shelf life assumptions is provided in Figure 3. Products other than sawlogs were not specifically examined.

Non-recoverable losses (NRL)
Volume or area that is damaged and becomes unmerchantable after some period of time.

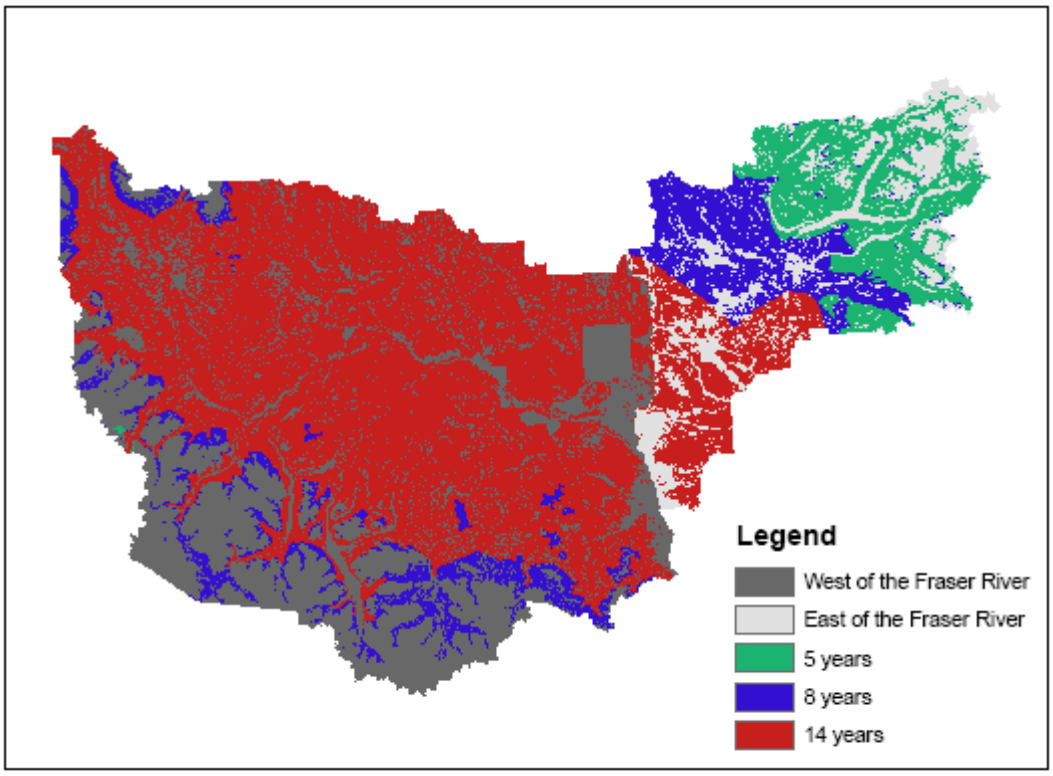

Figure 3. The distribution of wet, moist and dry ecosystems across the Williams Lake TSA.

The timber harvesting land base and inventory

Land base and inventory information used in the previous (2001) timber supply analysis provided most of the assumptions to reflect ownership, operability, sensitive areas, productivity and merchantability. This land base, updated for recent harvesting to the end of 2004 and reduced to account for old-growth management areas, woodlots, community forests, and protected areas, formed the basis of the detailed 20-year timber supply forecasts. The updated timber harvesting land base is about 15% smaller than the TSR 2 land base. Inventory volume adjustments were provided by staff in the Forest Analysis and Inventory Branch.

Management for non-timber objectives

General integrated resource management and visually sensitive areas were modelled for the productive forest within each landscape unit. Mature seral stage biodiversity requirements were modelled within each biogeoclimatic variant and landscape unit combination. A simplified habitat requirement was modelled on the timber harvesting land base to limit the rate of harvesting in caribou habitat areas. As mule deer winter ranges are found in pre-dominantly fir stands, no specific forest cover requirement was modelled. This was deemed appropriate as a key model assumption was that harvesting would target stands with at least 70% pine.

Minimum harvest volumes

Consistent with TSR 2, all scenarios assumed a stand required at least 65 cubic metres per hectare of salvage and/or green volume (i.e., live trees) to be considered a candidate for harvest. Volume from trees that are beyond their assumed shelf life does not contribute to this merchantability criteria in the analysis. Once a stand contains less then 65 cubic metres per hectare, the stand is considered a NRL.

Projection of the beetle epidemic

All the scenarios presented in this public discussion paper assume the mountain pine beetle epidemic will continue unabated for the foreseeable future. About 80% of the pine considered old enough to over-winter a mountain pine beetle brood is projected to die before 2026.

The epidemic was projected using a computer model (BCMPBv3) developed by scientists in the British Columbia Forest Service, the Canadian Forest Service and consultants. The computer model was calibrated using provincial infestation maps from 1999 to 2005.

How extensive is the mountain pine beetle infestation in the Williams Lake TSA?

