WEST CENTRAL B.C.
MOUNTAIN PINE BEETLE
STRATEGIC BUSINESS
RECOMMENDATIONS REPORT

For:
Province of British Columbia
Ministry of Forests
Resource Tenures and Engineering Branch

Contact Person:
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September 2001

R&S ROGERS Consulting Inc.

September 26, 2001

Mr. Jim Langridge
Ministry of Forests
Resource Tenures and Engineering Branch
PO Box 9510 Stn Prov Govt
Victoria, B.C. V8W 9C2

Dear Sir:

I am pleased to present for your review and distribution ten copies of our
West Central B.C. Mountain Pine Beetle Strategic Business Recommendations Report.

We have appreciated the opportunity to prepare this report for the Ministry of Forests. We hope that our recommendations can provide a positive contribution to efforts aimed at addressing the serious business implications of the evolving mountain pine beetle epidemic in west central British Columbia.

On behalf of the project team including Jim Burbee of Venture Forestry Consulting Inc., Steve Potter of *breakthrough* Solutions Inc., Reid Carter of National Bank Financial and myself, I want to thank you and your colleagues for the support and assistance we received while completing this project.

Yours sincerely.

R&S ROGERS Consulting Inc.

_____
R.E. (Bob) Rogers, RPF
President

ACKNOWLEDGMENT

The project team would like to acknowledge the cooperation and valuable input and feedback we received from all the stakeholders interviewed and those who attended our workshops.

We also wish to recognize the excellent co-operation and contribution provided by staff of the B.C. Ministry of Forests, Ministry of Sustainable Resource Management, Ministry of Water, Land and Air Protection and the Canadian Forest Service.

Although they have been formulated with consideration given to the input and feedback received from stakeholders, the recommendations made in this report are those of the Project Team.

We appreciate that there is a broad-based spirit of
"Let's Get on With It!"
and we support that spirit fully.

The Project Team wishes to recognize the invaluable administrative support provided by Peggy Crough of Foresight Survey and Design Ltd., Prince George, during this project.

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EXECUTIVE SUMMARY

As contracted by the Province of British Columbia, Ministry of Forests, R&S ROGERS Consulting Inc. has developed strategic business recommendations addressing the worse case scenario implications of the current Mountain Pine Beetle (MPB) epidemic in west central British Columbia. The recommendations recognize that lodgepole pine is the predominant species of commercially harvested timber in B.C. and that the currently evolving epidemic could threaten to infest a significant percentage of the estimated one billion cubic metres of susceptible pine in the eleven forest districts involved. The area includes thirty plus communities ranging from 100 Mile House in the southern portion of the Cariboo Forest Region through Prince George and west to Smithers in the Prince Rupert Forest Region.

The west central Timber Supply Areas and associated woodlots and Tree farm Licences have a cumulative annual allowable cut (AAC) of twenty-five and one half million cubic metres over an estimated Timber Harvesting Landbase (THLB) of approximately 9.1 million hectares. The worse case scenario for the epidemic assumes that an over supplied dimension lumber market offers no opportunity for significant increases in harvesting or manufacturing volumes. We suggest that new investment in primary milling capacity is not warranted in support of MPB control. The worse case scenario also assumes that the epidemic is in year 8 to 10 of a probable 10 to 20 year life and further that no epidemic-collapsing cold weather event, critical to the demise of the epidemic, will occur in the next 3 years. Moreover, the infested area is projected to increase at an exponential rate of 40% annually averaged over the term of the epidemic. We stress that it is important to recognize the concurrent threat and impact of other bark beetle infestations while addressing MPB strategies.

While we recognize that both the area and volume impacted by the current west central MPB epidemic is large and expanding, we were in fact not able to determine a total infestation level or overall magnitude of the epidemic within reasonable parameters to our satisfaction. We believe it is critical to the strategic management of this and other MPB beetle epidemics to be able to adequately and consistently measure and quantify the level of beetle infestation across the province. We recommend that *the Crown provide adequate resources to enable the roll-up of consistently acquired net cumulative infested area and volume numbers by attack category for each MoF district and TSA on a twice annually basis province-wide.*

The recommendations in this report were developed with consideration of the valuable input and feedback received from stakeholders and within the context of the following Basic Principles.

1. *The current MPB epidemic and its implications for business issues are grounded in a Forest Health issue that does not recognize administrative boundaries.*
2. *The Province is the landlord and has a strategic and fiduciary responsibility to manage the impacts of the current MPB epidemic.*
3. *The Province must recognize the costs associated with optimizing value from a depreciating economic asset.*
4. *The MPB epidemic must be managed through agency and industry application of proven and new innovative Best Practices.*
5. *All stakeholders must recognize that the west central MPB epidemic has local, regional, Provincial and national impacts.*

They were also developed within our core assumption that *all dollars should be treated equally, independent of source, and that capital should only be employed where it has a real opportunity to create value.*

Because we believe that, North American lumber producers currently have significant excess production capacity, the pricing environment will remain weak and that attempts by British Columbia producers to increase production will face serious market pressures for the foreseeable future, we recommend that *there be no significant increase in total net timber harvested across west central B.C. in support of MPB control.* We have also concluded that due to an over-supply of chips large scale production of market chips is not a significant or likely viable option for increased utilization of MPB killed timber. However, we recommend that *the MoF make beetle wood available to viable and innovative, non-SPF dimension lumber, value-added business opportunities that support the primary target of maximizing green attack harvest.*

We suggest that harvesting and manufacturing capacities, with an estimated potential primary milling capacity of twenty-nine million cubic metres (7.3 billion fbm) within the included forest districts, are not limiting factors. However we do suggest that transportation infrastructure in the Lakes District is limiting beetle control efforts and we recommend that *an action plan, complete with a MoTH decision and commitment to an enhanced transportation infrastructure in the Lakes Forest District, be adopted and immediately implemented.* Having reviewed the potential for long-term storage of beetle killed timber, we recommend that *emphasis be placed on the on-stump storage of beetle killed trees.*

We recommend that *proven and new innovative best practices be employed throughout the epidemic area to reduce planning and permit approval timelines.* We suggest that the "Administrative Streamlining Requirements" recommended to the government by the CLMA/NFPA Mountain Pine Beetle Task Force provide a *good basis for co-operative discussion between industry and the MoF aimed at putting in place effective means to reduce planning and approval timelines.*

Community stability was the foremost public issue in all community and First Nations consultations. We received five consistent messages:

- Communities are concerned about stable timber supplies for local mills, and the viability of operating these mills in beetle wood.
- Communities want opportunities to utilize cut uplifts and dry wood to establish new local economic initiatives, other than SPF dimension lumber mills.
- For the most part, communities do not want spikes in economic activity that require infrastructure improvements that cannot be sustained over the longer-term.
- Communities want local contract loggers, market loggers and market log tenures to continue to operate, provide local jobs and support local businesses.
- First Nation communities in particular want to establish trained workforces to manage beetle related activities, including logging and stewardship contracts and increased joint venture manufacturing.

However we have recommended *that short-term, cost effective transfers of cut by licencees and the SBFEP from the least beetle infested districts or TSAs to those most impacted by MPB be the main tool for continuing efforts aimed at maximizing harvest of green attack timber. In this circumstance, cut control credits for transferred quota, and haul cost recognition to the closest point of delivery are recommended to remove disincentives to cut transfers.* We do not recommend that reciprocal balancing of transfers between TSAs be guaranteed. We further recommend *that new non-*

replaceable forest licences be advertised in TSAs with cut uplifts to encourage new non-SPF business opportunities, local employment and First Nation involvement while optimizing crown revenues. These sales would be awarded competitively through bid proposals that are evaluated jointly for revenue creation and community stability elements.

Consistent with the Basic Principles, and our belief that industry has no ability to absorb further costs, we believe that costs associated with MPB control should be borne by the landlord and therefore should be reflected in the appraisal system through removal of beetle wood from the "waterbed." As a result the Province is likely to experience some significant impact on Crown revenues. Nevertheless, we recommend that *the Province recognizes the increased costs of harvesting beetle wood on a cost neutral basis* and that *the MoF implement strategic changes to the Interior Appraisal system to ensure that it supports rather than hinders sound beetle control and harvesting/manufacturing efforts.*

Timber pricing recommendations include:

1. *Defining cost neutral,*
2. *Removing beetle wood from the waterbed,*
3. *Issuing landscape level cutting permits,*
4. *Recognizing additional transportation costs between and within TSAs,*
5. *Reviewing the rate charged for "dead" grade 3 logs,*
6. *Completing a study to determine the decline in value and recovery from all categories of beetle-wood,*
7. *Maintaining the integrity of appraisal zones and*
8. *Establishing a log-based rate for market log tenures.*

We suggest that site rehabilitation is almost always a poor investment and we recommend *a GO SLOW policy be adopted for large scale site rehab as a result of the current west central mountain pine beetle epidemic.*

We believe the current AAC is adequate at this time and recommend that *the MoF and industry exhaust all efforts to maximize the harvest of green attack timber within the framework of revised cost recognition, tenure and operating area transfers and SBFEP revenue focused licence opportunities before further AAC uplifts are proposed.* We recommend that the Minister of Forests support a policy that ensures that new beetle related NRFLs are planned, advertised, reviewed and awarded within 120 days.

All strategic land use plans were not developed with an epidemic the scope of the current west central epidemic in mind. Therefore we have recommended that *MPB strategies and strategic land use plans be integrated during this evolving MPB epidemic and that responsible Regional Resource Boards and associated monitoring committees for each Strategic Land-use Plan address the synergies, conflicts and prudent means for integrating the strategies.*

We recommend that *the MPB strategy be effectively resourced to ensure results.* Defining adequate must be done within the context of the set of strategy recommendations and going forward actions that are implemented. We do not have sufficient information to recommend a target allocation of funds, but suggest it needs to include priority funding for:

- A ranking Provincial Beetle coordinator position within the MoF
- Defining the magnitude of the epidemic
- Enhanced survey, detection and probing efforts
- Full resumption of the aerial surveys
- Accommodating effective staff deployment
- Implementation of recommended transportation infrastructure upgrades

Effective co-ordination of the bark beetle control effort, including the implications for business issues, is critical to the Province's ability to carry out its mandate. Therefore consistent with our basic Principles, we recommend that *within 30 days the Deputy Minister of Forests confirm a coordinated provincial approach for MPB management through a 3 year appointment of a designated ranking senior staff position within the Operations Division of the MoF.*

At the conclusion of our report we provide a summary of our primary recommendations and we recommend *that the parameters of the epidemic and the validity and value of the strategic recommendations as implemented be reviewed on an annual basis.*

In support of our recommendations and with recognition of efforts to date by all parties, we recommend that Government give serious consideration to several priority actions as they go forward. We suggest that the action timeline commence October 1, 2001. Priority 30-day actions include:

1. *Appointment of a Bark beetle coordinator.*
2. *Identification of the magnitude of quota in non-priority cutting areas that is available for cost effective transfers.*
3. *Adoption and immediate implementation of a MoTH decision on enhanced transportation infrastructure in the Lakes Forest District.*
4. *Development of definitions of cost and/or profit neutral that are accepted by both the MoF and industry.*
5. *Implementation of strategic changes to the Interior Appraisal system to support sound beetle control and harvest/manufacturing practices and economic results.*

1.0 INTRODUCTION

1.1 Terms of Reference

Following a competitive bid process, the British Columbia Ministry of Forests (MoF) contracted with R&S ROGERS Consulting Inc. for the preparation of a Mountain Pine Beetle Strategic Contingency Plan. Following subsequent direction from the MoF, the terms of reference evolved to focus R&S ROGERS' efforts on the development of strategic mountain pine beetle (MPB) related business issue recommendations for the Ministry. In association with Venture Forestry Consulting Inc., *breakthrough* Forest Solutions and Reid Carter of National Bank Financial, R&S ROGERS Consulting Inc. is to deliver a MPB strategy report that recognizes the critical business implications of the mountain pine beetle epidemic and the necessity for provincial management of the business related issues impacted by the epidemic. The components of the strategy report consist of:

- An assessment of the potential business implications of the mountain pine beetle epidemic in west-central British Columbia for a collection of industrial, socio-economic, market, trade and administrative components
- The identification of options for managing the potential business implications assuming a worse case scenario in which the epidemic continues to increase at exponential rates
- Development of strategic recommendations that the Ministry of Forests can implement throughout the affected area

The deliverables of the contract include:

1. A draft Strategy report submitted to the MoF for review during July, 2001.
2. Presentation of the draft *Mountain Pine Beetle Strategic Recommendations* to primary stakeholders in the Cariboo, Prince George and Prince Rupert Forest Regions at three workshops in August 2001.
3. A final *Mountain Pine Beetle Strategic Business Recommendations Report* submitted to the MoF in September 2001.

This report represents R&S ROGERS Consulting Inc.'s submission of the West Central B.C. Mountain Pine Beetle Strategic Business Recommendations Final Report.

1.2 Background

Lodgepole pine accounts for more than 50% of the growing stock in BC's interior and is the predominant species of commercially harvested timber in the province. While mountain pine beetle attack on and destruction of mainly lodgepole pine stands in British Columbia is always present at endemic levels, frequent, regional epidemic level attacks lasting for 8 to 15 or 20 years occur regularly throughout the interior of the Province. Since 1992-1994, several factors have conspired to create the Province's historically largest and most severe mountain pine beetle epidemic in west central British Columbia. *The current epidemic is estimated to have infested to varying degrees approximately 1.2 million hectares as of Fall 2000.*

Mountain pine beetle infestations are generally controlled by periods of extreme or unseasonably cold temperatures that affect the MPB's ability to survive, multiply and migrate. During epidemic levels of infestation, the populations are left unchecked and the area infested may expand exponentially. The potential exists for a "worse case scenario" to evolve that sees the area infested in west central BC grow to impact a significant percentage of the estimated over 1 billion cubic metres of susceptible pine volume.

1.3 Objectives

Recognizing that the magnitude of the infestation has created a significant forest management challenge with serious implications for industry viability, community and employment stability, Crown revenues, long-term AAC and the Small Business Forest Enterprise Program, the objectives of the business issues strategy include:

- Providing assessment of the critical business issues related to the epidemic as impacted by market constraints, operational constraints, socio-economic impacts, cost issues and administrative and legislative issues.
- Identifying viable options for managing the business implications of a worse case scenario increase in the epidemic
- Development of strategic recommendations in support of timely and successful strategy implementation.
- Providing direction for centralized coordination and implementation of the strategic MPB control effort

1.4 Methodology

In recognition of the significant work that has been done to date by industry, provincial ministries and other stakeholders towards finding solutions for dealing with the beetle epidemic, the project methodology commenced with consultation with a cross-section of primary stakeholders. Stakeholders included government agencies, First Nations, community representatives, industry associations, and licensees. The consultants have also reviewed numerous maps, reports and data related to the MPB and the current epidemic in particular.

Workshops were held at Williams Lake, Vanderhoof and Burns Lake on three consecutive days in August. Approximately 120 stakeholders were invited and a total of 80 participants attended the three meetings including twenty-six at Williams Lake, twenty-three at Vanderhoof and thirty-one at Burns Lake. Our preliminary draft recommendations were presented at each meeting with valuable interactive input and feedback received from each group. In addition to numerous follow-up discussions around our preliminary recommendations, we received sixteen written responses as further feedback to our presentations. Our workshop draft recommendations are included as Appendix A together with a copy of our workshop invitation.

Input received during interviews, feedback from workshops, report and legislation reviews and data assessments have been considered during the development of our strategic recommendations.

1.5 Project Team

The project team consists of the following key personnel:

- R.E. (Bob) Rogers, RPF — President, R&S ROGERS Consulting Inc. Nanoose Bay, B.C.
- J.W. (Jim) Burbee, RPF — President, Venture Forestry Consulting Inc. Prince George, B.C.
- S.J. (Steve) Potter, RPF — President, *breakthrough* Forest Solutions Inc. North Vancouver, B.C.
- R.E. (Reid) Carter, RPF — Paper & Forest Products Analyst National Bank Financial, Vancouver, B.C.

2.0 DEFINING "WEST-CENTRAL" B.C.

2.1 Administrative Areas

As defined for this review the area included in the current west central B.C. MPB epidemic, is covered by three MoF forest regions, eleven forest districts and seven Timber Supply Areas (TSAs). They are listed below and administrative boundaries are presented on the map in Figure 1.

Region	Forest District	TSA
Prince Rupert	Morice	Morice
	Lakes	Lakes
	Bulkley-Cassiar	Bulkley
Cariboo	Quesnel	Quesnel
	Horsefly	Williams Lake
	Williams Lake	Williams Lake
	Chilcotin	Williams Lake
	100 Mile House	100 Mile House
Prince George	Prince George	Prince George
	Vanderhoof	Prince George
	Fort St. James	Prince George

At the time of the consultations the area was also covered by the three Prince George, Northwest and Cariboo fire centres, MOELP Regions and BC PARKS Districts, respectively located at Prince George, Smithers and Williams Lake. Subsequent to those early consultations, the Province made administrative changes to setup a new Ministry of Sustainable Resource Management (MSRM) and to rename and reorganize MOELP as the Ministry of Land, Air and Water Protection (MWLAP) including BC Parks.

The area includes thirty plus communities ranging from 100 Mile House in the southern portion of the Cariboo Forest Region through Prince George and west to Burns Lake and Houston in the Prince Rupert Forest Region.

Figure 1: MoF Administrative Units

2.2 Annual Allowable Cut (AAC)

Table 1 presents a summary of AAC levels for the seven TSAs. Full AAC summaries by TSA are presented in Appendix B.

Table 1 Summary of TSA AACs

TSA	AAC (m3)	SBFEP	Uplift (m3)	Current AAC (m3)
Bulkley	895,000	238,976		895,000
Morice	1,985,815	185,000		1,985,815
Lakes	1,462,000	413,000	1,500,000	2,962,000
Prince George	9,363,661	1,454,000		9,363,661
Quesnel	2,340,000	278,000	908,000	3,248,000
Williams Lake	3,807,000	470,000		3,807,000
100 Mile House	1,362,000	207,000		1,362,000
TOTAL	**21, 215,476**	**3,245,976**	**2,408,000**	**23,623,476**

Source: MoF: August 2001

In addition to the 23,623,476 m3 of available AAC from within the TSAs, there is an AAC attributable to various TFL and Woodlot Licences within the epidemic area. The summary in Table 2 indicates that this TFL/Woodlot AAC is approximately 1,869,000 m3 for a combined total AAC from TSAs, woodlots and TFLs of approximately *25,492,476 m3*.

Extrapolating from available MoF data, the total area covered by the west central BC forest districts and included TSAs, woodlots and TFLs under review is 19.2 million gross hectares, 13.9 million productive hectares and *9.1million hectares of Timber Harvesting Landbase (THLB).*

The total pre-uplift SBFEP apportionment for the 7 TSAs was approximately 3,246,000 m3 or 15%. The SBFEP apportionment for the Quesnel and Lakes TSA uplifts are not yet confirmed.

Table 2 Summary of Woodlot and TFL AACs

TSA Area	Woodlot AAC (m3)	TFL AAC (m3)	Total (m3)
Bulkley	22,000	0	22,000
Morice	40,000	0	40,000
Lakes	62,000	0	62,000
Prince George	106,000	750,000	856,000
Quesnel	138,000	671,000	809,000
Williams Lake	51,000	0	51,000
100 Mile House	29,000	0	29,000
TOTAL	**448,000**	**1,421,000**	**1,869,000**

Source: MoF: August 2001

2.3 Mature Pine Areas and Volume

Based on MoF data, the estimated area of susceptible mature pine within the THLB of the seven west central TSAs is 3.19 million hectares (35 % of the total THLB). The estimated mature lodgepole pine volume within the THLB is 696 million cubic metres. Extrapolating from these numbers to include woodlots and TFLs, the estimated volume of mature lodgepole pine at risk in the productive forest is in excess of 1 billion cubic metres.