Table 1. The impact of mountain pine beetle on mature growing stock by 2026

Location	% pine	Volume on the timber harvesting land base (millions of m³)	Volume of pine (millions of m³)	Pine volume projected to be killed by MPB (millions of m³)	Green volume in MPB impacted stands (millions of m³)
West of the Fraser River	>= 70%	97	94	73	15
	< 70%	22	5	4	13
East of the Fraser River	>= 70%	18	16	13	4
	< 70%	66	9	7	29
Williams Lake TSA		203	124	97	61

Table 1 provides the following context for the analysis:

- 97 million of the 124 million cubic metres of pine in the Williams Lake TSA is projected to be dead within 20 years (78%). The dead pine represents half of the inventory in the Williams Lake TSA.
- Of the 97 million cubic metres, 86 million (89%) of the dead pine volume is in stands comprised of at least 70% pine. These stands will become NRL if they are not harvested.
- 11 million cubic metres of the dead pine is inter-mixed with 42 million cubic metres of unattacked pine or other species. Harvesting these stands would be damaging to the medium-term timber supply.
- 73 million cubic metres of the dead pine occurs west of the Fraser River (75% of the dead pine).

Based on this table:

- **Harvesting in stands with at least 70% pine will address 89% of the predicted pine loss with little collateral damage to unaffected trees that could be harvested in the medium term.**
- **Based solely on the pine volume at risk, 75% of the current AAC should be focused west of the Fraser River.**

What has been harvested recently?

The Ministry of Forests and Range harvest billing records show that pine has exceeded 70% of the total harvest over the past five years. To safeguard the mid-term, licensees and government will need to maintain their efforts to ensure the vast majority of stands harvested over the next two decades have 70% pine content as a minimum. In response to the beetle infestation, harvesting has been focused in the pine stands east of the Fraser River. **The analysis suggests that most of the stands with at least 70% pine east of the Fraser River are projected to be harvested within the next two years.** While it is recognized there will be an ongoing requirement to salvage some other stand types in response to attack by other insect pests and fire, the largest risk to timber supply is the loss of pine volume west of the Fraser River.

What areas are at risk?

Another important aspect to managing the implications of the beetle epidemic is to minimize the number of stands becoming NRL. If the beetle continues unchecked as indicated by the provincial projection, Figure 4 shows the area that will become NRL in the next 20 years east and west of the Fraser River if it is not harvested. **The majority of the more than half a million hectares of land that is projected to be NRL if left unharvested is west of the Fraser River**. Stands east of the Fraser River that are depicted as becoming NRL due to the MPB have likely been harvested last year or will be harvested in the next two years.

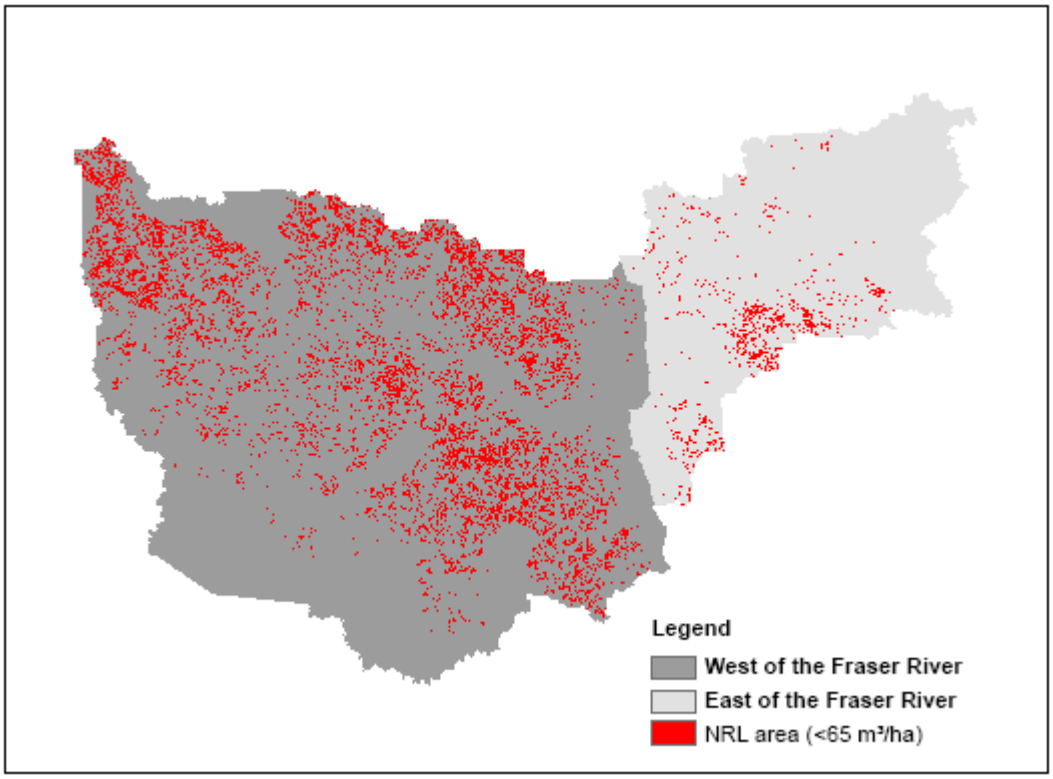

Figure 4. Beetle attacked stands possessing less than 65 cubic metres per hectare within 20 years without harvesting.

Which stands should be harvested and when in the Williams Lake TSA?

To date, the epidemic in the Williams Lake TSA has killed the equivalent of 8 years of harvest. It is important to recall that 850,000 cubic metres of the current AAC of 3.768 million cubic metres is still directly targeted at salvage of pine stands impacted by the mountain pine beetle. Limitation of the damage caused by the beetle infestation will be determined based on when stands are harvested. Three possible harvest strategies were examined.