Table 3 Summary of Susceptible Mature Pine Area and Volume by TSA

TSA	Est. Mature Pl	Est. Mature Pl
	Area (Ha)	Volume (,000M3)
Bulkley	33,014	10,555
Morice	159,907	48,122
Lakes	297,910	82,719
Prince George	1,307,615	298,592
Quesnel	492,171	109,442
Williams Lake	662,656	90,643
100 Mile House	238,143	55,834
Total	**3,191,416**	**695,907**

Source: MoF: August 2001

The estimated hectares of THLB and associated pine volumes do not include area or volume associated with parks or protected areas.

A Ministry of Forests map presenting an aerial overview of MPB red attack area as of Fall 2000 is included as Appendix C.

3.0 THE "WORST CASE SCENARIO"

The MPB strategic recommendations in this report were developed based on the projection that the current west central BC MPB epidemic will continue to expand consistent with a "worst case scenario". The "worst case scenario" under which the business implications are considered is based on the assumptions that:

- There is no increased SPF dimension lumber market capacity
  - See Section 6.1 on Market Constraints - Lumber
- There will be no "severe cold" weather event in the next few years that will significantly impact beetle populations.
- The current epidemic, somewhere in its 8^{th} to 10^{th} year (based on a start point of 1992 to 1994), will have a 10 to 20 year life span
- The area infested in Fall 2000 approached 1.2 million hectares
- Expansion of infested area will occur at an exponential annualized rate of 1.40 over the expected 10 to 20 year life of the epidemic
- Management efforts aimed at the forward lines of the MPB's spread will have limited impact on fill-in volumes infested.

3.1 Cold Weather Events

In a draft report reviewing "The frequency of cold weather events for mountain pine beetle control in northern climates," Stuart Taylor of the MoF reports that

"The combination of unseasonably low temperatures and low snow depths that can control mountain pine beetle infestations are likely to occur in the months of March, October or November. A retrospective look back at temperature records for the last 5 decades indicates that this lethal combination will occur 1 in every eight years near Prince George and 1 in every 13 years near Quesnel."

3.2 Timber Supply Reviews

Recent Timber Supply Reviews (TSRs) carried out by the MoF for the Quesnel and Lakes TSAs in February and March respectively of 2000, identified the projected worst case scenario for these two TSAs. It should be noted that these two TSRs addressed the question of infestation progression from two perspectives; Quesnel TSA on an area (Hectares) basis and Lakes TSA on a volume (cubic metres) basis.

3.2.1 QUESNEL TSA

For the Quesnel TSA the area infested by MPB is reported to have expanded from an estimated 2700 hectares in 1994 to 24,400 ha in fall 2000. *This rate of expansion represents an exponential or cumulative rate of 44% annually over a 6-year period.* Were the infested area to continue to expand at 44% annually for seven years beyond 2000, the total area infested would approximate 313,000 ha. The MoF 2001 Quesnel TSA Timer Supply Analysis Report suggests 90% of the infestations are within the THLB. At this ratio, 282,000ha or 57% of the estimated 492,171 mature pine hectares in the Quesnel TSA would be infested by 2007.

Depending on percent volume killed (or infested) within the infested area, the infested volume could range from 20 to 80% per stand. The Chief Forester's rationale for issuing a TSA AAC uplift projects a kill ratio of 50%. At the 50% level 35 million cubic metres would be infested over the 14 years from 1994 to 2007.

3.2.2 LAKES TSA

For the Lakes TSA, the TSR describes the projected worst case expansion of the MPB on a volume basis. Based on an initial 1995 affected volume of 100,000 m3 the affected volume had increased to 1.9 million m3 by 2000. This rate of expansion of volume affected represents an average annual increase of 80%.

The TSR further suggests that: " the total volume of pine attacked in all stands in the timber harvesting landbase could be as high as 19 million cubic metres in the first 5 years (3.8 million m3/year) and 34 million cubic metres in the second 5 years (6.8 million m3/yrear). The outbreak is expected to last approximately 10 years and will affect about 70% of the pine volume in the timber harvesting landbase."

Maps showing the Lakes District's projection of a worst case scenario for MPB expansion from year 2001 to 2010 are presented in Appendix D.

The Morice, Prince George, Williams Lake and 100 Mile House TSAs currently do not have infestation levels that have expanded as rapidly as either the Lakes or Quesnel TSA. However early reviews in 2001 suggest infestation rates of spread may be increasing for at least some of these TSAs based on ongoing field and aerial checks. This may be particularly true for southern portions of the Vanderhoof District within the Prince George TSA and the southeast boundary of the Morice TSA.

3.3 Historical Perspective

The following discussion is based on personal communication with Drs. Les Safranyik and Allan Carroll of the Canadian Forest Service. The rate of spread of MPB infestation by both area and volume will be subject to a combination of climatic and stand dynamics. While the severe cold events that occurred in 1984 and 1985 were the most significant cause in the collapse of the 1969 to 1985 Chilcotin outbreak, other outbreaks may collapse due to less severe but longer-term seasonal climatic trends and susceptible stand volume combinations. In other words, the current west-central outbreak may not collapse as dramatically as the recent Chilcotin outbreak. It has been demonstrated through modeling that the duration and severity of MPB outbreaks are strongly related to their latitudinal location; more northerly outbreaks are generally of less severity but longer duration than more southerly outbreaks.

Safranyik and Carroll suggest the recent sixteen year Cariboo Region Chilcotin outbreak from 1969 to 1985 is the best historical outbreak to compare the current west central outbreak to. That outbreak eventually covered an actual area of approximately 1.4 million hectares within an affected area of 4.8 million ha. The estimated annual rate of spread during the entire outbreak including the period of rapid decline was 40%. Representative graphs of the Cariboo epidemic MPB infestation development are shown in Figure 2.

The eventual realization of the worst case scenario for the current attack will be dependent upon the duration of the outbreak and the corresponding rapidness of the collapse.

Therefore, although rates of expansion will vary significantly by forest district or TSA, based on the Chilcotin experience and the indicated 44% exponential rate of spread for the current Quesnel infestation, the consultants suggest that:

- An exponential rate of expansion of 40% over the term of the outbreak represents a balanced approach to estimating the worst case scenario for "attacked area" over the term of the current outbreak.

The graphs in Figure 2 are assumed to represent typical epidemic development and collapse curves for MPB epidemics over their term.

3.4 Spruce and Fir Beetle Infestations

While the terms of reference for this project speak to the mountain pine beetle, it is important to note that within the west central B.C. area under review, there are "significant' current infestations of other bark beetles, mainly spruce bark beetle. These spruce beetle infestations are of such an intensity and distribution in some districts to be a major consideration in prioritizing insect control efforts, allocation of harvest volumes to optimize green attack and the application of financial, staff, contractor and licensee resources.

Therefore it should be recognized that when we are making our strategic recommendations, we intend that they be equally applicable to the management of beetle infestations in other species. This approach is one encouraged by the many stakeholders, the CLMA/NFPA Mountain Pine Beetle Emergency Task Force and the Ministry of Forests. It is suggested that these recommendations are of heightened value when applied to the control of other beetles in order to prevent further epidemics.

Figure 2: Area and Trees Killed – Cariboo 1969 – 1985: BC 1990-2000

4.0 MAGNITUDE OF THE EPIDEMIC

While we fully recognize that the scale of both the area and volume of the current west central MPB epidemic is large and expanding, identifying the magnitude of the epidemic within reasonable parameters was the single most challenging aspect of this project. We were in fact not able to determine a total infestation level to our satisfaction. While we reviewed data that put the estimate of infestation as of Fall 2000 as high as 40 million cubic metres over an infested area of 1.2 million hectares, we are not confident that these figures represent a valid summary of the scope of the infestation at that time.

During our review of various reports and data and during discussions with stakeholders, we encountered conflicting area and volume estimates for the epidemic. For some TSAs we found as many as 3 different volume estimates for the same period. The order of magnitude difference between some of these estimates was as much as four fold.

As discussed under the previous section describing the 'worse-case scenario" the two uplift related Timber Supply Reviews for the Lakes and Quesnel TSAs use different means to identify the epidemic, one related to volume and the other related to area.

We believe it is absolutely critical to the strategic management of this and other MPB beetle epidemics to be able to adequately and consistently measure and quantify the level of beetle infestation across the province. While we heard that it is better to over estimate the scope of the epidemic than to underestimate it, we do not concur with that premise. *We believe that if you cannot measure the parameters of the infestation you cannot properly manage it.* Without detracting from the very real and severe level of infestation in the Lakes TSA for example, but considering that estimates of both epidemic volume and area rates of spread are based on exponential factors, we believe that it is more likely that poor beetle management and economic investment decisions will be made based on over estimates than on under estimates.

Equally important to the assessment of the epidemic's magnitude is the use by all stakeholders of common definitions when describing the epidemic. During our review we encountered reference to infested volume, infested trees, infested area, affected area, red attack area, green attack ratios, grey attack areas and cumulative area and/or volume infested. While all these terms apply to valid parameters or stages of the epidemic, *we believe that for effective strategic management it is important to concentrate efforts at identifying the cumulative net volume infested over the term of the epidemic.* The cumulative net volume infested would recognize both the seasonal expansion of the infestation and the impact of control efforts.

We recommend therefore that:

- ***the MoF and industry standardize definitions, measurement and reporting of beetle infestations***
- ***consistent science based best practices for infestation survey methodology be rigorously applied in all areas of the province***
- ***the Crown provide adequate resources to enable the roll-up of consistently acquired net cumulative infested area and volume numbers by attack category for each MoF district and TSA on a twice annually basis province-wide***

- ***the first composite roll-up effective October 1, 2001 be completed by the MoF and made available to industry and stakeholders by November 1, 2001. Subsequent roll-ups would be made by May 1 each year to assess the winter harvest impact on infestation net-down.***
- ***the proposed senior MoF MPB coordinator staff person have both the responsibility and authority to ensure these recommendations are enacted and successfully fulfilled.***

5.0 BASIC PRINCIPLES

Throughout the development of the strategic recommendations presented in this report, we have recognized that the magnitude of the MPB infestation over such a large geographical area has created a significant forest management challenge with serious implications for industry viability, community and employment stability, Crown revenues, AAC projections and the Small Business Forest Enterprise Program. Development of our recommendations and consideration of the valuable input and feedback received from stakeholders has therefore been carried out within the context of the following basic principles.

5. **The current MPB epidemic and its implications for business issues are grounded in a Forest Health issue that does not recognize administrative boundaries.**
6. **The Province is the landlord and has a strategic and fiduciary responsibility to manage the impacts of the current MPB epidemic.**
7. **The Province must recognize the costs associated with optimizing value from a depreciating economic asset.**
8. **The MPB epidemic must be managed through agency and industry application of proven and new innovative Best Practices.**
9. **All stakeholders must recognize that the west central MPB epidemic has local, regional, Provincial and national impacts.**

While not one of our originally stated principles, we have also carried out our review and developed our recommendations within the core assumption that:

- **All dollars should be treated equally, independent of source, and that capital should only be employed where it has a real opportunity to create value.**

During our workshops, some stakeholders indicated a preferred revision to have industry included with the Province in Principle 2. However, from a strategic and fiduciary (given in trust) perspective we believe it is a Provincial responsibility to manage the impacts of the epidemic. With this responsibility comes both the authority to manage and the liability to recognize the costs.

However, we fully concur that the industry has a significant stewardship role in addressing the current and future MPB epidemics.

6.0 CRITICAL BUSINESS ISSUES

6.1 Market Constraints – Lumber

During the consultants' interviews with licensees and their association representatives, the primary constraint (impacting their ability to respond aggressively to the current severe MPB epidemic) referenced by the industry was that of the significant market constraint on present and future opportunities for increased market volume for SPF lumber. This market constraint is the result of an over supply of the total North American market. Without exception the companies confirmed that there is no hidden or untapped market for additional volumes of SPF lumber from the beetle infested area under review.

Any market opportunity is further constrained by the prospect of some on-going form of volume regulated or export tax/tariff based cost impediment structure impacting trans-border access to US markets following the March 31, 2001 expiry of the Softwood Lumber Agreement (SLA).

A third market constraint impacting industry results from the presence of "blue stain" in lumber cut from the area of the pine saw-logs directly attacked by the fungus emitting MPB. The presence and severity of the blue stain restricts a manufacturer's ability to sell wood in the Japanese market. While it has a greater impact on the production of wide boards, which are more affected by the outer diameter region of the logs, the stain also impacts 2X4's. The presence of blue stain therefore directly impacts the selling value of the lumber out-turn from infested logs. During interviews with licensee representatives, reference was made to increasing concern on behalf of some US customers about the amount of blue stain in appearance grades. This was also coupled with the potential for blue stain to cause visual overrides through COFI rules for Machine Stress Rated (MSR) lumber grading.

6.1.1 COMMODITY OUTLOOK

Because the consultants are confident that the commodity outlook for SPF lumber and other associated wood products is pivotal to the development of strategic recommendations, the following discussion is presented. This discussion on North American dimension lumber and panel markets was prepared by Reid Carter, RPF. Looking at SPF lumber history and the outlook for 2001 – 2005 it attempts to place the B.C. interior wood products industry in the broader perspective facing the North American wood products market and B.C.'s position in this market. We offer several conclusions:

Summary:

1. The demand side of North American wood products markets remains surprisingly robust.

- Both housing and the R&R market remains strong despite the broader economic slowdown. U.S. housing starts, currently at above 1.6 million, remain well above the 10-year average of 1.43 million
- Consumer confidence and employment influence housing demand more than mortgage rates, with starts lagging changes in these indicators by 4-6 months. We expect **U.S. housing demand to slow** to the 1.5 – 1.55 million level in the coming months. The recent terrorist attacks in New York and Washington are expected to considerable

undermine consumer confidence resulting in a more significant negative impact on medium-term housing and repair and renovation demand.

2. North American lumber producers currently have significant excess production capacity.

- Lumber production capacity is expected to continue to increase through at least 2050. No North American-wide log shortages are expected although regional log shortages will likely occur.

3. The pricing environment is expected to remain weak.

- Cash costs of lumber production have been declining continuously over the past four years.
- Most North American producers have learned to compete on service (e.g., on spec. lumber with just-in-time deliveries), we believe producers will continue to compete for market share based on price.
- Weakness in North American dimension prices is expected to continue reflecting chronic **over-supply** and a battle for market-share rather than weak demand.

4. Attempts by British Columbia producers to increase production can be expected to face serious market pressures for the foreseeable future.

- B.C. Interior producers have held a 17-18% share of the North American dimension lumber market over the past 20 years. Attempts to increase production (and market share) can be expected to result in increasing price pressure across the North American market, possibly injuring existing Canadian production, and could elevate the current lumber trade dispute.
- We note that most B.C. interior lumber producers are already producing at only 80-85% of their production capacity as a result of limited market opportunities.

We believe any action that increases overall harvest levels in an attempt to control and/or salvage beetle-killed wood should be approached very cautiously. We believe lumber trade relations between Canada and the United States will continue to be acrimonious with any attempts by Canadians to increase lumber shipments increasing the possibility of retaliatory trade sanctions. We believe beetle kill salvage-related increases in harvest levels and lumber production in the BC Interior will come under considerable trade scrutiny — possibly resulting in further trade sanctions against the broader community of BC and/or Canadian lumber producers.

We recommend therefore that:

- ***there be no significant increase in total net timber harvested across west central B.C. in support of MPB control.***

We further suggest that new net investment in milling capacity is not warranted in support of MPB control

Uncertainty Abounds for Lumber Outlook

Lumber is the most volatile of all Paper and Forest Products commodities. We remain very uncertain of the market outlook for dimension lumber grades in North American markets. The current trade battle between Canada and the United States could be quite damaging to Canadian lumber producers and is expected to lead to exceptional price volatility over the near-term. The Spring 2001 price recovery largely reflects this uncertainty as well as Canadian lumber producers holding back supply in order to avoid allowing the U.S. Department of Commerce from being able to demonstrate "Critical Circumstances". Our belief that North American lumber producers have little pricing power is demonstrated by the fact that the imposition of a Preliminary countervailing duty of 19.3% on August 10th, with retroactivity back to May 18th, did not result in any meaningful rise in lumber prices.

Small Increases in Harvest Can Have Large Implications

British Columbia's interior lumber producers have held a 17-18% market share in the North American lumber market over the past twenty years (Table 4). Trade actions by U.S. producers have largely been aimed at confining Canadian producing regions, particularly the B.C. interior, to their historic market shares. Investments in small log processing technology have increased the lumber production capacity of B.C. interior producers considerably over the past 3-5 years. However, most major B.C. interior producers have not been able to fully capture the benefits of these new investments, as they have been unable to move their finished products to market without negatively impacting pricing.

We believe that an actual annual harvest increase of only 2.5 million m^3 resulting from the combined Quesnel and Lakes TSA AAC uplifts would be enough to disrupt the overall SPF dimension lumber market. Two and one-half million m^3/year would result in approximately 800 mmfbm of annual SPF production. While this represents an increase of only 1.2% of North American lumber production it is a 2.25% increase in SPF production ¾ an increase we believe is more than enough to disrupt markets.

Table 4 North American Softwood Lumber Production by Key Producer Regions

	U.S. Production						Canadian Production						
Volumes (BBF)	So. Pine	Douglas Fir	West. Pine	Redwood	North	Total U.S.	B.C. Coast	B.C. Interior	East Canada*	Total Canada	Total North American	NCI and Other**	Total North American Demand
1984	10.67	8.33	8.99	1.66	1.52	31.17	3.90	9.17	7.32	20.39	51.56	0.05	51.61
1985	10.73	8.06	9.28	1.73	1.52	31.32	4.00	10.00	8.67	22.67	53.99	0.10	54.09
1986	11.68	9.41	10.48	2.02	1.68	35.27	3.75	9.58	9.30	22.63	57.90	0.13	58.03
1987	12.47	10.35	11.41	2.18	1.82	38.23	4.67	11.20	9.73	25.61	63.84	0.12	63.96
1988	12.68	10.03	11.40	2.21	1.82	38.14	4.58	10.99	9.60	25.17	63.31	0.11	63.42
1989	12.54	9.81	11.35	2.05	1.79	37.54	4.14	11.10	9.28	24.52	62.06	0.10	62.16
1990	12.91	8.75	10.45	1.97	1.71	35.79	3.80	10.40	8.56	22.76	58.55	0.07	58.62
1991	12.51	7.91	9.51	1.66	1.58	33.17	3.47	9.84	8.32	21.63	54.80	0.09	54.89
1992	14.11	7.95	9.26	1.57	1.64	34.53	3.53	10.63	9.38	23.54	58.07	0.12	58.19
1993	14.39	7.32	8.31	1.35	1.57	32.94	3.59	10.80	10.47	24.86	57.80	0.21	58.01
1994	15.01	7.90	8.10	1.47	1.62	34.10	3.68	10.59	11.68	25.95	60.05	0.32	60.37
1995	14.71	7.45	7.02	1.31	1.75	32.24	3.31	10.51	12.27	26.09	58.33	0.40	58.73
1996	15.26	7.75	7.08	1.37	1.81	33.27	3.39	10.46	13.23	27.08	60.35	0.41	60.76
1997	16.11	7.77	7.38	1.51	1.89	34.66	3.03	10.34	14.18	27.55	62.21	0.57	62.78
1998	16.15	7.80	7.30	1.39	2.04	34.68	2.68	10.13	14.79	27.60	62.28	0.65	62.93
1999	16.92	8.63	7.58	1.33	2.15	36.61	2.81	10.68	15.43	28.92	65.53	0.94	66.47
2000	16.68	8.78	7.56	1.32	2.12	36.46	2.88	10.93	14.77	28.58	64.30	1.16	65.46

Historical Data Sources: WWPA, Statistics Canada

** non-Canadian Imports (NCI)

* Includes Alberta

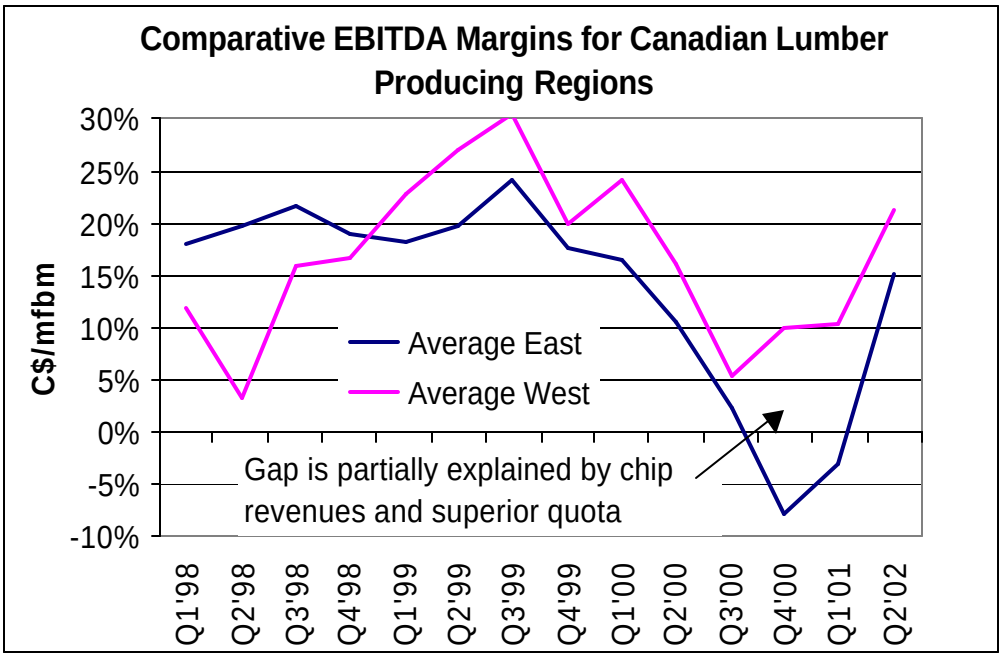
Possible Implications of Canada-US Softwood Lumber Dispute

Outcome of Current Trade Battle Could be Costly to Wood Products Producers

The outcome of the current high stakes lumber trade issue remains very uncertain. We believe this issue is ultimately about ensuring the profitability of U.S. lumber producers and, more importantly maintaining and/or increasing U.S. private timberland values. We believe Canadian lumber producers will be significantly disadvantaged by the final outcome. Our current expectation is that the preliminary determinations for the combined CVD and antidumping duties will be approximately 30% (19.3% CVD and 10% antidumping duties). Ultimately, we expect a final outcome of a Canadian export tax of approximately 10%. A tax of this level would not be expected to marginalize significant volumes of Canadian lumber production to result in sufficient lumber scarcity for improved pricing.