Maximum green volume strategy

One strategy to reduce the value loss that will occur once a pine tree is attacked is to harvest stands with at least 70% pine before they are attacked. Given that so much volume is expected to be dead (97 million cubic metres, 86 million in stands with at least 70% pine) over the next 20 years, harvesting should be focused on the highest value which implies harvesting the stands of the highest green volume with the least damage in the shortest time possible.

Maximum salvage strategy

Another strategy is to focus on stands that have enough attacked pine to render the stands NRL if they are not harvested (i.e., the remaining green volume is less than 65 cubic metres per hectare). Within this pool, stands with the highest volume of dead trees are harvested first.

This is a key issue in the Williams Lake TSA as many low volume stands west of the Fraser River cannot lose too much volume before becoming NRL. This is exacerbated by the previous beetle infestation in the early 1980's west of the Fraser River as these stands possess less volume than pine stands that have had no beetle damage.

Minimize NRL strategy

A third method approach is to augment the salvage scenario by considering the year a stand will become NRL based on the amount of attack that has occurred and the length of time the dead trees have been left unharvested. Where a stand will become NRL next year based on shelf life, it should be harvested this year. This method requires more planning than the previous method because it requires an ability to produce harvest plans and cutting permits on an annual basis in response to beetle activity. It is however, a best case scenario for examining the implications of leaving stands on the timber harvesting land base that are growing and/or merchantable for the longest possible time while harvesting those that are likely to become NRL.

Analysis results

Characteristics of the volume harvested by strategy

Figure 5 shows the total volume harvested and the dead pine volume harvested in stands with at least 70% pine at three different harvest targets. The results for the *maximum green volume* (dark blue) and *maximum salvage* strategies (light blue) are presented. Triangles connected by solid lines represent the total harvest while diamonds connected with dashed lines represent the dead pine harvested. The *minimize NRL* strategy achieves similar results to the *maximum salvage* strategy so it is not shown.

In terms of total harvest, the *maximum salvage* strategy achieves far more volume harvest at each harvest target than the *maximum green volume* strategy. The *maximum salvage* strategy achieves almost as much harvest in dead pine as the total volume harvest of the *maximum green volume* strategy. However, as the proportion of dead volume to total volume is much lower using the *maximum green volume* strategy, a higher economic return is expected as this strategy harvests more unattacked pine volume.

How stands are scheduled for harvest will affect the amount of dead pine salvaged and the total amount of harvest in stands with at least 70% pine.

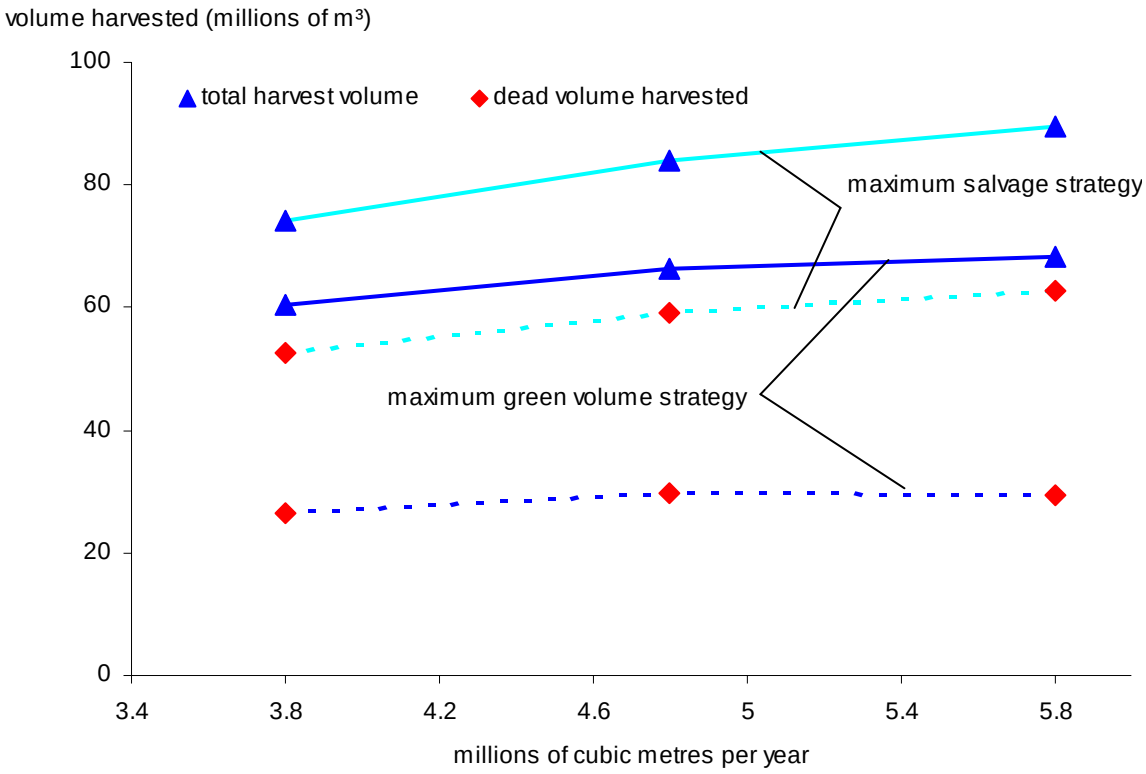

Figure 5. Volume of pine dominated stands (> 70% pine) harvested by harvesting strategy over the next 20 years.

Harvestable inventory in twenty years

Figure 6 shows the harvestable inventory in 20 years time based on the harvesting strategy and the harvest target employed. Harvestable inventory is the volume of stands that are projected to still possess 65 cubic metres per hectare in 20 years time. At the current AAC of about 3.768 million cubic metres per year (which includes an 850,000 cubic metre beetle uplift), the harvest strategies differ in 20 years time from a low of 63 million for the *maximum green volume* to a high of 84 million for the *minimize NRL* strategy. As the harvest target increases, the harvestable inventory declines by about 10 million cubic metres per one million cubic metre increase in uplift harvest. This is due to stands that were retained at the lower harvest level needing to be harvested to maintain the base AAC of 2.92 million cubic metres per year once the pine dominant stands (> 70%) are depleted and the uplift is removed.

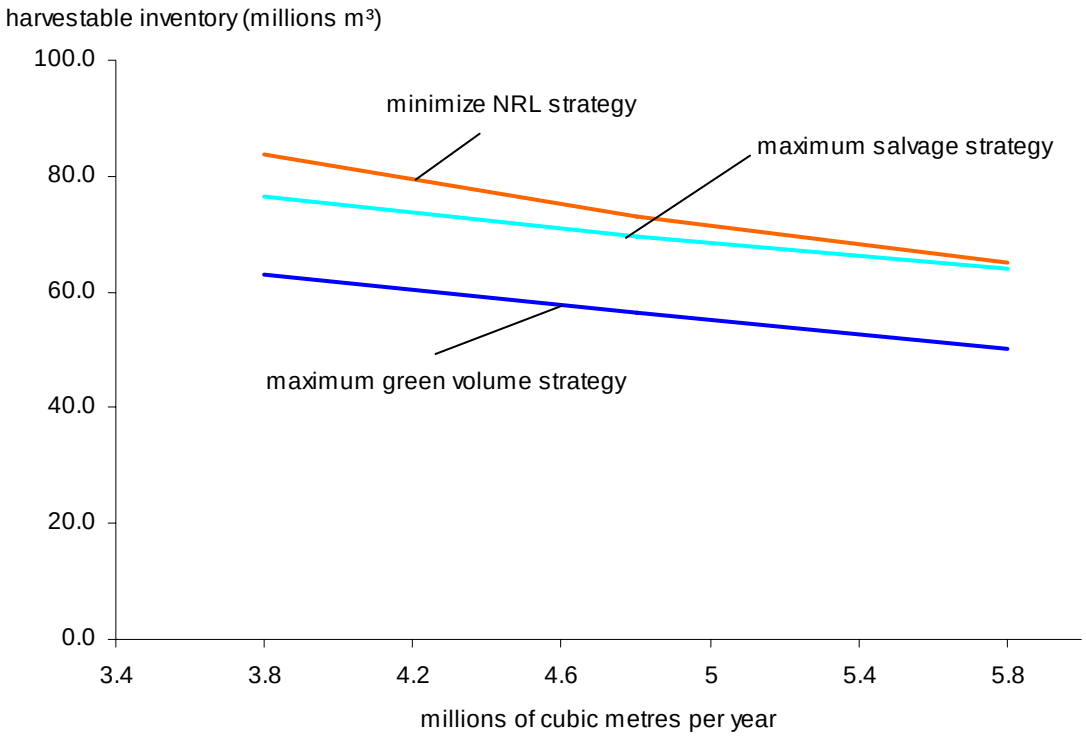

Figure 6. Projected inventory available for harvest in 2026 by harvesting strategy.

Effectiveness of increases in harvest on the NRL

Figure 7 shows the relationship between the projected NRL volume and the NRL area for each harvesting strategy by harvest target. The results for the *maximum green volume* (dark blue), *maximum salvage* (light blue) and *minimize NRL* (orange) strategies are presented. Diamonds connected by dashed lines represent the projected NRL volume while squares connected by solid lines represent projected NRL area.

Recall that there is both a volume and area associated with the projected NRL. In terms of NRL volume, the *maximum green volume* strategy leaves the most NRL on the landscape while *maximum salvage* and the *minimize NRL* strategies leave the least and are quite similar in magnitude. Increasing the harvest target by as much as two million cubic metres per year at most only reduces the NRL volume by 13%.

In terms of NRL area, the *maximum green volume* strategy leaves the most NRL area on the landscape while the *minimize NRL* strategy leaves only 20% NRL area while harvesting at the current AAC. The *maximum salvage* strategy shows the greatest improvement with increasing harvest but would require an additional two million cubic metres per year uplift to achieve the same result as the *minimize NRL* strategy at the current AAC.

In short, how stands are scheduled for harvest will influence the magnitude of the NRL.