B.C. Interior Producers Should Suffer Greatest Relative Negative Impact

Under the Softwood Lumber Agreement (SLA), each Canadian lumber producer was given an export quota that allowed for duty-free access to the U.S. market. As a generalization, lumber producers situated in the B.C. interior had the highest quota levels, ranging around the 65%-70% of their capacity. Eastern producers had much lower quota assignments, typically at the 40% level. Total U.S. export quota was 14.7 BBF. This quota was based on each producer's historic level of shipments to the U.S. Above this duty free shipment level, companies could ship a further 650 mmfbm at a lower fee base penalty of US$50/mfbm. Above this lower fee base volume, exporters were subject to a US$100/mfbm fee (later increased to US$105/mfbm and US$150/mfbm for B.C. producers). During the life of the agreement, lumber prices in the Canadian market varied between US$40-$45/mfbm below U.S market prices (weak markets) and US$75-$80/mfbm below U.S. market prices (strong markets). During the fourth quarter of 2000, Canadian market prices averaged approximately US$40/mfbm below U.S. market prices. B.C. producers, with their quota levels approximately 30% above their eastern counterparts, are believed to have received a net benefit of approximately US$12-$15/mfbm in Q4 2000. Now that the SLA has ended, we would expect B.C. producer's margins to decline by approximately US$12-$15/mfbm relative to their eastern counterparts. Absolute margins will continue to be dependent on production costs and market prices. We also note that those B.C. producers heavily leveraged to chip sales (e.g., Riverside Forest Products, Slocan Forest Products, International Forest Products) should also see their chip revenues decline by approximately US$12/BDU between Q4 2000 and Q2 2001 due to lower pulp prices. This reflects that chip prices are typically indexed directly to net pulp selling prices. This decline in the relative competitive position of B.C. Interior lumber producers versus their eastern Canadian counterparts in Q2 vs. Q1 is demonstrated below. Despite these negative impacts for B.C. lumber producers, we believe B.C. Interior lumber producers will continue to have the lowest cash costs of production among Canadian lumber producers.



Difficult to See Upside for Canadian Producers Under Any Scenario

We believe the Canadian producers will ultimately face a Canadian export tax (rather than a countervailing duty) of approximately 10%. In the event that free and open trade is the result of current Canada-U.S. lumber trade negotiations, we believe that the supply of lumber to North American markets will increase. As a result, we would expect to see prices come under increasing pressure. In the unlikely event that some form of managed trade is established, we would expect Canadian producers to lose significant market share (e.g., reduce shipments by 2.5^{+} BBF/year). In the mostly likely outcome that a tax or duties are imposed, we offer a conceptual outline of the possible impact of different levels of countervail and anti-dumping duties on lumber prices, margins and shipment levels for both Canadian and U.S. producers in the following table. We recognize that these outcomes will be extremely dependent on several key factors:

Price Responses are Driven by Supply and Demand. North American lumber markets cannot be expected to show a positive price response until supply becomes constrained — either through heightened demand or supply withdrawals. Supply should not become constrained until some portion of Canadian production is marginalized and neither produced nor shipped. We believe our scenarios are quite optimistic as the risks to demand are on the downside (*see later discussion on demand*).

Canadians Become the Marginal Producers. The impacts of different levels of countervail and anti-dumping duties will largely be dependent on the level of U.S. lumber demand and the level of supply withdrawals necessary to create scarcity and a commensurate price response. In exceptionally strong markets, Canadian producers may be motivated to maintain shipments and pay applicable duties (constrains price increases). In weak markets, Canadian producers should become marginalized more quickly than their American counterparts and be forced to reduce shipments more

significantly. Under all scenarios, American lumber producers and private timberland owners should be much more profitable than their Canadian peers.

Ability of U.S. Producers to Step Up Production May be Limited. One factor that may result in a more positive pricing environment than we are currently forecasting could be a situation where the ability of U.S. producers to increase production economically was limited by apparent log shortages in the U.S. Inland and Southeastern regions. The most U.S. recent timber supply analysis suggests that U.S. timber production should increase through 2050. However, regional timber supply shortages may still limit overall production and assist in setting a pricing floor.

Non-Canadian Imports to U.S. Expected to Increase. Jurisdictions not subject to import duties (e.g., Europe, New Zealand, Chile, etc.) are expected to increase their market share as prices in the U.S. market increase due to reduced Canadian access. Export opportunities for these regions will, in turn, be dependent on relative market opportunities and foreign exchange.

Table 5 Conceptual Impacts of Various Net Duty Levels

	2000	Net Duty (CVD + Anti-dumping)		
		10%	20%	30%+
Canadian Shipments to U.S.	18.3 BBF	18+	16-16.5 BBF	14-15 BBF
Non-Cdn imports to U.S.	1.1 BBF	± 1.1BBF	± 1.3BBF	± 1.5BBF
Canada:US price differential	±US$45/mfbm	±US$20/mfbm	±US$40/mfbm	±US$60-$70/mfbm
Price response	na	None: prices remain under pressure due to excess supply	±US$30/mfbm as Canadian supply is marginalized and shipments decline	±US$40-$50/mfbm as Canadian supply is increasingly marginalized
Canadian EBITDA Margins	±10%	Down US$0-$10/mfbm	Down US$10-$20/mfbm	Down US$25-$30/mfbm
U.S. EBITDA Margins	na	± unchanged	Up: US$30-$35/mfbm	Up: US$40-$50/mfbm
Market Situation	U.S. market is over-supplied despite strong demand with prices under constant downward pressure.	Canadian producers continue to ship. U.S. market remains over-supplied with prices under constant downward pressure.	Canadian producers cut back shipments by ±10%. U.S. market tightens with prices responding. U.S. producers gain market share.	Canadian producers cut back shipments by ±15%. U.S. market tightens significantly with price response tracking change in Canadian producer's costs of entry to U.S. market. U.S. producers continue to gain market share.

Above conceptual impacts assume market demand at a status quo (e.g., North American lumber demand at approximately 53 BBF/year with import duties applied to Canadian shipments only.

U.S. Import Duties Could have Differing Impacts over Different Timeframes

Near-term Impacts – Price Volatility and Declining Margins.

Under any level of duties, we expect the near-term impact to be a considerable increase in price volatility. This outcome has been very apparent since April as prices have spiked as Canadian exports have been significantly constrained in an effort to avoid a finding of critical circumstances by the DOC. The near-term could also see Canadian producers' costs of accessing the U.S. market increase without an immediate commensurate increase in price. Prices should ultimately stabilize at a level that should partially offset the impact of any duties, allowing Canadian producers to sell enough lumber into the U.S. to balance supply with demand. However, Canada would become the marginal producer and a price response could only be expected if Canadian access to the market was sufficiently marginalized to create scarcity. Canadian margins would have to decline for this to occur, and in weak demand situations, Canadian producers might expect to have to lower shipments considerably.

Medium-term Impacts – Lost Market Share and Declining Competitiveness.

Over the medium-term we would expect Canadian producers limited access to the U.S. market to result in a declining market share (Canadian lumber shipments to the U.S. have averaged 35.6% of U.S. consumption). U.S. producers should also be much more profitable than Canadian producers. This will likely lead to greater investments in sawmill capacity in the U.S. resulting in a longer-term relative decline in Canadian sawmills competitive position.

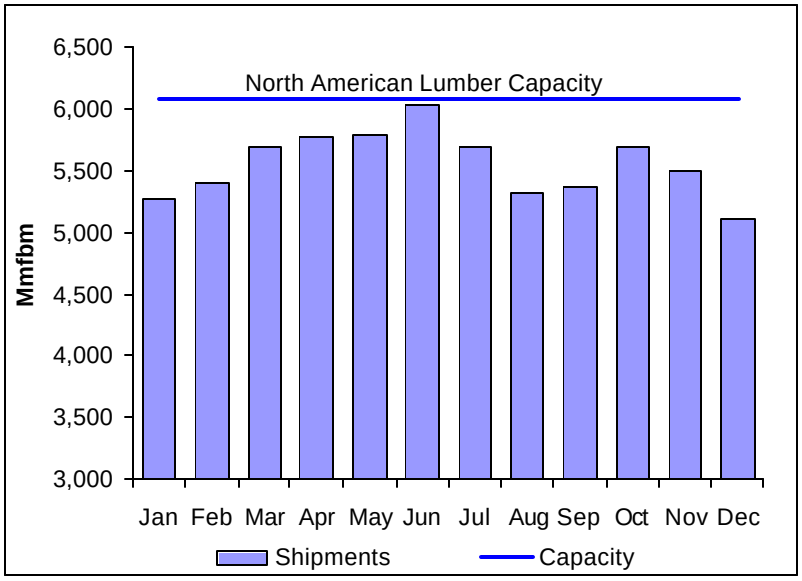
Longer-term Impacts –. Given past experience, Canada might be expected to successfully defend itself against allegations of subsidy and/or dumping through its applications to the WTO and NAFTA. However, this process can be expected to take at least two years. The costs of the intervening two^{+} years of weak financial performance, depressed capital investments, and lost market share could be considerable, while the underlying problem of excess North American supply persists.

Private Timberland Owners Expected to be Major Beneficiaries

We believe the U.S. lumber market will be made up of "haves" and "have-nots" under most scenarios. Timberlands owners and integrated timberlands/wood products producers should be the "haves". Over the past decade there has been a very significant shift in ownership of private timberlands from industrial to institutional ownership. Private timberland owners have also become more focused on maximizing cash rather than seeking steady cash flows. As a result, many private timberland owners today are less willing to lower stumpage during weak markets. Sawmillers having no direct ownership of timber are expected to be squeezed between high stumpage and low lumber prices, with any increases in lumber prices largely absorbed through higher stumpage.

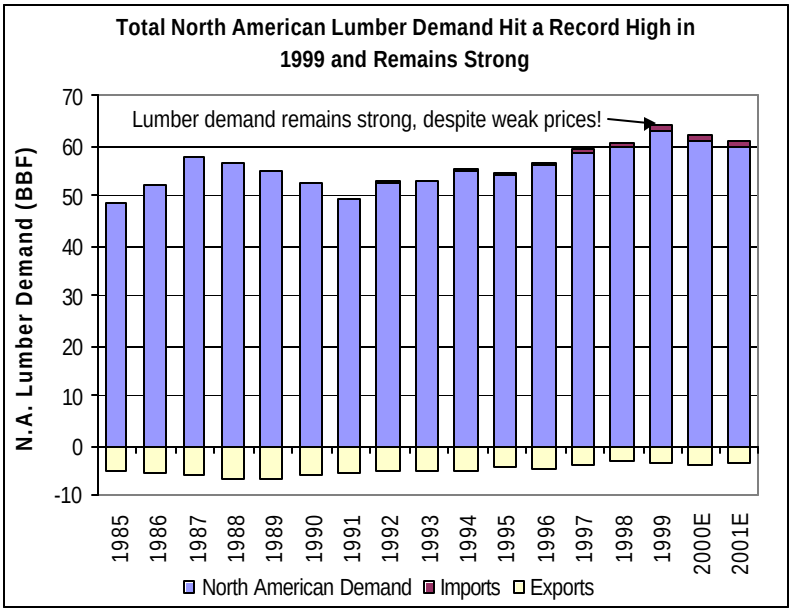
MARKETS

North American Lumber Markets Remain Fundamentally Over-supplied



North American lumber markets are expected to remain fundamentally oversupplied although seasonal periods of strong demand can bring about short-term scarcity resulting in price spikes. Total annual North American production capacity on a two-shift basis is approximately 73 BBF and increasing, while lumber demand is expected to be approximately 62 - 66 BBF. Since most producers have become very competent at competing on quality and service, the battle for market share is expected to focus on price.

Demand Remains Remarkably Strong; Excess Supply Remains the Problem



Strong demand = Weak Prices..?
The demand side of the equation is not broken! 1999 was the peak year for North American lumber shipments with shipments at 65.61 BBF. 2000 was a close second with shipments down only 1% at 64.96 BBF. Despite these strong shipments, prices fell to 10-year lows in late 2000. North American demand is not the problem; the pricing problem has been too much supply.
North American lumber exports have been declining since 1988 and are expected to remain soft, while imports have been increasing steadily. Increasing imports reflect the strong US$, increasing lumber self-sufficiency in Europe, and increasing supplies in Chile and New Zealand.

Demand Remains Remarkably Strong; Excess Supply Remains the Problem

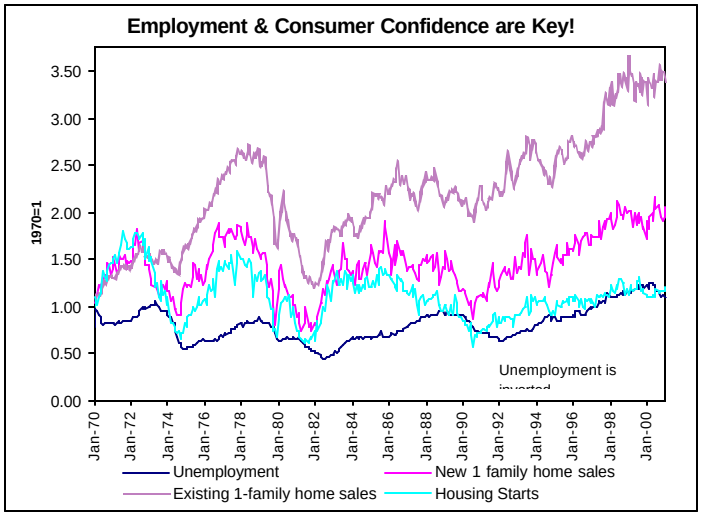
North American Housing Starts Expected to Remain Strong Following Softer 2002-2003

As a result of the strong employment growth of the past nine years, we believe the base level of housing demand has moved upward. However, U.S. housing starts and repair and renovations are expected to slow to at least 1.50 million in 2002 as the North American economy slows and consumer confidence and employment growth decline. This declining demand is expected to put significant further downward pressure on prices.

However, continued low inventories of new homes for sale, low mortgage rates and overall high levels of employment are expected to keep U.S. starts at the 1.5 million level over the next two years, avoiding precipitous falls experienced in past North American slowdowns (Table 5). We expect this "slowdown" to be followed by a recovery to the 1.65 – 1.68 level in 2004-2005 (see Table 6). Canadian starts are expected to follow a very similar patter to U.S. starts.

Table 6 North American Housing Starts

	US	Canada	30 yr Mortgage
1996	1,470,000	124,000	7.81
1997	1,470,000	148,000	7.60
1998	1,620,000	140,000	6.95
1999	1,660,000	149,000	7.46
2000	1,610,000	152,000	8.06
2001E	1,580,000	145,000	6.97
2002E	1,510,000	138,000	7.05
2003E	1,540,000	142,000	7.34
2004E	1,650,000	156,000	7.67
2005E	1,680,000	159,000	8.02



Japanese Housing Starts Forecast to Remain at or Slightly Below Recent Levels

We are forecasting a continued slowing of the Japanese housing market. This forecast reflects our expectation that Japan will continue to suffer low levels of economic growth and a steady devaluation of the Yen. Wooden homes are expected to maintain their market share of total housing at approximately 45% while 2x4 platform North American style housing is expected to gain market share slightly from the traditional post and beam market (Table 7).

Table 7 Japanese Housing Starts Forecast to Remain at Recent Levels

	Total	Post & Beam	Pre-Fab (wooden)	2*4	Total Wooden
1996	1,643,266	619,027	41,575	93,694	754,296
1997	1,387,014	498,023	34,015	79,458	611,496
1998	1,198,295	447,287	29,923	67,923	545,133
1999	1,214,601	457,126	31,534	75,864	564,524
2000	1,150,000	433,211	29,095	65,569	527,876
2001E	1,160,000	416,511	28,448	66,453	511,412
2002E	1,172,000	437,472	29,266	66,433	533,171
2003E	1,185,000	445,985	30,765	74,015	550,766
2004E	1,205,000	453,930	30,125	77,723	554,300
2005E	1,210,000	434,464	30,250	80,465	559,020

Total North American Lumber Demand Expected to Slow Only Slightly.

Based on our estimates of domestic and Japanese housing starts, we believe total North American lumber demand will remain reasonably strong after a moderate slowing in the second half of 2001 through 2003. However, this "slowing" is expected to be at levels well above recent period averages (Table 8).

Table 8 Total North American Lumber Demand Expected to Slow Only slightly.

	U.S.	Canada	Offshore	Total
1996	50.6	7.6	4.6	62.8
1997	50.9	7.4	4.4	62.7
1998	52.2	7.5	3.1	62.8
1999	54.3	8.4	3.6	66.3
2000	54.5	8.0	3.6	66.1
2001E	54.0	8.3	3.5	65.8
2002E	52.9	7.8	3.5	64.2
2003E	53.2	7.5	3.6	64.3
2004E	55.3	8.1	4.0	67.4
2005E	56.7	8.8	4.1	69.6

We believe W.SPF 2x4 pricing will be dependent on outcome of trade issues as per Table 9.

Table 9 W.SPF 2x4 Pricing Forecast over Medium-term is Dependent on Trade Issues.

Forecast	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
NBF[1]	$353	$354	$289	$342	$257	$260	$260	$275	$270	$260
NBF[2]	$353	$354	$289	$342	$257	$295	$280	$285	$290	$290

[1]No CVD; free-trade scenario.

[2]15% net CVD-anti-dumping duties imposed. Note: net sales realizations under scenario 2 would be approximately 15% below price levels quoted.