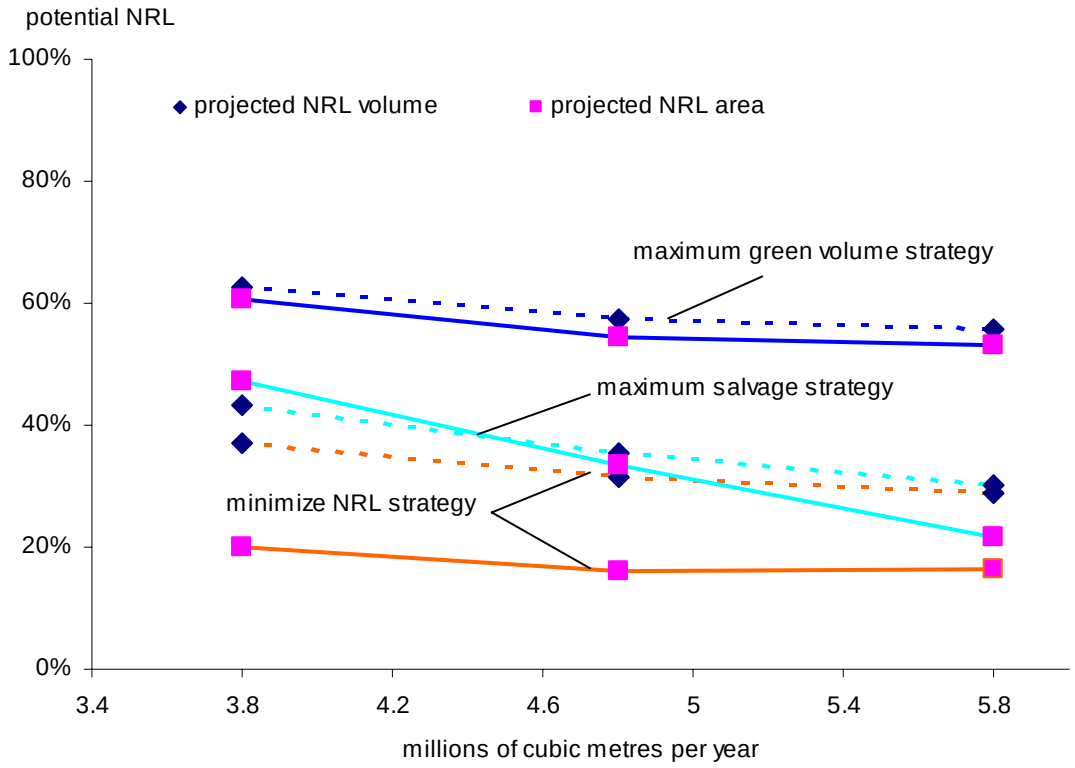

Figure 7. Changes in percentage of projected NRL volume and area at three different harvest levels.

Spatial distribution of the harvest

Figure 8 shows one possible projection of harvesting based on applying the current AAC of 3.768 million cubic metres and the *minimize NRL* harvest strategy. The analysis indicates that most of the harvesting over the next 10 to 20 years will eventually be in the west if harvesting continues in stands with at least 70% pine, while stands of mixed species in the east are retained for future harvesting opportunities. It is important to recognize the harvest concentration east of the Fraser River in the years 2005 through 2009 are mainly the result of a concentration of activity in 2005, 2006 and 2007 to address the earliest stands attacked by the beetle.

After 2007, the harvest east of the Fraser River is projected to decline below 20% regardless of the harvest strategy used if a focus in stands with at least 70% pine is maintained.

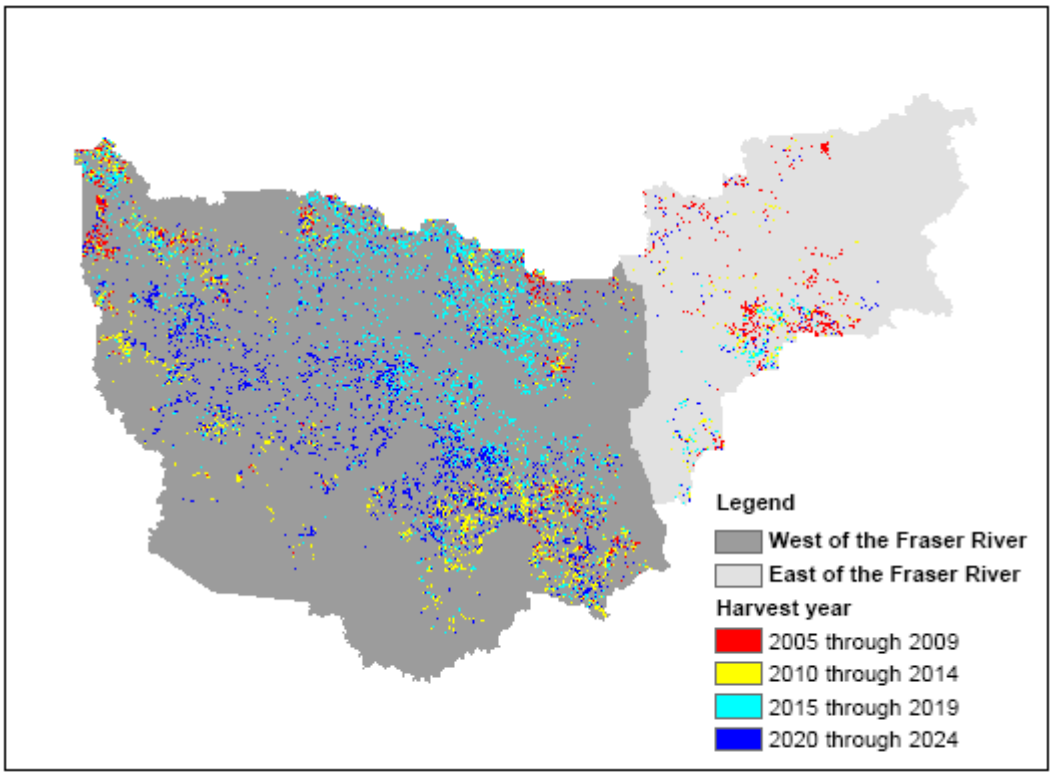

Figure 8. Potential harvesting pattern with the current AAC and a 'minimize' NRL harvest strategy.

Timber supply projection

Table 2 shows the length of time a potential uplift could be in place for a given harvest strategy and harvest target, **assuming all harvested stands possess at least 70% pine for the duration of the uplift**. The projected length of uplift is a modelled outcome. The table also illustrates the number of years from 2005 that 2.92 million cubic metres could be maintained based on dividing the remaining inventory by 2.92 million cubic metres and adding it to the years of uplift. For each one million cubic metres per year increase in harvest target, the length of the uplift is reduced by two years, regardless of the harvest strategy. This is a result of harvesting within a finite number of stands with at least 70% pine. The higher the rate of depletion, the shorter the time harvest can be maintained.

Once the stands with at least 70% pine are depleted, harvesting must shift to other stand types. The longer the focus is on pine dominated stands, the higher the medium-term timber supply as the other stand types can continue to grow. The earlier this transition to harvesting other species occurs, the earlier mid-term timber supply is dependent on volume that does not exist today (i.e., tree growth over the next 20 years).

Table 2. Duration of harvest target by harvest strategy

Harvest strategy	Harvest target (m^3/year)	Projected length of an uplift at the harvest target level	Years of uplift + years of harvest at 2.92 million m^3/year	Green harvest
Maximum green volume	3.8	16	41	56%
	4.8	14	39	55%
	5.8	12	37	57%
Maximum salvage	3.8	19	46	29%
	4.8	17	44	30%
	5.8	15	42	30%
Minimize the NRL	3.8	20	48	22%
	4.8	18	45	29%
	5.8	16	42	30%

For example, using a *maximum salvage* strategy with the current AAC (with its associated uplift) of 3.768 million cubic metres per year, the pine resource is projected to be harvested for 19 years while the current AAC without uplift of 2.92 million cubic metres per year could be maintained for a combined total of 46 years from 2005. By increasing the harvest by two million cubic metres per year using the same strategy, the pine resource would be exhausted 4 years earlier and the current AAC without uplift could only be projected to be maintained for a total of 42 years, a reduction of 4 years.

Table 2 shows that representing any precise medium-term timber supply is a challenge. The medium term will be dependent upon the progression of the epidemic and the harvesting strategies adopted by the licensees — both of which are unknown. If licensees can operate economically on only a small percentage of green volume (~30%) either the *maximum salvage* or *minimize NRL* strategies could lead to a better medium-term timber supply than if more green volume is required for economic reasons.

The medium-term harvest level will also be a reflection of the growth of young thrifty stands between 21 and 60 years of age and young managed stands currently less than 20 years of age and when these stands become ready for harvest between 30 and 60 years from now. The table is simply a risk measure for how long the current inventory volume without any growth could sustain the harvest level before being completely exhausted and does not reflect constraints on timber availability.
It is highly likely that the mid-term timber supply will need to decline below two million cubic metres per year to enable a reasonable transition to managed stands.

Characteristics of possible future harvest opportunities in 2026

Figure 9 shows a possible view of the harvesting opportunity differences in 20 years time between the *maximum green volume* strategy and the *minimize NRL* strategy using the current AAC of 3.768 million cubic metres per year. In gold are the stands shown to be harvestable under either harvest strategy while the additional green areas are stands available for harvest only under the *minimize NRL* strategy. By retaining harvest options as long as possible using the *minimize NRL*, many more options are left west of the Fraser River. **More importantly, the harvest opportunities common to both strategies, mainly east of the Fraser River will be the key to the medium-term timber supply within 20 years time. Harvesting these stands in the short term would reduce medium-term timber supply.**