Regional Cost Structure to be Very Dependent on Outcome of Current Softwood Lumber Trade Dispute

The relative competitive position of North American lumber producers is expected to be very dependent on the outcome of the current softwood lumber trade dispute. We believe there is a very real possibility that Canadian lumber producers could be badly disadvantaged through the near-term imposition of countervailing and/or antidumping duties and ultimately by export taxes.

Average variable costs for North American softwood lumber producers have moved continuously downward since 1997. We expect this trend to continue through 2002 before moving slowly upward in 2003. Much of the cost reduction has come through lower stumpage prices in the U.S. and timber-pricing formulas in Canada which respond to lower market prices for lumber. Our estimated variable costs by region are provided in Table 10.

Table 10 Regional Averages for North American Softwood Lumber Producers (US$/mfbm).

Region	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
U.S. W. Coast	$344	$349	$300	$304	$293	$259	$236	$253	$280	$287
U.S. Inland	$315	$317	$280	$314	$302	$260	$244	$257	$290	$316
U.S. South	$279	$301	$325	$300	$279	$253	$238	$246	$266	$278
B.C. Interior	$256	$279	$241	$223	$211	$196	$198	$200	$201	$211
Ontario & Quebec	$168	$198	$186	$186	$188	$203	$207	$219	$223	$235

Sources: NBF, RISI

British Columbia Interior Producers are Lowest Cost

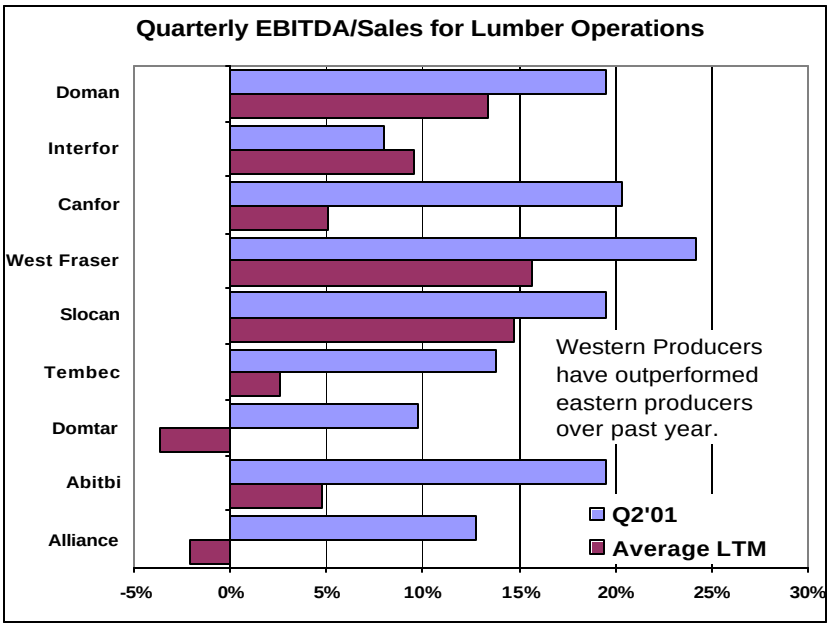
Interior British Columbia lumber producers, together with Alberta lumber producers currently have the lowest variable costs in North America. While this is a strong competitive position it also makes these areas targets for various anti-competitive actions such as countervailing duties and anti-dumping charges. *We believe therefore that:*

Any actions aimed at alleviating the cost implications of harvesting beetle-killed wood will have to be very carefully considered in terms of their possible negative impacts on competing regions and Canada-US lumber trade.

Given our view that North American lumber markets are fundamentally over-supplied, *we also believe* that:

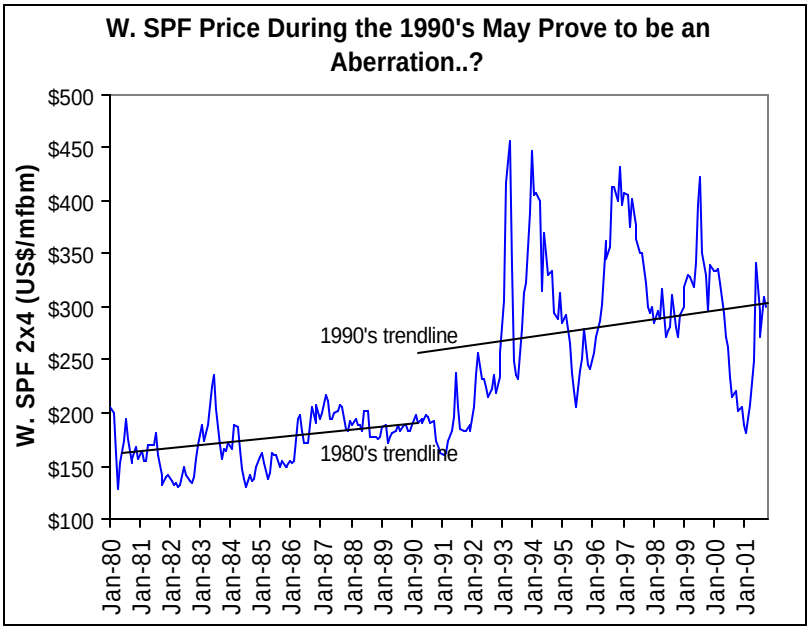
Any actions that result in significant new production of dimension lumber could directly impact North American market prices impacting profit margins across the North American industry.

Comparative Costs for Canadian Producers Shows Western Canadian Producers to be Lowest Cost
A comparison of EBITDA margins for Canadian lumber producers in Q1 2001 and for the latest 12-months demonstrates that BC Interior producers – West Fraser and Slocan are the lowest cost (highest margin) producers. Eastern producers – Domtar and Alliance have the weakest performance.



Lower Cost Structure and Surplus Capacity are Expected to Lead to Declining PriceTrend

Most North American lumber producers have learned to satisfy their customer's service requirements. Since North American lumber markets are believed to be fundamentally over-supplied, we believe most producers will compete on price. In addition, declining lumber production costs are expected to result in even more price pressure. As a result, we expect the volatile, yet steep price curve of the 1990's to be replaced by a flatter trend line that will likely see lower average prices. **We are forecasting a trend price of US$270 per mfbm versus the 10-year average price of US$294 per mfbm.**



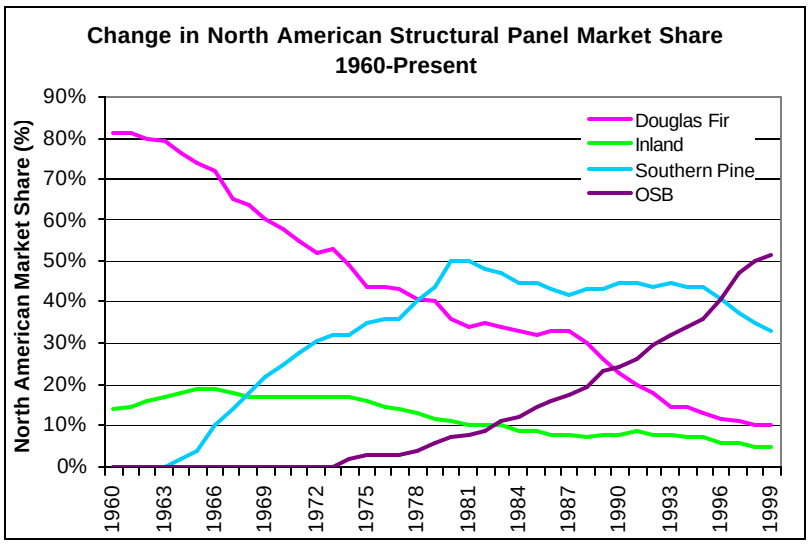
Conclusion: The pricing environment is expected to remain weak.

- Cash costs of lumber production have been declining continuously over the past four years.
- Most North American producers have learned to compete on service (e.g., on spec. lumber with just-in-time deliveries), we believe producers will continue to compete for market share based on price.
- Weakness in North American dimension prices is expected to continue reflecting **chronic <u>over-supply</u>** and a battle for market-share rather than weak demand.

Structural Panels

Plywood

The North American structural panel market has been a market-share battleground over the past three decades. The dominance of Douglas-fir region plywood up until the early 1960's was replaced by southern pine plywood in the 1960's through the '80's. However, since the early 1970's, OSB has been gaining market share at the expense of both Douglas-fir region and southern pine region plywoods. As a result, plywood production is now becoming increasingly marginalized and forced into increasingly competitive niche markets. We do not believe there are meaningful opportunities for profitably increasing plywood capacity or production.



Oriented Strandboard (OSB) Outlook

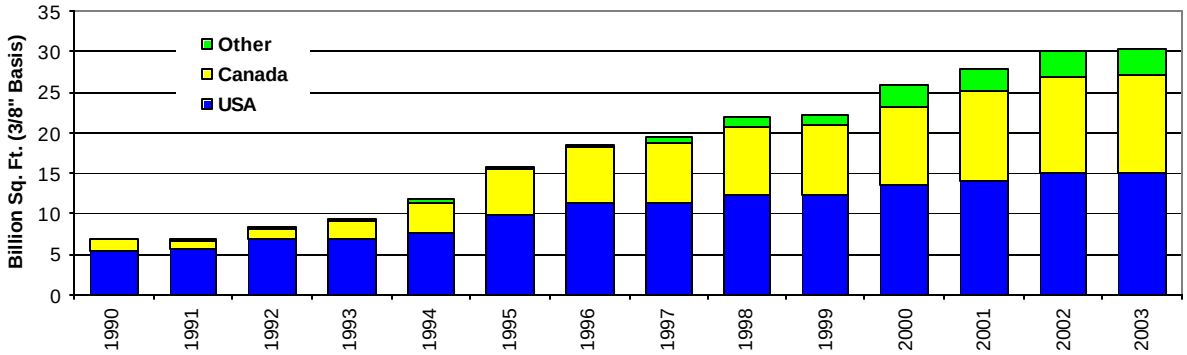
OSB now accounts for approximately 55% of North American structural panel consumption. The declining quality of Southern Pine plywood is expected to facilitate OSB increasing its share of the market to approximately 75%. It will be difficult for the existing OSB product mix to keep growing at historic rates because it has essentially saturated the most accessible markets in residential construction. Those markets are sheathing applications in the wall, roof, and floor as plywood "refocused" on remodeling, nonresidential construction, and industrial markets. Can OSB find enough new demand to absorb the tremendous capacity additions planned for the next three to four years? The answer depends on the economy, actual additions to capacity, closures of existing mills (both plywood and OSB), market development, exports, and other factors. OSB markets are

expected to remain difficult through 2006 due to excessive recent capacity expansions (Table 11). Plywood producers are expected to be the primary casualty as OSB capacity continues upward and as producers battle for market share. We expect OSB prices to remain at, or below levels that will provide for a return on capital employed greater than the cost of capital for most modern mills (e.g., an average OSB price of US$170/mdf through 2003).

Table 11 Structural Panel Supply and Demand History and Outlook 1980 - 2006 (mmsf 3/8")

	Capacity Changes 1980-2000			Capacity Changes 2001-2006		
	Plywood	**OSB**	**Total**	**Plywood**	**OSB**	**Total**
New Mills	1,800	17,810	19,610	20	5,250	5,270
Capacity Creep	8,650	6,010	14,660	(275)	1,620	1,345
Closures	(10,200)	(1,000)	(11,200)	(2,725)	(200)	(2,925)
Net Change	250	22,820	23,070	(2,980)	6,670	3,690
Demand Growth			20,000			2,500

Source: APA-The Engineered Wood Association



Source: Wood Markets Quarterly

North American OSB Capacity Increases 2000 - 2004			
Company	**Location**	**Capacity (3/8" basis)**	**Status/Start-up Date**
Approved/Under construction			
Norbord (Nexfor)	Joanna, South Carolina	500 msf	Running Q2 2000
Weyerhaeuser	Hudson Bay, Sask.	560 msf	Running Q1 2001
Potlatch	Cook, Minnesota	185 msf (improvements)	Running Q1 2001
Georgia Pacific	Fordyce, Arkansas	410 msf	Running Q1 2001
Footner Forest Products (Grant-Ainsworth jv)	High Level, Alberta	900 msf	Running Q1 2001
Norbord (Nexfor)	Hugeley, Alabama	500 msf	Q2,2001 confirmed
Proposed Plants			
Ced-Or	Bern, Quebec	190 msf	Proposed 2002
Chateaugay OSB	Chateaugay NY	500 msf	Proposed 2002
Norbord (Nexfor)	Prescott, Arkansas	500 msf	Proposed 2003
St. Lawrence	Ogdensburg, NY	450 msf	Proposed 2003
Ainsworth Lumber	Grand Prairie, Alberta	400 msf (combi-panel)	Proposed 2003+
Louisiana-Pacific	Les Bergeronnes, Quebec	625 msf	Proposed 2003+
Slocan/Louisiana-Pacific	North Eastern British Columbia	700 msf	Proposed 2004+
Ainsworth	Meadow Lake, Sask.	Unknown	Proposed 2004+

Medium Density Fibreboard (MDF) Outlook

MDF opportunities are driven by the availability of low cost fibre, typically sawdust. While we recognize that there are likely substantial opportunities for increasing the volume of MDF exports, we believe this market will remain slightly over-supplied over the next five years. The North American market has become more balanced and prices have stabilized at approximately US$100/msf above particleboard; however, prices are still expected to challenge opportunities for an adequate return on capital. MDF mills are a relatively capital intensive business. As a result, longer time periods are typically necessary to gain a payback. *We believe this need for large amounts of capital (e.g., over $150 million for a 100mmsf per year mill) and long payback periods make MDF a less desirable candidate for consuming any surplus fibre made available through harvest increases associated with beetle-killed wood.*

Engineered Wood Products (EWP) Outlook

The production of Glulam, LVL, and composite I-joists has increased dramatically over the past decade. Although these products are gaining global acceptance, the U.S. continues to be the dominant producer and consumer.

I-Joists. The U.S. represents over 80% (3.46 million m^3) of global I-joist output with Canada in 2nd place at 18%. Global capacity has increased 2.75x since 1995 to approximately 5.5 million m^3. Global capacity is expected to grow by approximately 2 million m^3 through 2005.

Glulam. Europe is the largest producer of Glulam beams with almost 50% of global production, although the U.S. is the largest producing country with a 30% share of global production. Global capacity has increased by 1.45x since 1995 to approximately 2.75 million m^3. Global capacity is expected to grow by approximately 500,000 m^3 through 2005.

LVL. The U.S. is also the largest producer of LVL with a 76% global market share with Canada a distant second at a 6% share. Global capacity has increased by 2.25x since 1995 to approximately 2.35 million m^3. Global capacity is expected to grow by approximately 650,000 m^3 through 2005.

Most EWP are in the mid-range of their product development lifecycle; however, they are becoming increasingly commoditized. New Plants are relatively capital intensive and successful sales are increasingly dependent on producers being allied with strong distribution capabilities. We believe movement into this business should only be considered if it is part of a broader strategy that

combines production with marketing, distribution and sales. We expect margins to come under increasing pressure going forward.

Conclusion: Panel Prices are expected to come under continued pressure over the medium-term.

Based on the above assessment of market supply and demand, we believe that the availability of an as yet unknown and uncertain supply of beetle killed timber will not be a key factor in any investment decisions related to structural panels or engineered wood products.

6.2. Market Constraints – Chips

Based on both the consultants' beliefs and majority opinion of stakeholders interviewed, we see no likelihood of a regional or provincial increase in pulp demand that would translate into any significant market uplift for chips in the near or mid-term.

On the contrary, any potential uplift in lumber production would result in a corresponding increase in by-product chip production that would reduce the demand for whole log chipping. *During consultations, various stakeholders raised concerns about potential for a beetle wood driven temporary increased chip supply to negatively impact chip prices and thereby the viability of some non-integrated sawmill operations.*

The export market for chips may absorb a minor incremental volume of chips. It is suggested that there is absolutely no potential for increased Japanese demand and that other demand in China for example, is *not sufficiently predictable* to warrant inclusion in this strategic strategy.

However, the following analysis on producing whole log chips for export is presented for consideration.

The current list price for NBSK pulp is $480US per tonne. At these price levels pulp mills are losing money and many mills cannot cover their cash costs of production. The outlook for pulp prices for the short to medium term is poor with little if any price improvement expected. This outlook results in a forecast of low prices for chips for the next few years.

Currently pulp mills in the northern interior are paying $60 to $70 Cdn per BDU for residual sawmill chips. The export market for chips f.o.b. ship is approximately $95US per BDU or $140 Cdn.

Based on these prices, handling, transportation and shipping costs we have calculated an estimated margin for log purchase as follows:

Sale Price of Chips FOB ship:	$140.00 per BDU
Handle and market at Fibreco:	$ 25.00 per BDU
BC Rail Freight from Prince George:	$ 45.00 per BDU
Cost of Whole Log Chipping:	$ 20.00 per BDU
Amount that can be paid for Pulp Logs/BDU:	$ 50.00 per BDU
Amount that can be paid for Pulp Logs/Cubic metre:	$15 - $20 per cubic metre

While there may be some limited economic opportunity for the increased production of pulp logs as a byproduct of increased sawlog production there is no opportunity for the harvest of stand alone cutting permits of pulp logs. The current export price for chips would suggest that $15 - $20 per

cubic metre could be paid for pulp logs. Harvesting costs, net of any stumpage payable, range from $40 to $50 per cubic metre, thus the economic harvest of pure pulp stands is likely not possible.

Fibreco Export expressed a strong willingness to explore opportunities for the increased export of chips. Potential volume and location of targeted supply (dead stands) would have to be explored as the epidemic progresses and after its collapse. Should a private entity consider it worthwhile to conduct a separate examination of the potential to export chips from west central B.C., an assessment of the viability of establishing required infrastructure at Prince Rupert or Kitimat may be warranted, however economics are likely marginal at best. We believe that other, more beneficial non-SPF local-use opportunities targeted at value added products will be proposed for the fibre.

However, should the Province decide to move to encourage future export of MPB chips the following suggestion is made for discussion purposes only,

- Advertise Pulpwood Timber Sale type licences in stands that are a minimum 80% dead for open, revenue- focused high bid award. The successful bidder, based on bid price over minimum upset stumpage would be able to sell sawlog portions to offset average costs. Chips would be for mandatory export.

It should be noted that consistent with our core assumption that all dollars should be treated equally, independent of source, and that capital should only be employed where it has a real opportunity to create value, the consultants do not support the concept of delivering "rehab-supported" low cost chips to export markets that could negatively impact the competitive position of domestic pulp operations.

We have concluded therefore that large scale production of market chips is not a significant or likely viable option for increased utilization of MPB killed timber.

6.3 Market Opportunities - Alternative Uses

6.3.1 Power Generation

Various consulted stakeholders raised the issue of power co-generation utilizing MPB killed pine as the primary furnish. This concept may warrant further analysis by private entrepreneurial entities. Again, consistent with our core assumption that all dollars should be treated equally, independent of source, and that capital should only be employed where it has a real opportunity to create value, we believe that:

Whole log harvesting, processing and transportation of dead MPB infested logs for power generation is likely <u>not</u> a viable business opportunity.

The wood waste power generation facility in Williams Lake is reported to be technically state of the art and efficient. However it is reported to be economically marginal even with a low cost (transportation only) waste furnish. The Williams Lake facility, like similar projects proposed for Houston (with an estimated capital investment of $100 to $120 million) and elsewhere, is predicated on the use of sawmill by-product (hogfuel) delivered to the plant for only the cost of transportation from close-to-hand mills. Even based on a worst case scenario, available low cost fibre, price competitive with natural gas and sufficient to contribute over the economic life of any proposed project, cannot be guaranteed from an as yet unknown volume or source of dead grey pine as a consequence of an evolving MPB epidemic.

This assessment likely holds for ethanol, although we have not investigated that option.

6.3.2 INNOVATIVE NON-SPF DIMENSION OPPORTUNITIES

We believe that the Government should encourage and that the MoF should accommodate the use of beetle killed wood in the manufacture of both established and innovative non-SPF value-added products. These products could include such products as ties, panels and fencing, flooring or railing components. Input received during our consultations, indicate that many of the proposals for utilizing beetle wood rely on a supply of dead and dry Grade 3 logs at a minimum stumpage of $0.25 per m3.

However, we recommend that:

- ***the MoF make beetle wood available to viable and innovative, non-SPF dimension lumber, value-added business opportunities that support the primary target of maximizing green attack harvest.***

Harvest of green attack timber currently does not receive recognition for minimum stumpage rates.

We have included as Appendix E a review by Bill Wilson of the CFS Industry Trade and Economics Program, Pacific Forestry Centre as a sobering indication of the limited potential for value-added to provide a significant avenue for addressing increased beetle wood harvest. His review, Preliminary Comments on the Potential for Utilization of Beetle-Kill Timber in British Columbia Secondary Manufacturing, suggests that " *…The character and expected outcome of the US softwood lumber CVD/AD action against Canadian commodity grade exports to the US market does not encourage any additional volume from salvage or sanitation efforts in response to MPB. This is particularly so if this wood has reduced stumpage."*

Any tenure opportunities made available for new value-added ventures targeted at beetle wood should be awarded based on a revenue-focused approach and their potential to be successful and should have strong timeline and performance requirements. In addition, as per Section 6.5.1, we suggest that consideration be given to also including appropriate community stability criteria. The number of criteria should be kept to a minimum to ensure timely award. The purpose here is to address beetle control and value optimization.

A benefit of non-SPF targeted opportunities is that they will not compete in an already over-supplied SPF dimension lumber market. *If sustained*, they will contribute to community stability; if not viable over the longer-term they will serve to disrupt employment continuity and cause temporary challenges to community provision of infrastructure.

Business and community stakeholders interviewed frequently referenced that an increased opportunity for export of processed house logs exists as a result of the beetle epidemic. In his review, Mr. Wilson reports that lodgepole "… should substitute very well for spruce in log home manufacturing. Producers and consumers in the US are accustomed to lpp log homes, as this is the main species used in Montana's log home industry (concentrated in the Bitteroot Valley)." However, Mr. Wilson indicates that "…This product uses small volumes of quite specific log types, so only a very small fraction of beetle-kill timber could be absorbed by log home manufacturing."

We support efforts to increase volume processed into house logs and again suggest it is based primarily on the harvest of dry logs at minimum stumpage.

Although we believe that the potential for a significant cumulative volume demand for dry beetle killed logs is limited, any such demand supports our recommendation that emphasis should be placed on storing beetle killed logs on the stump.

6.3.3 LOG EXPORTS

We suggest that the administrative issues for export of beetle killed logs should not be treated any differently than export of other non-infested timber. We suggest that there is also likely limited opportunity for cross-border US or Pacific Rim export bark-on logs that may contain beetles.

The export of beetle killed logs not subject to a 19.3 % countervail duty would only serve to exaggerate the competitive challenge facing primary mill operators within the west central infestation area that are currently operating many of their mills at less than full capacity.

We do not comment here on the general question of the pros and cons of log exports, but *we do suggest that the export of beetle killed logs be considered in the context of any province-wide log export review.*

6.4 Operational Constraints

6.4.1 INDUSTRY CAPACITY

6.4.1.1 Harvesting Capacity

We do not believe that harvesting capacity will constrain effective beetle control efforts. During our interviews equipment and manpower availability were reported not to be a limiting factor. Licensees, small business operators, full phase and hauling contractors indicated there is sufficient capacity and mobility within the system. This view is further supported by our recommendation that there be no significant increase in total net timber harvested across west central BC in support of MPB control.

6.4.1.2 Manufacturing Capacity

Adequate response to the beetle epidemic is not constrained by industry lumber manufacturing capacity. It is, as addressed previously, constrained primarily by lack of market capacity. One refrain heard most frequently during our consultations with both industry and other stakeholders was that of "No new large scale milling capacity". It was also a criteria in the recent advertising of the 500,000 m3 licence volume within the Quesnel TSA made available following the AAC uplift. The summary in Table 12 presents the estimated lumber capacity by district for the eleven forest districts included in this analysis. *It supports the position that at a historical log usage of 23 million m3 or a 25% enhanced log usage of 28 million m3 there is adequate capacity within those districts to process the full volume of actual harvest attributable to the total estimated AAC of approximately 25.5 million m3 identified in section 2. 2. While some shifting of mill utilization is likely to result due to differing mill efficiencies and moisture sensing, drying and sorting capacities, we conclude that primary mill capacity will not constrain effective beetle control efforts.*

Table 12 Estimated Lumber Production/Capacity by Forest District

District	Total Log Usage (MMm3)	Total Lumber Production (Mmfbm)	Potential Change in Prod'tn(%)	Potential Log Usage (MMm3)	Potential Lumber Production (Mmfbm)	Change in Vol Usage/Prod.	
						(MMm3)	(Mmfbm)
Lakes	1,180	322	25	1,475	403	295	81
Morice	2,184	641	25	2,730	801	546	160
Bulkley	928	226	25	1,160	283	232	57
Fort St. James	1,748	449	25	2,185	561	437	112
Vanderhoof	2,542	701	25	3,178	876	636	175
Prince George	6,729	1,970	25	8,411	2,463	1,682	493
Williams Lake	2,909	490	25	3,636	612	727	122
Quesnel	3,002	624	25	3,753	780	751	156
Chilcotin	376	94	25	470	117	94	23
100 Mile House	1,501	312	25	1,876	390	375	78
Totals	23,099	5,828		28,874	7,285	5,775	1,457

Log usage was extrapolated based on lumber production
Source for Capacity: MoF Major Primary Timber Processing Facilities in B.C. 2000

6.4.2 TRANSPORTATION INFRASTRUCTURE

A number of transportation related issues were raised during consultation, however, only the Lakes Forest District expressed significant concern with respect to adequacy of current road programs to address current AAC uplifts. In large measure, road building on the interior plateau is relatively straightforward and can be accelerated to meet operational needs of beetle harvesting. The Southern portion of the Lakes Forest District is transected by two large lake systems – Ootsa and Francois – that represent significant physical barriers to movement of timber by truck from that portion of the TSA. To date most of the volume leaving the area South of Ootsa Lake (South Ootsa) has been via water transport along and across the Ootsa Lake system in combination with truck hauls East to Fraser Lake and Vanderhoof. This log flow pattern has avoided the need to cross Francois Lake with South Ootsa timber.

Recent doubling of the AAC in the Lakes TSA to approximately three million cubic meters annually is expected to result in accelerated cutting in the South Ootsa and in the area between Ootsa and Francois Lakes. This could necessitate increased truck hauling of timber potentially in three directions, north, west and east. The magnitude of these movements has yet to be determined and is the subject of other recommendations in this report (section 6.5.1). There have been numerous infrastructure studies done for the southern portion of the Lakes TSA and the options are well described and understood. Forest road construction and/or upgrades will need to make provision for wood to move in any direction as mountain pine beetle events outside the TSA may influence future timber flows. For example, new or expanded operations in Burns Lake or serviced through Burns Lake will cause increased north-south traffic. The growing problem in the Vanderhoof Forest District may limit easterly flows to the extent that westerly flows need to be increased, or conversely, growing infestations in the southern portion of the Morice TSA may limit flows to the west. It is important to provide for flexibility in short term volume flows, as well as provide for an

appropriately positioned long-term transportation network for use by all industrial sectors. Barge crossings are secured for a number of Ootsa Lake sites suitable for use by self-propelled barges that can be moved up and down the lake as harvesting priorities dictate. Major licensees have experience with installation and operation of barge systems and there is precedent for related cost recognition in the appraisal system.

Fundamental to any infrastructure solution for the southern part of the TSA is the capacity of the government road system from Ootsa Lake to Burns Lake. Use estimates run from 200 to 250 trucks per day during operating seasons, probably with production peaks that exceed these estimates. This is sufficient volume to occupy an eight truck barge for the Francois Lake crossing, two shifts per day. This far exceeds current capacity especially when local residential and service traffic is taken into account. Road upgrades such as passing lanes, stabilization, realignment and surge areas at the ferry crossing are also noted as essential to safely accommodate expected traffic flows.

In light of the above information, we recommend for the Lakes TSA:

- ***that in 30 days an action plan, complete with a MoTH decision and commitment to an enhanced transportation infrastructure in the southern portion of the Lakes Forest District, be adopted and immediately implemented in conjunction with the timber allocation decision recommended in section 6.5.1.***

We recommend further that:

- ***the plan provides flexibility to accommodate the short-term needs of beetle control harvesting, options for traffic flow patterns that may potentially develop as the beetle epidemic evolves within and adjacent to the Lakes TSA, and ongoing management in salvage and endemic beetle situations.***
- ***implementation include immediate action by the Ministry of Transportation and Highways to address upgrading of the Ootsa Lake to Burns Lake transportation route in general, and the Francois Lake ferry and crossing facilities in particular.***
- ***that forest road development including Ootsa barge systems be delegated to private enterprise to establish, with corresponding cost recognition.***
- ***the plan optimizes return to crown in finding the balance between infrastructure establishment costs and transportation cost savings.***

In addition to the operations related strategic issues above, a number of transportation questions were raised during consultations. These included concern for connector roads, road densities in general, and the effect that these may have on other resource uses and/or resource values. It is assumed that operational decisions regarding road construction, deactivation and permanent verses temporary crossings of major water bodies will be done in the context of and with consideration for existing land use planning.

Another concern raised mainly in Quesnel and Ft. St. James was for log truck traffic in congested urban areas. Major haul routes for both of these communities include main streets of municipalities where current safety concerns would be heightened by increased industrial traffic. These local concerns are not specifically addressed in this report, as they are not precipitated by the current mountain pine beetle epidemic. However, the potential to be affected by the epidemic is very real and this should be a consideration in normal improvement planning by government and municipalities.

Other specific points raised around transportation infrastructure included:

- Lack of existing road network in the Klukus area
- In its submission to the Government Caucus Northern Pine beetle task Force, the Lhooshuz Dene Government proposes the development of a road system in the central Blackwater area.
- Fear that addressing MPB would result in developing as yet undeveloped areas, thereby impacting future choices
- The need for additional link or loop roads to facilitate most efficient inter TSA/inter-district log transfer
- Fear that link/loop roads would negatively impact wildlife and back-country lakes experience

These aspects of the transportation infrastructure requirements resulting from the west-central beetle infestation should, we believe, be dealt with as part of the recommended integration of MPB strategic plans with strategic land use plans and targets during the evolving epidemic.

6.4.3 Fire Threat - Fire Protection

The issue of fire threat and/or fire protection was raised with (not necessarily by) each stakeholder. During the Vanderhoof and Burns Lake workshops concern was raised regarding our preliminary assessment that there was no significant on-going increase in fire threat.

Some level of concern was raised by First Nations in the Chilcotin area based on the potential threat related to existing dead and down timber in proximity to the small isolated villages. The concern was founded partly in the recent absence of controlled historical burns. Renewed controlled burning and cleared firebreaks were suggested as possible responses to the threat.

The consultants interviewed senior MoF Fire Centre managers and Victoria staff. Based on these interviews, we are comfortable that the fire threat and associated fire protection requirements related to a large-scale beetle epidemic are manageable. We recognize that there is a probable increased threat of a more intense fire gaining hold in a stand of fallen beetle killed pine some years (15 to 30) after the epidemic starts. The buildup of dry pine blow-down will create a significant large fuel source. However, we believe that it does not warrant an extraordinary response in terms of deployed fire protection capital or manpower resources. We further believe that the current deployment of the equivalent of two 20-man initial attack crews distributed between Houston, Burns Lake and Vanderhoof, is an appropriate response to the increased threat. It is expected that the deployment of these crews and additional crews as required, will be reviewed on an annual basis.

We believe that the province has the ability to promptly focus resources on priority fires. As with any forest fire, early detection and fast, effective initial attack will be critical in determining the impact of any fires. It should be noted, that despite a significant increase in industrial activity and recreational us over the last 20 years, there has not been a significant increase in frequency or severity of fires in the area of the 1969 to 1985 Chilcotin MPB epidemic. Further, a report by Dave Marek of the MoF Northwest fire centre addressing efforts to initiate a controlled fire within MPB killed stands in Tweedsmuir Park, suggests that there are over the long-term, limited periods when the right combination of fire indices occur to support a successful burn effort.

However, these issues notwithstanding, we recommend that:

- ***the MoF continue to monitor and implement appropriate fire threat/fire protection related initiatives including:***
  - ***conduct a three region, three Fire Centre meeting of senior regional/district/fire centre staff to review MPB related fire issues.***
  - ***include a MPB infestation stage map layer in the Protection Branch's GIS system***
  - ***increase communication around beetle related fire threat/fire protection with First nations, communities and industry***
  - ***deploy Protection Branch and District resources to train and identify fireproofing opportunities for MPB fire-risk communities***
  - ***engage the CFS to model fire in various beetle attack fuel types.***

6.4.4 Operational Planning and Response

We believe there are two options for addressing the beetle related operational planning issue.

- Option 1 is to accept the status quo in planning and approval timelines.
- Option 2 is to employ both proven and new innovative best practices on a consistent basis throughout the west central region to reduce planning and permit approval timelines.

The strategic need to achieve shortened planning and approval timelines, where 1 week or 1 month delays can result in a full operating season delay in on the ground control and harvest efforts, was well presented during our consultations.

During our consultations we also heard that, while significant progress has been made towards this goal, planning and approval timelines still remain an impediment to the strategic goal of maximizing green attack harvest in an effort to reduce spread and infestation levels while capturing maximum wood value.

We therefore recommend that:

- ***proven and new innovative best practices be employed throughout the epidemic area to reduce planning and permit approval timelines***

Although we have reviewed the "Administrative Streamlining Requirements" recommended to the government in the CLMA/NFPA Mountain Pine Beetle Task Force presentation, we have not carried out an in-depth assessment of the proposals. We believe however, that these recommendations provide a *good basis for co-operative discussion between industry and the MoF aimed at putting in place effective means to reduce planning and approval timelines*. This recommendation includes the setting of objective targets.

6.4.5 Long-term Storage

There is currently an increased volume of beetle infested logs being transported and stored in Ootsa Lake as a result of the aggressive MPB management response within the Lakes TSA. We understand that there may be potential to increase the annual volume handled through the existing water transportation infrastructure to 2 million m3 from a historic level of 300,000 to 600,000 m3. Three parameters impact the viability of an increased reliance on lake storage:

- Uncertain environmental impacts and concept approval challenges related to a large scale program even in a reservoir system
- The impact of the cost of money related to the inventory value of stored logs over time
- The generally accepted realization that there will be some log grade and value deterioration and lumber grade fall-down and drying impacts for the stored volume

This approach has implications for both licensee operating costs and Crown stumpage payments based on point and time of scaling and/or billing. In order to address this issue, we offer the following financial analysis.

6.4.5.1 Financial Analysis of Water (Sprinkler) Storage Option

Several parties have suggested that it may be possible to mitigate future regional timber supply shortages stemming from beetle damage through the harvest of standing green attack timber at levels above mill consumption and the storage of this timber under water or sprinklers. The following simple analysis attempts to identify the major financial implications of such a strategy. This analysis reflects considerable uncertainty in terms of the impact of long-term water storage on lumber recovery, lumber and chip quality, and future lumber markets. The analysis is also sensitive to the chosen discount rate.

Consistent with our core assumption that all dollars should be treated equally, independent of source, and that capital should only be employed where it has a real opportunity to create value, we have chosen to examine the financial impact of capitalizing logging and water storage using a 10% rate of capitalization — equivalent to Interior wood products producers' average cost of capital. Average logging costs are assumed to be approximately $\$51/m^3$ (Table 13). This cost is then capitalized at 10% (a 4% discount rate is also provided for comparative purposes) over storage periods of one to eight years. No allowance is provided for on-going storage costs such as tied up boom gear, sprinklers, boom maintenance, etc. Costs of log recovery from water storage to the mill are then added to the capitalized log cost (Table 14). These costs are then applied against industry average lumber recovery factors and conversion costs to forecast operating earnings against these capitalized costs (Table 15). Finally, the impact of differing levels of lumber quality/value de-grade is demonstrated (Table 16).

Table 13 Average Interior logging costs to water[1]

Cost	PWC 1999 ($/m3)
Tree to truck	$18.23
Hauling	$9.23
Scaling	$0.25
Camp Costs	$0.21
Other Direct	$0.89
Roads	$6.14
Silv. & Reforest.	$3.95
Planning & Admin.	$5.45
Depreciation	$0.52
Corp. OH	$0.19
Other indirect	$0.42
Subtotal	**$45.48**
Dump & Boom	$4.55
Tow & put in place	$1.00
Total	**$51.03**

[1] Assumption is that stumpage will not be charged until wood is delivered to the mill in future

Table 14 Costs of log recovery to mill

Cost	$/m3
Tow	$1.00
Dewater & Reload	$1.97
Haul to Mill	$4.50
Road Maintenance	$0.75
Total	$8.22

Table 15 Predicted impact of log storage capitalization on operating earnings at trend pricing

	Yr0	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7	Yr8
Capitalized Log Cost (@ 10%)	$51.03	$56.13	$61.75	$67.92	$74.71	$82.18	$90.40	$99.44	$109.39
Recover to Mill	$8.22	$8.22	$8.22	$8.22	$8.22	$8.22	$8.22	$8.22	$8.22
Total	$59.25	$64.35	$69.97	$76.14	$82.93	$90.40	$98.62	$107.66	$117.61
Conversion Costs ($/mfbm)	$150.00	$150.00	$150.00	$150.00	$150.00	$150.00	$150.00	$150.00	$150.00
LRF (declining @ 2% p.a.)[1]	0.263	0.258	0.253	0.248	0.243	0.238	0.233	0.228	0.224
Wood cost ($/mfbm)	$225.29	$249.68	$277.00	$307.60	$341.88	$380.28	$423.32	$471.55	$525.62
Total wood & conversion costs (C$/mfbm)	$375.55	$399.94	$427.25	$457.85	$492.12	$530.52	$573.55	$621.78	$675.84
Sales (C$/mfbm)[2]	$442.50	$442.50	$442.50	$442.50	$442.50	$442.50	$442.50	$442.50	$442.50
By-product Sales	$50.00	$50.00	$50.00	$50.00	$50.00	$50.00	$50.00	$50.00	$50.00
Total sales (C$/mfbm)	$492.50	$492.50	$492.50	$492.50	$492.50	$492.50	$492.50	$492.50	$492.50
Operating earnings ($/mfbm)	$117.21	$92.82	$65.50	$34.90	$0.62	($37.78)	($80.82)	($129.05)	($183.12)

[1] LRF of 263 BF per m3 is 1999 PWC Interior average; small pine could be expected to be lower, increasing costs.

[2]Uses a generous trend lumber price of US$295/mfbm and a C$/US$ rate of 1.50

Table 16 Conceptual impact of different levels of lumber value degrade on operating earnings.

Value Matrix	Yr0	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7	Yr8
Op. Earn. with Value decline @ 3% p.a.	$116.95	$77.79	$40.62	$10.03	($24.24)	($62.64)	($105.67)	($153.90)	($207.97)
Op. Earn. with Value decline @ 6% p.a.	$116.95	$63.01	$35.70	$5.10	($29.17)	($67.57)	($110.60)	($158.83)	($212.89)
Op. Earn. with Value decline @ 9% p.a.	$116.95	$48.24	$20.92	($9.67)	($43.94)	($82.34)	($125.37)	($173.60)	($227.67)
Op. Earn. with Value decline @ 12% p.a.	$116.95	$33.46	$6.15	($24.45)	($58.72)	($97.12)	($140.15)	($188.38)	($242.44)

Water or Sprinkler Storage May Allow for Positive Operating Earnings ¾ Although Not an Adequate Return on Capital Employed

Our relatively simple model suggests that it may be possible to achieve positive operating earnings under a long term storage regime of approximately three to four years. However, we point out that most lumber producers seek higher levels of profitability than simply breaking even at an operating level. We also question the merits of long-term water based storage. It appears that standing beetle-killed timber remains commercially viable for up to 10^{+} years. This method of storage, while likely to experience significantly more quality de-grade over time, does not entail the initial capital outlays.