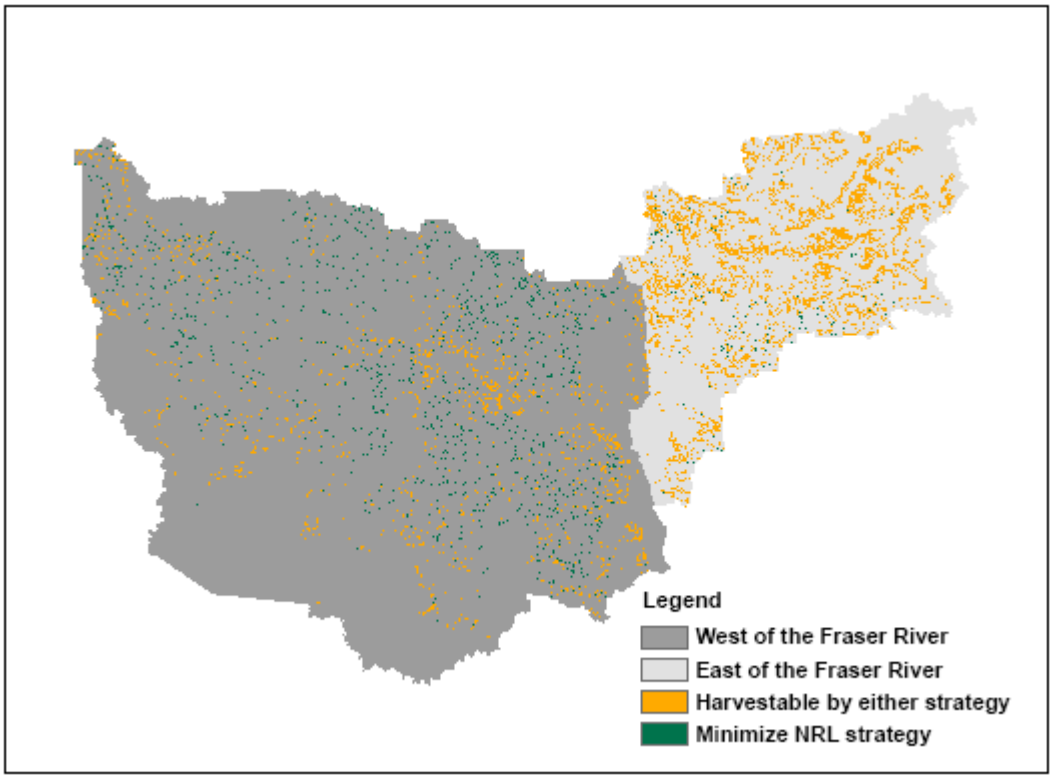

Figure 9. Stands harvestable in 20 years with the current AAC using either the maximum green volume or minimize NRL strategy.

To reiterate the key messages in the previous sections:

1. If the mountain pine beetle epidemic continues unabated, it is projected to kill almost 100 million cubic metres on the timber harvesting land base.
2. Almost all of the pine damage is projected to be in stands with at least 70% pine content.
3. Most of the pine volume projected to be lost occurs west of the Fraser River.
4. Non-recoverable losses (NRL) impact both volume and area. Stand level harvest strategies will dictate how effective any harvest level is in reducing the NRL.
5. The safest course (assuming no other forest health issues) in preserving the mid-term harvest level is to harvest in stands with at least 70% pine and preserve harvest opportunities in other stand types east of the Fraser River.
6. Increasing the rate of harvest may not necessarily reduce the projected NRL as this depends on the harvest strategy employed but will maximize the value of the pine resource in the short term as more unattacked volume can be harvested.

Proposed objectives and strategy to deal with the beetle infestation

The Williams Lake TSA (consisting of the Chilcotin and Central Cariboo Forest Districts) Forest Health Strategy (2005-2006) was signed off by the district managers in November of 2005 to deal with the impacts of the mountain pine beetle epidemic is, with full consideration to protect and manage other non-timber resource values, to maximize value recovery of dying and dead pine trees across the timber supply area.

Mountain pine beetle population levels are high across the majority of the timber supply area, and it is no longer possible to slow or delay the population. As such, the beetle harvest activities will be primarily focused on expedited large-scale harvest of dead lodgepole pine stands. This will reduce the net economic loss of timber value but will ensure the forest land is actively growing trees as soon as possible.

MPB salvage harvesting has been rapidly depleting lodgepole pine-leading stands to the east of the Fraser River. As a result — harvesting needs to be focused west of the Fraser to minimize NRL and maximize timber supply opportunities in the mid term.

The Williams Lake TSA Forest Health strategy and objectives in responding to the current infestation include:

- Encouraging the movement of harvesting operations of a significant portion of the existing base AAC to high-priority (> 70% pine component) mountain pine beetle killed or infested stands west of the Fraser River.
- Directing any additional uplift volumes to high-priority mountain pine beetle killed or infested stands west of the Fraser River, a portion of which may be directed to harvest of stands with less than 100 cubic metres per hectare. The intent of this strategy is to manage NRL and as a result mitigate mid-term timber supply impacts.
- Maintaining the existing AAC partition in the three western supply blocks.
- Developing new short-term tenure opportunities to help expedite the harvest of mountain pine beetle infested stands.
- Providing and enhancing First Nations opportunities in conjunction with accommodation agreements.

- Conserving the long-term forest values identified in the Cariboo-Chilcotin Land Use Plan.
- Recognizing landscape and stand-level biodiversity values, and developing retention strategies to maintain or enhance those values in a manner consistent with the Chief Forester's December 2005 "Guidance on Landscape- and Stand-level Structural Retention in Large-Scale Mountain Pine Beetle Salvage Operation".
- Limiting impacts to the non-pine component of the timber supply area, other than to address forest health factors associated with that component in order to maximize harvesting opportunities in the mid term and mitigate impacts on communities and the forest industry.
- Notwithstanding the impacts associated with the current mountain pine beetle infestation, other emerging forest health factors will be proactively addressed in a manner consistent with the TSA Forest Health Strategy.

Implications of changes in the AAC

Environmental implications

The impacts of the current mountain pine beetle infestation in the Williams Lake TSA will inevitably affect the structure of the forests. The Chilcotin and Central Cariboo Forest Districts are revising forest management strategies where necessary to mitigate the impact on the environment.

To offset environmental implications, the forest districts will develop management strategies to consider, among other things, values related to First Nations, watersheds, old-growth management areas, visual quality objectives, harvesting priorities, non-susceptible species retention and wildlife trees.