Large scale logging for storage may generate increased levels of logging at the front end, but it will also result in subsequent lower harvest activity and employment as the stored logs are removed from storage. However, as discussed under Section 6.5.4 if long-term storage is considered in concert with site rehabilitation efforts, we do not believe that the synergistic financial interactions between rehabilitation and storage are likely to be meaningful. We believe near-term harvest efforts should focus on green-attack stands for current mill consumption rather than for long-term storage options.

Use of 4% rate of capitalization.

Table 17 Predicted impact of log storage capitalization on operating earnings at trend pricing

	Yr0	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7	Yr8
Capitalized Log Cost (@ 4%)	$51.03	$53.07	$55.19	$57.40	$59.70	$62.09	$64.57	$67.15	$69.84
Recover to Mill	$8.22	$8.22	$8.22	$8.22	$8.22	$8.22	$8.22	$8.22	$8.22
Total	$59.25	$61.29	$63.41	$65.62	$67.92	$70.31	$72.79	$75.37	$78.06
Conversion Costs ($/mfbm)	$150.00	$150.00	$150.00	$150.00	$150.00	$150.00	$150.00	$150.00	$150.00
LRF (declining @ 2% p.a.)	0.263	0.258	0.253	0.248	0.243	0.238	0.233	0.228	0.224
Wood cost ($/mfbm)	$225.29	$237.80	$251.06	$265.10	$279.98	$295.74	$312.43	$330.12	$348.86
Total wood & conversion costs (C$/mfbm)	$375.55	$388.06	$401.31	$415.35	$430.22	$445.97	$462.66	$480.35	$499.09
Sales (C$/mfbm)	$442.50	$442.50	$442.50	$442.50	$442.50	$442.50	$442.50	$442.50	$442.50
By-product Sales	$50.00	$50.00	$50.00	$50.00	$50.00	$50.00	$50.00	$50.00	$50.00
Total sales (C$/mfbm)	$492.50	$492.50	$492.50	$492.50	$492.50	$492.50	$492.50	$492.50	$492.50
Operating earnings ($/mfbm)	$117.21	$104.70	$91.44	$77.40	$62.52	$46.76	$30.07	$12.38	($6.36)

Table 18 Conceptual impact of different levels of lumber value degrade on operating earnings.

Value Matrix	Yr0	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7	Yr8
Op. Earn. with Value decline @ 3% p.a.	$116.95	$89.66	$66.56	$52.52	$37.65	$21.90	$5.21	($12.47)	($31.21)
Op. Earn. with Value decline @ 6% p.a.	$116.95	$74.89	$61.64	$47.60	$32.73	$16.98	$0.29	($17.40)	($36.14)
Op. Earn. with Value decline @ 9% p.a.	$116.95	$60.11	$46.86	$32.82	$17.95	$2.20	($14.49)	($32.17)	($50.91)
Op. Earn. with Value decline @ 12% p.a.	$116.95	$45.34	$32.09	$18.05	$3.18	($12.57)	($29.26)	($46.95)	($65.69)

Subsequent to the stakeholder workshops where we presented our preliminary recommendations, we received a copy of a recent Forintek report by Tony Byrne prepared for the Northern Forest products Association (NFPA). The report, Water Storage of Logs with Implications for Preventing Deterioration of Mountain pine Beetle-killed Trees, recommends that additional studies be done to address:

- Re-wetting of dry logs
- Additional staining of water-stored logs
- Feasibility of industrial-scale sprinkling
- Strength, stability and finishing properties of water stored wood
- Alternatives to water storage.

A further report supplied by the NFPA addressed water storage of pine logs in Britain following the 1987 blowdown of large volumes in that country. Based on the results of a four year study of under sprinkler storage, the report, Water Storage of Timber: Experience in Britain, edited by Webber, Griggs and Gibbs suggests that, "…In future, water storage should be considered a major option whenever large quantities of pine are rendered vulnerable to stain and decay."

We believe a review of these reports and support for further study should be a part of the shelf-life study we have recommended for the on-stump storage alternative. In view of the indication by the NFPA that industry will not fund long-term storage, the Province should objectively assess this alternative to on-stump storage on both its merits and priority related to other Crown expenditure and revenue impacts associated with the west central B.C. MPB epidemic.

In consideration of the above discussion and in support of the future potential for ensuing economic and ecological benefit that can be derived from standing dead trees, we recommend that:

- ***emphasis be placed on the on-stump storage of beetle killed trees.***

6.5 Socio-Economic Issues

6.5.1 COMMUNITY STABILITY

Community stability was the foremost public issue in all community consultations, including First Nation communities. Concerns were expressed in a number of ways and in a number of contexts, but there were five consistent messages:

- Communities are concerned about stable timber supplies for local mills, and the viability of operating these mills in beetle wood.
- Communities want opportunities to utilize cut uplifts and dry wood to establish new local economic initiatives, other than SPF dimension lumber mills.
- For the most part, communities do not want spikes in economic activity that require infrastructure improvements that cannot be sustained over the longer-term.
- Communities want local contract loggers, market loggers and market log tenures to continue to operate, provide local jobs and support local businesses.
- First Nation communities in particular want to establish trained workforces to manage beetle related activities, from detection and protection contracts up to logging and stewardship contracts and increased joint venture manufacturing.

Community stability as impacted by industry stability and viability is the significant and leading concern of the various stakeholders. It is the issue that drives the near unanimous opinion that any strategic plan implemented by government must leave the local mills supplied in the long-term. With minor exception, communities seemed to be willing to support each other in maintaining mutually stable timber supplies. It was evident that this drives the belief by most that haul cost recognition as discussed later in this report must be two way or reciprocal. It also is the main factor behind local mayors and communities wanting to be part of decision making with respect to cut transfers and operating area allocations. A number of fiscal concerns arose that are addressed elsewhere in this report, related to how cost are impacted by relocation of operating areas and changes in log flows to local mills. Similarly, the effectiveness and consistent application of control strategies was questioned from the perspective of protecting the community timber supply base.

Many see the opportunity for new economic development initiatives based upon increased availability of timber, both through new product lines and through utilization of non-merchantable timber for uses other than lumber production. There is general acceptance of the fact that surplus lumber manufacturing capacity exists and that new market opportunity for dimension lumber is currently limited. However, interest is high in establishment of new product lines and value-added initiatives outside conventional markets. There is a general expectation that opportunities will be made available for this type of business to become established and/or expanded locally. There is also a relatively strong interest among First Nation communities to engage in joint ventures relationships to pursue these local economic development opportunities. There are a number of established joint venture initiatives throughout the MPB epidemic area that help to meet local needs of First Nation communities and contribute to government revenues.

A number of community concerns revolve around continued employment generated by local contract loggers and silviculture workers, market loggers and market log tenures such as community forests, woodlots and some Tree Farm Licences. This segment of the workforce contributes to the well being of local businesses in many communities based upon geography and local spending patterns.

First Nation communities in most cases are seeking opportunities to expand their employment base, and see contract work related to beetle management as an opportunity to establish a trained contract workforce. This can provide low cost employment results without the need for capital investment, specialized technology or market knowledge. As well, cut uplifts are seen as a way to address timber related bridging arrangements that may result from interim measures related to treaty discussions.

In the context of economic implications for government, the main four messages are not incongruous. Community stability is generally seen as a contributor to economic stability in a larger context. However, the perceptions of what actions were necessary to achieve community stability varied considerably and some had significant business implications for government. While the desire of community leaders to play a role in decision making around cut transfers and allocation of operating areas is understandable, it is likely unworkable due the fact that it will become highly politicized.

Recommendations related to community stability that drew the greatest debate during workshop sessions were related to the deployment of existing harvesting rights into green attack beetle areas and the method of disposition of cut uplifts from new allowable annual cut increases. The prevailing belief is that cut transfers, the transfer of existing harvesting rights from adjacent TSAs into TSAs with allowable annual cut uplifts to displace cutting in healthy stands, will destabilize timber supply for the community with the cut uplift. In reviewing the AAC Rationale Reports published by the Chief Forester, this does not appear to be the case. The two timber supply areas that have allowable annual cut uplifts are the Quesnel and Lakes TSAs.

The compelling argument for cut transfers is to prevent the aggregate harvest level from increasing any more than is necessary to control the MPB. As discussed elsewhere in this report, the combined harvest rate uplift recently approved is large enough to cause a price drop if converted into dimension lumber and put into the North American market. A lumber price drop could close marginal mills in communities, and lessen profit margins for others. This is potentially a larger threat to local employment and community stability than beetle killed logs leaving the community.

When increasing the Lakes TSA allowable cut by 1.5 million cubic metres the Chief Forester used the worst case projections for MPB infestation rate of spread. In the most aggressive case

considered, the cut uplift was maintained for ten years and declined over the next twenty years to a level 192,000 cubic metres per year below the status quo harvest rate. In doing so, beetle killed timber was assumed to have no useful value for lumber after five years of being killed. When this assumption was changed to ten years of useful shelf life for beetle killed timber, this decline was reduced by 200,000 cubic metres, which would completely offset the projected downfall. Experience in the previous MPB epidemics suggests that the shelf life of beetle killed timber is longer on average than five years, and that the Chief Forester has used a conservative assumption. This report recommends that a shelf life of beetle killed timber study be undertaken immediately to confirm these assumptions. Also, if the cut uplift is only left in place for ten years the corresponding fall in AAC is reduced to 82,000 cubic metres. If the worst case assumption for beetle spread rates is not used, there is no projected decline in harvest levels. There is a high probability that allowable cuts may not decrease at all as a result of short term cut uplifts. This may be counterintuitive but forests are dynamic in nature and harvesting is but one factor in determining long term timber availability.

Another factor to consider for the Lakes TSA is that there are legal commitments in place to supply logs to mills that are outside the TSA. The Lakes TSA is a net exporter of logs, 443,000 cubic metres of which are in long term replaceable tenures. Cut levels would have to fall by twice the worst case projections to impact the existing mills in the Lakes TSA. Given these facts and projections, there is little threat to local timber supply stability from short-term transfer of harvesting rights into the Lakes TSA to help address the cut uplift without significantly increasing dimension lumber production.

Based upon the above, we recommend as follows:

- ***that cut transfers, the short-term transfer of existing harvesting rights from adjacent TSAs into TSAs with allowable annual cut uplifts to decrease cutting in healthy stands, be used to avoid an overall increase in harvesting. In this circumstance, cut control credits for transferred quota, and haul cost recognition to the closest point of delivery are recommended to remove disincentives to cut transfers.***

- ***that existing cut within TSA boundaries be immediately redirected, on a cost effective basis, into priority beetle control harvesting, and that haul cost recognition to the nearest point of delivery be recognized for priority beetle control harvesting.***

- ***that guaranteed reciprocal provision for the balancing of short-term cut transfers <u>not</u> be undertaken at this time.***

  We believe that there is a high probability that no timber supply reductions will result from short term cut transfers.

- ***that companies and government identify the magnitude of quota in non-priority cutting areas that is available for cut transfers and agree upon an action plan for cut transfer by October 30, 2001. Further, that Regional Managers direct cut transfers according to that action plan including the adjudication of any operating area allocation disputes within a further15 days.***

- ***that immediate consideration be given to regulatory changes that provide the necessary empowerment to enact these recommendations for forest health purposes.***

- ***that the mandate for decision making related to harvesting rights administration remains with the Ministry of Forests. Community interest in operational aspects of timber administration is encouraged through public involvement in established consultation processes and through normal political process.***

When determining the magnitude of quota available for transfer, parties should consider the volume required to maintain MPB or other beetle control efforts in the assisting TSA or district. They should also consider the species or log profile required to supply specialty mills such as peeler/plywood facilities.

When increasing the Quesnel TSA allowable cut by 908,000 cubic metres the Chief Forester used the worst case projections for MPB infestation rate of spread. In the most aggressive case considered, the cut uplift was maintained for ten years and then reduced to a level 270,000 cubic metres per year below the status quo harvest rate. Should the rate of beetle spread decrease by 25% the corresponding cut decrease would be 120,000 cubic metres, and if the spread rate collapsed there would be no drop in harvest levels for 140 years.

These projections are made on shelf life assumptions similar to those in the Lakes TSA. Beetle killed timber was assumed to have a shelf life of 5 years and then stands volumes would drop by 50%. If this reduced the stand to below 150 cubic metres per hectare the stand was then considered non-merchantable. Stands killed in the 1980s beetle epidemic in the Chilcotin are still being harvested so again this appears to be a conservative assumption.

Recent accelerated cutting in the Quesnel TSA has been achieved through the transfer of SBFEP cut into Quesnel from Williams Lake. This is a reasonable way to avoid increasing harvest levels in aggregate, even with a local AAC uplift. When the beetle epidemic is in check, these transfers can be reversed and while the cost of purchased wood may fluctuate locally with the volume shifts, the total timber supply between the two TSAs remains stable. Given these tactics and projections, there is little threat to local timber supply stability from transfer of harvesting rights into the Quesnel TSA to help address the cut uplift without significantly increasing dimension lumber production.

Based upon the above, we recommend as follows:

- ***that, where feasible and required for forest health purposes, external SBFEP AAC be transferred into priority beetle harvesting in TSAs where either the AAC has been increased or there is greater demand for beetle control harvesting. In this circumstance we recommend that competitive bonus-bid, revenue-focused sales with cost recovery upsets be established in order to avoid administrative cost barriers to expedient harvest.***
- ***that at the end of the epidemic reciprocal volumes be made available in a similar manner from the SBFEP of TSAs that implemented AAC transfers, to maintain stability of total purchase wood volumes between the participating TSAs.***

While cut transfers are not expected to impact significantly on community timber supply stability, they cannot be expected to address all the beetle logging required to control the spread of MPB, nor to salvage all the killed timber before it deteriorates beyond use. New tenures will be required to control the spread of MPB, and to assist with the salvage operations once the beetle spread rate comes under control. These tenures can be sold in a manner that enables new product opportunities to be explored either directly or through value added activities. Local entrepreneurs should be successful in these competitions due to closer proximity to the log source, and associated lower transportation costs.

First Nation contractor workforce training opportunities can be developed in either case, with existing or new tenures. Tender provisions can be included in new tenures to encourage this activity.

We recommend:

- ***that new non-replaceable forest licences be advertised in TSAs with cut uplifts to encourage new non-SPF business opportunities, local employment and First Nation involvement while optimizing crown revenues. These sales would be awarded competitively through bid proposals that are evaluated jointly for revenue creation and community stability elements. To ensure that priority forest health issues are addressed in a timely manner, strong performance provisions are recommended.***

Contract loggers are often involved in long term agreements with mill owners and in some cases are protected by the Timber Harvesting Contract and Subcontracting Regulation. Increased levels of activity overall provide enhanced opportunities for contract work. This places the contracting community in a relatively secure position with respect to employment, although some services may be supplied from different service centres during cut transfers.

The issue of local employment from market logging and market log tenures is more difficult to address directly as there is no compelling reason for mills to purchase from these sources, other than log price. Market loggers and market log tenure holders are more vulnerable on two fronts. First, they may be required to sell into an oversupplied log market due to increased harvest levels. Secondly, cost provisions provided to facilitate cut transfers of major quota holders could skew local market log prices.

A number of suggestions have been made to lessen this problem, however, in the final analysis logs must be competitively priced in the market they are sold into. If no local market exists, then provisions are needed to adjust stumpage costs to provide for the sale of beetle logs outside the local log market. If market logs are not competitively priced in local log markets due to stumpage rates, administrative solutions are needed. Many suggestions were received during consultations for enabling market log tenures to operate during MPB epidemic.

A number of these suggestions are recommended for consideration.

Where there is no forest health problem within the market log tenure:

- *Allow cutting to be deferred with provisions to roll ahead the resulting undercut for another cut control period.*
- *Conversely, provide an option for cut to be transferred into beetle control harvesting outside the tenure boundaries, with cut control credits and cost provision similar to those provided in other cut transfer recommendations, and no roll ahead provisions for volume transferred*
- *Use the purchase price of logs as the basis for setting stumpage rates for market log tenures*

Where there is a forest health problem within the market log tenure:

- *Waive cut control as required to accommodate harvest of beetle killed timber above approved cut control limits. Provide the option to reconcile over cutting by deferring future harvest until the overcut is offset, or by recalculating the allowable cut for the tenure.*
- *Provide log purchasers cut control credit for the purchase of beetle affected timber from market log tenures.*

- *Use the purchase price of logs as the basis for setting stumpage rates for market log tenures*
- *For all tenures consider:*

Staggering cut control periods for all tenures evenly over time, both licences held by mill operators and market log tenures, so that administrative cut control pinch points do not result in artificially depressed log prices

It should be noted that we believe, that in the absence of other market influences, the cumulative strategic and operational responses to control beetle infestation spread and intensity in the near-term will, if anything, result in more regional employment and enhanced community economic activity. In general, the mill workforce will remain fairly local and stable with some continued difficulty in attracting qualified trades people. Our consultations indicated that there is general agreement that there are sufficient contractors and loggers, including truckers, to meet the demands associated with beetle wood harvest. Logging contractors and workforce will continue to be fairly mobile. This mobility will be significantly impacted by the contractual obligations between licensees and their contractors, which on review with a number of licensees, frequently affects in excess of 80% of their volume harvested.

6.5.2 STABILITY OF CROWN REVENUES

Invariably, the consulted stakeholders were of the opinion that the *Crown, as owner of the economically depreciating asset,* should bear the impact of any required cost additives resulting from a licensees mandated response to ensure the loss of fibre value and forest health is minimized.

However some feedback questioned whether tenure holders should share in the absorption of costs related to addressing the MPB epidemic. In response to that feedback and in keeping with our basic assumption that the "industry" has no ability to absorb further costs and consistent with our recommendations around timber pricing the following comment is presented.

6.5.2.1 Crown vs. Tenant — Sharing of Costs

It is recognized that tenure-holders have a significant investment in their crown harvest rights. Interior Licensees typically have between C$50 and $150 employed per cubic meter of annual harvest rights. While we believe that interior producers recognize the stewardship responsibilities associated with their investments in these rights, we also believe there is an implicit expectation that the landowner will set costs at a level that allows for a reasonable return on capital employed. The average weighted cost of capital is 10+%. Given our view of future wood products markets, we believe that meeting this level of return on capital employed will be challenging for wood products firms for the foreseeable future. We believe that the Crown, as the landlord, is ultimately responsible for any deterioration in the quality of its assets. Licensees have come to accept changes in the long-term harvest level of their licenses; however, we believe costs associated with mountain pine beetle management activities such as changes in harvest plans, modified harvest practices, increased hauling distances, reduced wood quality, etc. should be reflected in the appraisal system and borne by the landlord.

Therefore, as a result of our recommendation in Section 6.5.3.1 that beetle wood be removed from the B.C. Interior appraisal "waterbed," the epidemic will cause on-going fluctuations in Crown revenues. They will be generally lower in proportion to the:

- Volume qualifying for cost recognition of increased beetle wood harvest and transportation costs
- Recognition of lower LRFs and AMV
- Volume of Grade 3 harvested

There is some potential for offsetting declining Crown revenue as the result of:

Increased stumpage if additional "actual harvest" volume results from activity tied to announced AAC uplifts of 2.4 million m3.

- Increased beetle control economic activity generation of employment tax revenue
- Increased economic activity resulting from successful new non-SPF business ventures.

6.5.3 INDUSTRY COST ISSUES

The principle of asset owner bearing responsibility for costs has translated into a "cost neutral" concept for recognition of incremental costs associated with beetle management. It has also been extended to give consideration to a profit neutral approach to total fibre utilization to recognize the evident impact of beetle attack on manufactured lumber quantity and/or quality as defined by market acceptance and market value of the lumber output.

While we acknowledge that the Province has the option to either recognize or not recognize the increased costs associated with planning for, harvesting and transporting beetle invested timber, we recommend that:

❖ ***the Province recognizes the increased costs of harvesting beetle wood on a cost neutral basis.***

We believe that addressing cost issues implications of beetle control efforts will be the single most effective means to ensure that maximum effort is directed at retarding local advance of the infestations and maximizing log and lumber recovery and value.

However, we also believe it is prudent for government to assess the potential for this approach to truly effectively control the net infestation and volume loss in an economic manner that optimizes value to the Crown. We understand that modeling efforts are underway to address this issue giving consideration to foregone stumpage revenue through cost recognition versus revenue lost through log and lumber degrade impacts over time.

The following discussion on timber pricing further addresses one means by which industry cost issues can be dealt with.

6.5.3.1 Timber Pricing

Valuing Mountain Pine Beetle infested stands for the purpose of the payment of stumpage is perhaps the most important element in ensuring the timely and effective harvest of beetle-infested stands. During interviews and at the stakeholder workshops, inadequate cost recognition and inequitable administration of timber pricing was referenced as the single most significant impediment to vigorous beetle control efforts.

Timber pricing policy and administration must ensure that the timber is priced fairly, equitably and expeditiously. Fairly and equitably so that the crown receives the legitimate compensation for the timber harvested and the forest industry's financial performance is not negatively impacted by the harvest of beetle-infested timber. Expeditiously so that stumpage

appraisal does not negatively impact a timely response to reducing the magnitude of the beetle problem. We heard on numerous occasions that appraisal policy must support rather than hinder the harvest of beetle-infested stands. We support this position and recommend that, consistent with the MPB focus of our recommendations:

- ***<u>the MoF implement strategic changes to the Interior Appraisal system to ensure that it supports rather than hinders sound beetle control and harvesting/manufacturing efforts</u>***

After careful consideration and review the following course of action is recommended. Change to stumpage appraisal policy should have four main thrusts:

1. Harvesting of pine beetle should be cost/profit neutral to industry
2. There should be no increase in stumpage rates paid in other parts of the interior due to the harvest of pine beetle (no "waterbedding")
3. The stumpage appraisal process should be carried out expeditiously and should not be an impediment to the timely harvest of pine beetle infested stands
4. Stumpage payable to the crown should be fair and equitable

There is increased revenue risk to the province in implementing the following recommendations. However, we believe that the revenue risk must be weighed against the importance of retarding the spread of the pine beetle infestations and accelerating the harvest and optimizing the value of a depreciating crown asset. Therefore it is recommended that the province accept this increased level of revenue risk in the calculation of stumpage rates for the harvest of green and red attack beetle-infested timber. Specifically we recommend that:

- ***the MoF develop definitions of cost and profit neutral that are accepted by the MoF and industry***

Appraisal cost recognition is currently applied on an "average efficient operator" basis. In order to adequately address the epidemic level of beetle infestation some industry associations and/or licensees have strongly indicated that cost neutral should be defined on an "operation specific basis" or at a minimum on a "similar operating circumstance" basis. We believe it is important to maintain the concept of the average efficient operator and that the definition of cost neutral should be defined on that basis.

- ***the MoF Remove Beetle wood from the "waterbed"***

The current Comparative Value Stumpage Appraisal methodology is target rate driven. This methodology generates an average stumpage rate each quarter no matter that the value of the asset being harvested declines due to disease or pest infestation. Put simply if one area of the interior pays less stumpage another must pay more to ensure the average stumpage rate is achieved. The potential sources of beetle related "waterbedding" are:

- additional harvesting costs
- reduced value of the products produced – lumber and chips
- shift in species – spruce is generally more valuable than pine
- recognition of higher transportation costs
- the cost associated with accelerated road construction programs

- increased harvest of low-grade volumes. Grades 3, 4, 5 & 6 currently pay $0.25/m3 stumpage

Three suggestions are made for removing the mountain beetle harvest from the waterbed.

1. Estimate the magnitude of the annual waterbed. Divide this amount by the annual harvest and then subtract the result from the target rate. For example:

Hypothetical waterbed[1]:	$150,000,000
Annual harvest under CVP:	32,000,000 m^3
Waterbed per cubic metre:	$4.69/$m^3$
Target Rate:	$25.00/$m^3$
Adjusted Target Rate:	$20.31/$m^3$

This is the method currently being used to compensate for the impact of the beetle waterbed. The target rate has been adjusted downward by $0.50/$m^3$ for a period of one year to recognize the increased cost of small patch sanitation (sps), small clear cuts (scc) and additional haul distances. The calculation of the $0.50/$m^3$ adjustment was both difficult and controversial. As the magnitude of the beetle problem grows this calculation becomes more difficult. Furthermore, since the adjustment must be calculated at a point in time, it is not representative of the ever-changing circumstances of harvesting the beetle. For these reasons another suggestion that would eliminate the beetle waterbed is made.

2. Utilize a fixed data set mean value index (MVI).

Comparative value appraisal calculated stumpage uses the equation:

IR = BR + (VI – MVI)

Where IR = Indicated Rate
BR = Base Rate
VI = Value Index
MVI = Mean Value Index

Since the mean value index (MVI) is the average value index for all cutting authorities in the interior it is the mechanism around which achieving the base rate (BR) revolves. As the profile of timber being harvested declines the MVI declines and the BR is achieved. By fixing the data set used to calculate the MVI the MVI will not decline as more beetle is harvested. The declining value of the beetle and the increased cost of harvesting will be recognized in the cutting permit specific Value Indices (VI) but not in the calculation of the MVI. Thus an overall reduction in stumpage payable is achieved. In other words the BR will no longer be the average stumpage paid rather the average stumpage payable will be the BR less the reduced value of the mountain beetle harvest.

[1] A hypothetical guesstimate of the beetle waterbed; the actual waterbed has yet to be determined. Current estimates vary from $2 to $10 per cubic metre.

This mechanism eliminates the waterbed problem due to both increased harvesting costs and declining value of the timber harvested. Furthermore this proposal is self-adjusting in that changing beetle harvesting circumstances are recognized on an ongoing basis. We believe that if the province is prepared to recognize the full costs of harvesting beetle infested timber then this is the best methodology to adopt.

3. Eliminate the beetle infested cutting permits for the MVI calculation

   This proposal would simply eliminate the 'beetle infested" cutting permits from the MVI calculation. Since this would result in historically high value index (VI) permits being removed from the MVI calculation the MVI would be lowered and stumpage rates actually increased. For this reason this suggestion should not be considered.

We suggest that the degree of removal of beetle wood from the waterbed is the determining action that will result in increased revenue risk to the Province. We also suggest that not removing beetle wood from the waterbed poses a significant risk to total provincial stumpage revenue if continued water-bedding of some beetle control costs results in unsustainable costs to industry.

❖ ***The MoF issue landscape level cutting permits***

This recommendation is based on the fundamental premise that an accelerated response time will result in a more effective attack on the beetle and less decline in the quality of the timber being harvested. These recommendations are directed at facilitating efforts to control the spread of the beetle. Salvage of dead trees can continue to be carried out under the more traditional planning and cutting permit process.

- In areas threatened by epidemic infestation or already at epidemic levels issue landscape level cutting permits for small patch sanitation and small clearcut operations on the following basis.
  - Generally homogenous timber types should be blended together to develop "composite" cruise information that is representative of the average profile of timber being harvested. This may require the blending together of cruise information from several cutting permits to develop a cruise representative of the timber being harvested. This cruise information should be used in the landscape level cutting permits.
  - Deletions and additions to the cutting permit should be made on an ongoing basis
  - The term of the permit would be ongoing (revolving) until the beetle infestation dissipates
  - The transportation cost and tree to tuck cost estimates should be a weighted average for the harvesting operations in the permit calculated on a "best forecast" basis
  - The silviculture cost estimate should be based on the average conditions
  - The development cost estimate should be the estimated road cost expenditures in the landscape unit for the year divided by the estimated harvest in the unit for the year
  - Quarterly updates of stumpage rates would occur. Reappraisal would be on a yearly basis

- Only beetle infested stands or stands of very high risk of being infested would be eligible for harvest under landscape level permits.
- Grey attack stands would not qualify for landscape level cutting permits. These stands no longer contain significant level of beetle and the rapid harvest of these stands while important is not critical. Cutting Permits for grey attach stands would be obtained through the normal cutting permit process.

❖ ***The appraisal system recognize additional beetle related transportation costs***

- Where a licensee is directed by the regional manager to move or voluntarily moves harvesting operations from their normal operating area to beetle infested areas with the consent of the regional manager, the additional cost of transportation should be recognized in the appraisal on the following basis.
  - The "point of appraisal" should become the closest point of delivery to a sawmill consuming some proportion of the timber from the cutting permit. In no case will this distance exceed the haul distance from the licensees new harvest area to the sawmill that has normally consumed the majority of the timber from the transferred licence.
  - *The additional transportation cost should be recognized both across Timber Supply Area boundaries and within Timber Supply Areas*

  These changes vary from the wording in the current manual. The current manual wording allows transportation costs to "the place that would have been the point of appraisal if the timber had been harvested in the timber supply area or TFL from which the cutting rights have been transferred." The wording we propose allows for rationalization of haul destinations and the recognition of this rationalization in the appraisal. Secondly we recommend that additional transportation costs be recognized for transfers of cut both across and <u>within</u> Timber Supply Area boundaries.

  To appreciate the significance of this recommended change to current practice, it is estimated that based on current allowances, an additional 100 km haul would result in an approximate $5.00/m3 reduction in stumpage. Estimating the potential volume impacted by this recommended "within TSA" point of delivery transportation cost recognition should be part of the recommended review of the volumes available for transfer.

  For the reasons discussed under Community Stability, we do <u>not</u> recommend that this haul cost recognition for transfer operations be two-way or reciprocal for future off-setting volume transfers.

❖ ***The MoF review the rate charged for grade 3 logs as part of a broader timber pricing review***

IT SHOULD BE WELL NOTED THAT WE DID NOT RECEIVE SUPPORT FOR THIS REVIEW FROM EITHER MAJOR LICENCEES OR LOCAL ENTREPENEURS ANTICIPATING BUSINESS VENTURES BASED ON THE CURRENT GRADE 3 PRICE

There are currently five grades of timber harvested in the interior. A sawlog grade and 4 lower grades of timber. The sawlog grade pays full stumpage. Grades 3, 4, 5 and 6 all pay $\$0.25/m^3$. As the beetle infestation ages it is anticipated that there will be a

significant increase in the volume of grade 3, a dead dry sawlog, harvested. Thus average stumpage payable could drop from the sawlog rate of $35.00/m3 to $0.25/m3 for this volume. While there is no question the value of a dead sawlog is less than the value of the same log in a green state the magnitude of this reduction has been questioned. It is suggested that a review of the stumpage rate charged for Grade 3 logs be undertaken. This review must give careful and balanced consideration to three important factors:

- Maintaining an incentive to harvest grade 3 logs. A grade three log is dead and dry and if not harvested in timely manner, its value will deteriorate significantly.
- Ensuring fair return to the crown for the grade 3 logs being harvested.
- Recognizing competitive aspects of minimum stumpage logs

Suggested options for grade 3 pricing are:

a. Maintain the status quo

b. Increase the flat $0.25 per cubic metre rate to a higher rate

c. Set Grade 3 at a percentage of the cutting permit sawlog rate

d. Set the grade 3 rate as a flat rate reduction off the cutting permit sawlog rate[2]

As the beetle infestation ages the harvest of increased volumes of grade 3 is anticipated. The salvage of this timber is very important; therefore, the incentive to harvest grade 3 must not be lost. The size of the incentive to harvest grade 3 must be balanced against the potential revenue losses to the crown.

We further suggest that consideration be given to creating a special timber pricing rate for the harvest of green attack brood trees.

To be effective in combating the spread of the beetle and stopping the beetle from reaching epidemic proportions in other areas of the province a sanitation rate set appropriately to encourage the harvest of green attack brood trees, should be considered. This would require identifying the green attack brood logs either pre-harvest or at the time of scaling. We do not know if this is feasible, however we do believe that if beetle populations are to be controlled, the stumpage system should provide encouragement to both small and larger operators to harvest brood trees.

Based on feedback received by the R&S ROGERS team, exploring this option has the support of some stakeholders and the Ministry of Water Land and Air Protection.

❖ ***Adequacy of beetle specific appraisal cost estimates be maintained***

Increased cost estimates for small patch sanitation (SPS) and small clear cuts (SCC) have been introduced into the appraisal manual. These costs estimates are based on the average efficient operator concept and appear to be adequate. The number should however be reviewed and updated on ongoing basis as better information becomes available and every effort should be made to ensure these rates are adequate and thus not

[2] For example if the sawlog rate is $40/m3 and the flat reduction is $25/m3 the stumpage payable would be $15/m3. If the reduction resulted in a negative number minimum stumpage would apply.

a disincentive to the harvest of beetle wood. New information should be introduced in the cutting permits at reappraisal.

- ***The MoF and industry complete a study to determine the magnitude of the decline in AMVs and LRFs due to MPB infestation across all attack categories***

  A study should be undertaken in lumber sales values (AMVs) and lumber recovery factors (LRFs) due to the mountain pine beetle infestation. Once the magnitude of the decline in value of these two factors is known, how this information is integrated into the appraisal manual will have to be carefully determined.

  The difficulty is that over time, through Revenue Branch collection of AMV and LRF information, the impact of the mountain pine beetle will be reflected in the appraisal manual. Thus lower AMVs and LRFs due to the harvest of pine beetle will make there way into the system. The benefit of these lower AMVs and LRFs will accrue to all operators in an appraisal zone; whether or not they are harvesting beetle wood. Thus if a reduction to LRFs and AMVs is applied to beetle infested cutting permits double accounting is likely to occur.

  It is suggested that the first step is to determine the magnitude of the problem. If the problem is determined to be significant then a mechanism will have to be developed that would see reductions in LRFs and AMVs for beetle infested cutting permits added back into the LRF and AMV surveys conducted by Revenue Branch. This would negate the double accounting problem. Arriving at the correct adjustments will require careful analysis.

- ***The integrity of the AMV and LRF zones be maintained***

  It has been suggested that Williams Lake operators should redirect there harvesting operations into beetle infested stands in the Quesnel Timber Supply Area. There is general agreement that the Williams Lake operators should get recognition of additional hauling costs in there appraisals; however, a more difficult issue arises because Quesnel and Williams Lake are in different Selling Price Zones. The Williams Lake operators want the Williams Lake Zone 8 selling prices and LRFs to apply while operators in other zones believe the Quesnel Zone 5 selling prices and LRFs should apply. A similar situation may arise between Zone 5 and Zone 6. This is a difficult issue with no obvious solution. In order to avoid the possibility of similar and adjacent cutting permits having significantly different stumpage rates due to different LRFs and AMVs being applied we recommend that the integrity of the AMV and LRF zones be maintained for the calculation of the selling prices in the appraisal.

- ***Establish a Log Based Target Rate for Market Log Tenures***

  Pure Market Loggers such as woodlot operators sell their logs into a log market that is more a reflection of log supply than it is lumber price. Thus even at reasonable lumber prices the price paid for competitively sold timber may be quite low. Conversely if logs are in short supply prices paid may be quite good even though lumber prices are poor. Category 1 SBFEP operators can adjust their bids to reflect the reality of the current log market. Woodlot operators and other market loggers do not have this ability. Consideration should be given to setting a target rate for woodlot operators and other pure market loggers that is tied to the current competitive price for logs rather than the

price of lumber. This could be done on a regional basis. The current manual would continue to be used to distribute stumpage. The target rate would be high at times of a strong log market and lower when the log market is weak.

While this recommendation may add another stumpage category, we believe it has some value in ensuring all available AAC, including the approximately 1% woodlot volume, is focused on beetle control. We believe that market prices for the estimated 15% SBFEP harvest will set the price level.

6.5.4 SALVAGE VALUE LIFE SPAN

A critical issue affecting strategic planning for the eventual harvest of the MPB infested volume under the worst case scenario that envisions a large cumulative volume of infested pine throughout the region is challenge of determining the expected "shelf life" of attacked trees. It is this challenge that is at the root of proposals for both rehabilitation programs and log storage alternatives for either lake storage or log pile sprinkling facilities. Indeed the actual and carrying costs of storage practices for early harvest volumes including value loss must be less than the value loss and present value of regeneration delay alone for infested stands left standing on the stump.

Establishing predicted shelf life by bio-geo-climatic parameters may be one way to prioritize both timing and cost latitude for harvest of "grey" stands. Dryness, elevation, slope and aspect may be shown to influence expected shelf life.

While the conditions of the '69 to '85 Chilcotin epidemic area are different than much of the present epidemic area, it is important to note that economic value is still being extracted from those infested stands, 16 years after the epidemic collapsed. There has been some speculation that the shelf life in the current west central epidemic may be as little as 2 years. This has been discounted by most licensees interviewed, most of whom referenced an expected shelf life expected of 5 to 7 years.

Giving priority to getting a scientific (if possible) assessment of this issue is crucial to any strategic contingency plan for the worst case scenario. We therefore recommend that in order to support priority cutting in high-risk areas and focus harvest on areas with projected shortest shelf-life parameters:

- ***the MoF and industry initiate a study to identify the parameters necessary to maximize on-stump shelf life for MPB infested trees/stands.***

The following is a point form summary developed by Timberline Forest Inventory Consultants Ltd.(TFIC) of Prince George for a possible methodology to meet the objectives of the ground-based aspects of the proposed shelf-life study. TFIC is the inventory advisor to this R&S ROGERS team. Harvesting and milling parameters would also have to be developed.

- Data acquisition: collate timber cruises and/or beetle probes, c/w associated maps, for Pl beetle killed timber (note: date of kill must be within 1 year and must be standing cruised or probed timber; not yet logged). The timber cruise or probe will enable identification of green and red attack trees with an actual date and a location that can be re-visited.
- Sample planning: complete a sample plan based on a random selection of timber cruises /probes across a spectrum of Biogeoclimatic subzones; sample plan will determine the protocol to net factor (i.e. determine the % decay by stem) individual PL stems for decay. The timber cruise or probe can identify a starting condition for each tree and the net factoring will describe the end condition. Start and end conditions can be computer compiled to compare difference in volumes.

- Field work: will collect tree decay information (as per protocol in sample plan document) and will collect site information such as site series, slope, aspect, elevation, BGC Unit, and other identified variables. Field crew would consist of an ecologist to collect detailed ecosystem plots (FS882) and a Timber Cruiser to collect decay information by individual tree stem.
- Statistical analysis: determine statistical relationships between various site factors (such as site series) and rate of decay in MPB killed lodgepole pine.
- Final Report: will identify methods and make recommendations for continuation of work across the province. Statistical relationships between site factors and volume decay in MPB killed pine will be documented.

It would be important to include assessment of historical shelf life in the Kootenays where moisture regimes may be more closely aligned with those of some areas of the west- central plateau.

6.5.5 SITE REHABILITATION

We believe site rehabilitation is almost always a poor investment. In support of this position we offer the following brief analysis around the site rehabilitation decision.

Rehabilitation treatments are considered separately from basic silvicultural obligations following harvest. Site rehabilitation is described as those treatments aimed at restoring a forest site to it full commercial productivity. This could involve treatments such as removal of residual forest cover (e.g., standing dead and/or green undesirable species), site preparation, brushing and weeding and seeding/planting. Treatment costs for rehabilitation of post beetle-kill lodgepole pine stands are estimated to range from approximately $200 - $1,400 per hectare (planting costs are estimated to be approximately C$625/ha at 1,600 sph).