Regardless of the allowable annual cut determined by the chief forester, the districts will monitor the beetle epidemic, effectiveness of management strategies, and licensee responsiveness to the epidemic, and report the findings periodically to the chief forester.

First Nations implications

There are twenty-two First Nations asserting traditional territories in the Williams Lake TSA. Ten First Nations have communities within the Williams Lake TSA. They are four Secwepemc (Shuswap) communities: Xats'ull (Soda Creek), Xatl'tem/Stwecem'c (Dog Creek/Canoe Creek), Esketemc (Alkali Lake) and T'exelc (Williams Lake) bands; Five Tsilhqot'in (Chilcotin) communities: Tl'esqox (Toosey), Tletinqox-t'in (Anaham), Yunesit'in (Stone), Xeni Gwet'in (Nemiah Valley) and Tsi Del Del (Alexis Creek) bands; and one southern Carrier community, the Ulkatcho Band.

Other First Nations with traditional territories in the timber supply area are three Secwepemc (Shuswap) communities: Tsq'escen' (Canim Lake), High Bar and Whispering Pines/Clinton; one Tsilhqot'in (Chilcotin) community: Esdilagh (Alexandria); four southern Carrier communities—Lheidli T'enneh, Lhtako (Red Bluff), Nazko, and Lhoosk'uz Dene; one Stl'atl'imx (Lillooet) community: Ts'kw'aylaxw (Pavilion); two Coast Salish communities, Homalco and Nuxalk; and one Kwakiutl community: Da'naxda'xw/Awaetlala.

First Nations in the Williams Lake timber supply area are actively involved in forestry-related activities including harvesting, silviculture and firefighting, and Community Forest Agreements and have frequently expressed an interest in increasing that involvement.

All First Nations that assert an interest in the Williams Lake TSA have been offered accommodation under the First Nations Forestry Strategy and nine have signed Forest and Range Agreements.

In the event the current uplift to the allowable annual cut is maintained or increased, additional opportunities will exist for First Nations to increase their involvement in the forestry sector.

During past timber supply reviews First Nations have expressed concerns about timber harvesting in areas with high cultural, environmental and economic values. Many of the cultural and environmental considerations are beyond the scope of the chief forester's Section 8 consideration. However where information has been provided, it is considered in the operational planning process.

An archeological overview assessment was completed over the Williams Lake timber supply area in 1998. This assessment indicates the relative potential for archeological resources to be found, based on terrain features and anthropological factors, and can be used to determine where on-the-ground archeological impact assessments are to be carried out.

The Ministry of Forests and Range has already begun consultation efforts with respect to this timber supply review and intends to continue to fulfill its legal obligations to consult with First Nations in conjunction with the release of this public discussion paper.

Community Implications

The implication of changes in the allowable annual cut for local communities is an important consideration in the timber supply review. The current allowable annual cut for the Williams Lake TSA is 3.768 million cubic metres. The information supplied suggests that the harvest level should be maintained or possibly increased in response to the mountain pine beetle infestation, depending on the shelf life of dead pine within the TSA. To minimize the community implications, harvest planning should focus on stands with at least 70% pine.

Should additional volume be made available there would be an increase in direct and indirect forestry-related employment, as well as other industry-related changes in the Williams Lakes TSA forestry sector.

Your input is needed

Public input is a vital part of establishing the allowable annual cut. Feedback is welcomed on any aspect of this discussion paper or any other issues related to the urgent timber supply review for the Williams Lake TSA. Ministry staff would be pleased to answer questions to help you prepare your response. Please send your comments to the forest district manager at the address below.

Your comments will be accepted until September 18, 2006.

You may identify yourself on the 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 made public, personal identifiers will be removed before the responses are released.

For more information and/or to submit comments contact:

District Manager
BC Ministry of Forests
and Range
Chilcotin Forest District
Stum Lake Road.
Alexis Creek, BC
V0L 1A0

Phone: (250) 394-4700
Fax: (250) 394-4515

District Manager
BC Ministry of Forests
and Range
Central Cariboo Forest District
200, 640 Borland Street
Williams Lake, BC
V2G 4T1

Phone: (250) 398-4345
Fax: (250) 398-4790

Or by electronic mail to:

Chilcotin Forest District
Shane.Schofield@gov.bc.ca

Central Cariboo Forest District
Ray.Leduc@gov.bc.ca

Visit our website at
http://www.for.gov.bc.ca/hts

Background information regarding the timber supply review

The chief forester's responsibility

Determining allowable annual cuts (AACs) for public forest lands in British Columbia is the responsibility of the province's chief forester. In this lengthy and complex process, the chief forester considers technical reports, analyses and public input, as well as government's social and economic objectives.

This responsibility is required by legislation in the *Forest Act*, Section 8. It states that the chief forester shall specifically consider the following factors:

1. production that may be sustained from the area, taking into account:
   - the composition of the forest and its expected rate of growth;
   - the time that it will take the forest to become re-established;
   - silviculture treatments, including reforestation;
   - standards of timber utilization;
   - constraints on the amount of timber that may be produced due to use of the forest for other purposes.
2. The short- and long-term implications to the province of alternative rates of timber harvesting from the area.
3. The economic and social objectives of the Crown for the area, region and province — as expressed by the minister of forests and range.
4. 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 and range when determining AACs. In these determinations, the chief forester considers relevant information from all sources.