Site Rehabilitation Almost Always a Poor Investment

Sites considered for rehabilitation almost always have some level of existing commercial cover (e.g., unattached trees, species not suitable as host trees, etc.). In addition, such sites can be expected to experience some level of commercial in-fill over the post-beetle attack period. A simple analysis attributing no value to the unrehabilitated forest cover suggests that the net present value of future rehabilitated stands is unlikely to offset rehabilitation costs capitalized at a very low "social discount rate" of 4.0% (note: weighted average cost of capital for a typical interior wood products producers is 10 – 12% p.a.). Given the basic assumption that *all dollars spent should be treated equally, independent of source of funding, and that all investments should only be made where they have a reasonable opportunity to provide an economic return*, it appears that the decision to invest in site rehabilitation is almost always a poor decision (*see Table 19*). Only stands rehabilitated on sites of site index $22m_{50}$, a very high site quality for the area in question, appear to offer the potential to cover planting costs alone.

Table 19 NPV of Site Rehabilitation Investment

Treatment Cost	Site Index									
C$/ha	14		16		18		20		22	
	NPV	Age	NPV	Age	NPV	Age	NPV	Age	NPV	Age
$200	($705)	80	($512)	70	($230)	60	$121	50	$575	50
$400	($905)	80	($712)	70	($430)	60	($79)	50	$375	50
$600	($1,105)	80	($912)	70	($630)	60	($279)	50	$175	50
$800	($1,305)	80	($1,112)	70	($830)	60	($479)	50	($25)	50
$1,000	($1,505)	80	($1,312)	70	($1,030)	60	($679)	50	($225)	50
$1,200	($1,705)	80	($1,512)	70	($1,230)	60	($879)	50	($425)	50

NPV calculations are presented on a C$/ha basis and use a 4.0% discount rate with no real price or cost increases assumed.

All NPV calculation are before stumpage charges and make no assumptions for potential lost values stemming from the non-rehab option and are therefore very generous.

Lumber prices are assumed to be:

2x4	C$390/mfbm	2x6	C$385/mfbm
2x8	C$385/mfbm	2x10	C$465/mfbm
Chips	C$110/BDU		

Consideration of Future Market Uncertainties Supports the Non-Rehab Decision

We recognize that there is a strong desire to return beetle-damaged sites to their maximum productive potential. This can increase confidence in the long-term viability of the wood supply while creating near-term employment opportunities in rehabilitation activities. However, we point out that the timber produced on rehabilitated sites will serve future uncertain markets and will almost certainly be converted in processing facilities not in existence today (see rotation ages in Table 18). As no allowable cut effect can be attributed to possible volume gains stemming from site rehabilitation investments we believe promotion of local community stability in the distant future should not be used to justify un-economic investments. As a result, we believe there is likely to be little benefit in undertaking significant site rehabilitation activities.

We recommend therefore that:

- ***a GO SLOW policy be adopted for large scale site rehab as a result of the current west central mountain pine beetle epidemic***

We believe this recommendation is supported by the poor response to site rehab programs associated with the earlier Chilcotin MPB epidemic and the Swiss fire, where in both cases, little advantage was taken of the proposed programs. Also in both cases, it is reported that when assessed for rehab potential many sites had regenerated naturally or continued to have significant volumes of merchantable timber, sufficient to support harvest operations. Based on feedback we received at the workshops, we further believe this recommendation is supported by many stakeholders.

6.6 Administrative and Legislative Issues

6.6.1 APPROVED HARVEST VOLUMES

In light of:

- the restricted market opportunities
- total regional primary mill capacities of 23 - 28 million m3,
- inconsistencies in defining the magnitude of the epidemic at this time,

… we believe that the total TSA, woodlot and TFL available AAC of 25.5million cubic metres is adequate at this time. We recommend that before further AAC uplifts are considered:

❖ ***the MoF and industry exhaust all efforts to maximize the harvest of green attack timber within the framework of revised cost recognition, tenure and operating area transfers and SBFEP revenue focused licence opportunities <u>before</u> further AAC uplifts are proposed.***

6.6.1.1 New Tenures

Based on discussion with MoF staff, we suggest that there is no need for new forms of tenure. We believe that existing forms of tenure including most specifically Non-Replaceable forest Licences (NRFLs) offer sufficient latitude for district and regional managers to allocate and award any available volume targeted at timely harvest of beetle infested stands. However, it is important that these tenure opportunities be advertised and awarded in a timely manner and that appropriate criteria for award be simple and generally revenue focused with strong performance requirements.

Shortened periods for advertising, assessing and awarding new licences should be put in place. Recognizing that the most recent NRFL aimed at addressing MPB control within the Quesnel TSA has been ten months from planning to award. We recommend that a policy direction within the Ministry of Forests with support from the Minister, ensure that new beetle related NRFLs are planned, advertised, reviewed and award within 120 days. Although this may require regulatory or legislative change to advertising or public comment periods, we believe it be warranted as a means to achieve timely, results based targets.

We also suggest that it would be imprudent to facilitate new area based tenures within the MPB epidemic area until after the beetle infestations collapse. We suggest it would be too risky for a community, First Nation or private woodlot proponent to apply for an area based tenure such as a Community Forest Licence when the forest health of the area may be at significantly increased risk.

6.6.1.2 Cutting Right Transfers

We believe that the transfer of cutting rights within and between districts, regions, and TSAs offers the greatest potential for addressing a spreading and intensifying beetle epidemic. The issue of transfers has been dealt with and recommendations made in Section 6.5.1, Community stability.

Considering that within the 7 TSAs current apportionment for replaceable and non-replaceable ranges from 70 to 90 % of the AAC, transfers evidently offer the greatest opportunity to focus maximum regional harvest on the beetle.

We have made strong recommendations around this issue.

6.6.2 UTILIZATION STANDARDS

Feedback to our preliminary recommendations included at least one suggestion that "… Given the magnitude of the volume involved and the associated logistical problems it may make sense to adopt a more flexible utilization policy." It was further suggested that "… increasing the minimum top to 12.5 cm (from 10 cm) for example would provide" lower cost and higher value benefits to industry while improving revenues to the Crown as a result of an improved industry position.

This suggestion was made on the premise that adopting a lower utilization standard would enable the harvest of more beetle infested hectares while not significantly increasing lumber production.

We believe that this suggestion may have some definitive merit within the scope of a time limited strategic response aimed at maximizing the harvest of green attack trees.

We therefore suggest that the MoF explore the benefits and challenges that might arise from a temporary revision to the utilization standard applied to beetle control cutting permits.

6.6.3 LEGISLATIVE, REGULATORY AND ADMINISTRATIVE OPTIONS

We believe that full use should be made of all legislative, regulatory and administrative options and flexibility available under the Forest Act to accommodate timely and innovative "results oriented" approaches to MPB control. We have for example, when discussing cut transfers in Section 6.5.1 recommended that:

- ***that immediate consideration is given to regulatory changes that provide the necessary empowerment to enact these recommendations for forest health purposes.***

This may include strengthening of Section 18 of the Forest Act.

We suggest that the following sections of the *Forest Act* be used to their fullest potential if the recommended Timber Pricing, cost recognition and transfer policy changes are either not implemented or not successful in achieving full co-operation in achieving required efforts at maximizing the key goal of green attack harvest for control.

- Section 18 – Transfer to other timber supply area
- Section 23(c) – No advertising required: i.e. Direct award for forest health reasons for timber value or loss at risk due to insect infestation
- Section 64 – Cut control
- Section 65 (3) and (4) and (6) – excess harvesting
- Section 66 (10) – Inadequate volume
- Section 67 (2) and (4) – Carry Forward
- Sections 72 and 73 – removal of dead or damaged timber

While this is likely not a complete list of regulatory tools available to the MoF to ensure action towards maximum MPB control is carried out in a timely manner by all licensees and operators across the full scope of within the affected area, it does indicate the significant range of legislative, regulatory and administrative options available to the responsible MoF authority. While these tools may represent the "stick approach", we recommend that the MoF and industry enhance the co-operative spirit aimed at maximizing the value return to both parties.

However in the final analysis, consistent with our generally accepted Basic Principle that *"The Province is the landlord and has a strategic and fiduciary responsibility to manage the impacts of the current MPB epidemic."* the Province must have both the authority and the means by which to manage this Forest health challenge.

For example, consideration should be given to the possibility of amending licenses to permit Regional Managers to direct licensee operating areas within TSAs where that authority may not presently exist.

6.6.4 IMPLICATIONS FOR LAND USE MANAGEMENT

While an in-depth assessment of the implications for land use management is beyond the scope of this report, such an assessment should receive prompt consideration for inclusion as part of a broader, comprehensive strategy.

It is evident that higher level plans, Regional Plans and LRMPs as captured under the generic term of "Strategic Land Use Plans", were not all developed with a consideration of the potential for a worst case MPB epidemic to evolve so rapidly over parts of the "region." It is also evident that because there are different types and statutory status of the plans either in effect, pending or not yet started, there are also different constraints placed on developing MPB strategies by TSA and/or Forest District.

For these reasons and the potential for conflict between the targets and goals of strategic land-use plans and associated MPB strategies, we recommend that:

- ***MPB strategies and strategic land use plans be integrated during this evolving MPB epidemic and that***
- ***responsible Regional Resource Boards and associated monitoring committees for each Strategic Land-use Plan address the synergies, conflicts and prudent means for integrating the MPB strategies and land-use plan targets over both the short and long-term.***

Our interviews with and feedback from First Nations suggest there is enhanced opportunity for greater First nations contribution to efforts aimed at balancing MPB strategies and land use targets. Further, consistent with a balanced approach to MPB management, we suggest the development of broader MPB strategies that recognize the necessity for a pro-active partnership between the MoF and MWLAP – BC Parks based on a "good-neighbour" policy. We believe that in most instances, a balanced approach, including for example recognition of tourism interests will have positive business implications. The monitoring committees should be well positioned to maintain this balanced approach as the epidemic evolves.

6.6.5 ADEQUACY OF GOVERNMENT RESOURCES

We believe that the Crown has only two options with respect to the adequacy of government resources. The Province can either rely on current resources or it can, as we recommend:

- ***that the MPB strategy be effectively resourced to ensure results***

To achieve this effectiveness it is necessary to assess needs on a district basis in relation to the scope and intensity of the MPB infestation and spread in that district. We understand this assessment is a priority matter in all affected districts and at the regional and MoF Headquarters.

In support of the implementation of the recommendations that we have made regarding effective use of timber harvest transfers between districts and TSAs the adequate resourcing of the beetle control effort will require some shifting of resources (dollars and staff) to priority districts.

We do not have sufficient information to recommend a target allocation of funds at some preset minimum but uncapped amount. Defining adequate must be done within the context of the set of strategy recommendations and going forward actions that are implemented. However we do suggest that the success of the strategy to optimize value from the impacted timber resource will be directly related to the adequacy of the dollar and staff resources applied.

We recommend that there be only one spending authority for the MPB epidemic control effort. We suggest that having dual authority between the MoF and FRBC for allocation and approval of spending funds is not the most effective way of managing the available resources. Having two organizations with different funding sources and different mandates is not conducive to effective or timely priority setting or expenditure approval. The FRBC concept of balanced spending by region and restrictive project guidelines is not consistent with a prompt-response, results-based approach to direct resources at the most impacted districts.

- ***We recommend that the MoF be the sole spending authority for Provincial resource allocation and spending on beetle control within the working forest.***

We suggest that most significant provision of Crown resources will be through the revenue impact associated with the full recognition of planning, harvest and transportation costs associated with the harvest efforts directed at control.

In support of other recommendations contained in this report, we suggest that priority be given to resourcing the following:

- A ranking Provincial Beetle coordinator position within the MoF (See section 7.0)
- Defining the magnitude of the epidemic
- Enhanced survey, detection and probing efforts (See early detection section below)
  - Including full resumption of the surveys previously conducted by the CFS
- Accommodating effective staff deployment requirements
- Implementation of recommended transportation infrastructure upgrades
- Up-front funding to provide planning and development costs for increased and/or redirected SBFEP licences

6.6.5.1 Early Detection

We recommend that in order to both increase the harvest of green attack to maximize value from the timber and to more effectively control the spread of the epidemic that:

- ***the MoF actively support and fund applied research to develop effective early detection techniques.***

We believe this approach is critical to eventual improvements of addressing both epidemic and endemic levels of infestation across the province.

We support and encourage efforts by Lignum and the MoF to pursue this effort. We understand that the MoF has concluded a contract with “itres” to complete an operational

trial using a *"casi"* sensor for airborne hyperspectral remote sensing and mapping of green attack trees. We suggest that this direction in applied research continue to be funded on a priority basis.

7.0 PROVINCIAL CO-ORDINATION

Effective co-ordination of the bark beetle control effort, including the implications for business issues, is critical to the Province's ability to carry out its mandate that stems from recognition of the Basic Principle that:

The Province is the landlord and has a strategic and fiduciary responsibility to manage the impacts of the current MPB epidemic.

Consequently we recommend that

- ***within 30 days the Deputy Minister of Forests confirm a coordinated provincial approach for MPB management through a 3 year appointment of a designated ranking senior staff position within the Operations Division of the MoF.***

The Provincial Bark Beetle Coordinator position would be apolitical in nature and be staffed by an experienced individual fully knowledgeable of the rules and capable as a facilitator to quarterback the issues around beetle epidemics. This position would carry the authority consistent with its level within the Operations Division ensuring full access and influence with both District and Regional Managers. The position would however carry no "statutory" authority as defined by the Crown.

We suggest that a priority responsibility of the Bark Beetle Coordinator would be the confirmation of the real cumulative volume magnitude of the current west-central epidemic.

Emphasizing that this is a single position without direct supporting bureaucracy, we do not support the concept of establishing new regional or district " beetle groups" with statutory authority to make decisions independent of Victoria on a district or regional basis related to timber pricing, exemptions, redirecting timber, etc. We believe that that authority rests properly with the District and Regional Managers, operating with firm policy and administrative direction and supported by flexible yet consistent application of the applicable regulations and best practices.

We do support the premise put forward by many stakeholders that the necessary strategy to control the forest management and economic impacts of beetle epidemics will require a management approach at all levels that is less adverse to risk taking. We believe that the bark beetle coordinator can assist in fostering this risk-tolerant approach.

A prime responsibility for the bark beetle coordinator would be the coordination of the annual reviews of the validity of the strategic recommendations in this report.

8.0 SUMMARY OF PRIMARY RECOMMENDATIONS

The following summary brings together the primary recommendations that we have made in this report. As per our initial project proposal, we recommend that the parameters of the epidemic and the validity and value of the strategic recommendations as implemented be reviewed on an annual basis. The responsibility for coordinating this review and subsequent warranted response would rest with the Bark Beetle Coordinator.

Primary recommendations:

- ***That the MoF and industry standardize definitions, measurement and reporting of beetle infestations.***
- ***That consistent science based best practices for infestation survey methodology be rigorously applied in all areas of the province.***
- ***That the Crown provide adequate resources to enable the roll-up of consistently acquired net cumulative infested area and volume numbers by attack category for each MoF district and TSA on a twice annually basis province-wide.***
- ***That the first composite roll-up effective October 1, 2001 be completed by the MoF and made available to industry and stakeholders by November 1, 2001. Subsequent roll-ups would be made by May 1 each year to assess the winter harvest impact on infestation net-down.***
- ***That the proposed senior MoF MPB coordinator staff person have both the responsibility and authority to ensure these recommendations are enacted and successfully fulfilled.***
- ***That there be no significant increase in total net timber harvested across west central B.C. in support of MPB control.***
- ***That the MoF make beetle wood available to viable and innovative, non-SPF dimension lumber, value-added business opportunities that support the primary target of maximizing green attack harvest.***
- ***That in 30 days an action plan, complete with a MoTH decision and commitment to an enhanced transportation infrastructure in the southern portion of the Lakes Forest District, be adopted and immediately implemented in conjunction with the timber allocation decision recommended in section 6.5.1.***
    - ***That the plan provides flexibility to accommodate the short-term needs of beetle control harvesting, options for traffic flow patterns that may potentially develop as the beetle epidemic evolves within and adjacent to the Lakes TSA, and ongoing management in salvage and endemic beetle situations.***
    - ***That implementation include immediate action by the Ministry of Transportation and Highways to address upgrading of the Ootsa Lake to Burns Lake transportation route in general, and the Francois Lake ferry and crossing facilities in particular.***
    - ***That forest road development including Ootsa barge systems be delegated to private enterprise to establish, with corresponding cost recognition.***
    - ***That the plan optimizes return to crown in finding the balance between infrastructure establishment costs and transportation cost savings.***

- ***That the MoF continue to monitor and implement appropriate fire threat/fire protection related initiatives including:***
  - ***conduct a three region, three Fire Centre meeting of senior regional/district/fire centre staff to review MPB related fire issues.***
  - ***a MPB infestation stage map layer in the Protection Branch's GIS system***
  - ***increase communication around beetle related fire threat/fire protection with First nations, communities and industry***
  - ***deploy Protection Branch and District resources to train and identify fireproofing opportunities for MPB fire-risk communities***
  - ***engage the CFS to model fire in various beetle attack fuel types.***
- ***That proven and new innovative best practices be employed throughout the epidemic area to reduce planning and permit approval timelines***
- ***That emphasis be placed on the on-stump storage of beetle killed trees.***
- ***That cut transfers, the short-term transfer of existing harvesting rights from adjacent TSAs into TSAs with AAC uplifts, be used to decrease cutting in healthy stands and increase green attack harvest while avoiding an overall increase in harvesting. In this circumstance, cut control credits for transferred quota, and haul cost recognition to the closest point of delivery are recommended to remove disincentives to cut transfers.***
- ***That existing cut within TSA boundaries be immediately redirected, on a cost effective basis, into priority beetle control harvesting, and that haul cost recognition to the nearest point of delivery be recognized for priority beetle control harvesting.***
- ***That guaranteed reciprocal provision for the balancing of short-term cut transfers <u>not</u> be undertaken at this time.***
- ***That companies and government identify the magnitude of quota in non-priority cutting areas that is available for cut transfers and agree upon an action plan for cost effective cut transfer by October 30, 2001. Further, that Regional Managers direct cut transfers according to that action plan including the adjudication of any operating area allocation disputes within a further15 days.***
  - ***That immediate consideration be given to regulatory changes that provide the necessary empowerment to enact these recommendations for forest health purposes.***
  - ***That the mandate for decision making related to harvesting rights administration remains with the Ministry of Forests. Community interest in operational aspects of timber administration is encouraged through public involvement in established consultation processes and through normal political process.***
- ***That, where feasible and required for forest health purposes, external SBFEP AAC be transferred into priority beetle harvesting in TSAs where either the AAC has been increased or there is greater demand for beetle control harvesting. In this circumstance we recommend that competitive bonus-bid, revenue-focused sales with cost recovery upsets be established in order to avoid administrative cost barriers to expedient harvest.***

- ***That at the end of the epidemic reciprocal volumes be made available in a similar manner from the SBFEP of TSAs that implemented AAC transfers, to maintain stability of total purchase wood volumes between the participating TSAs.***

- ***That new non-replaceable forest licences be advertised in TSAs with cut uplifts to encourage new non-SPF business opportunities, local employment and First Nation involvement while optimizing crown revenues. These sales would be awarded competitively through bid proposals that are evaluated jointly for revenue creation and community stability elements. To ensure that priority forest health issues are addressed in a timely manner, strong performance provisions are recommended.***
- ***That the Province recognizes the increased costs of harvesting beetle wood on a cost neutral basis.***
- ***<u>That the MoF implement strategic changes to the Interior Appraisal system to ensure that it supports rather than hinders sound beetle control and harvesting/manufacturing efforts</u>***
  - ***The MoF develop definitions of cost and profit neutral that are accepted by the MoF and industry***
  - ***The MoF Remove Beetle wood from the "waterbed"***
  - ***The MoF issue landscape level cutting permits***
  - ***The appraisal system recognize additional beetle related transportation costs***
  - ***The MoF review the rate charged for grade 3 logs as part of a broader timber pricing review***
  - ***Adequacy of beetle specific appraisal cost estimates be maintained***
  - ***The MoF and industry complete a study to determine the magnitude of the decline in AMVs and LRFs due to MPB infestation across all attack categories***
  - ***The integrity of the AMV and LRF zones be maintained***
  - ***Establish a Log Based Target Rate for Market Log Tenures***
- ***That the MoF and industry initiate a study to identify the parameters necessary to maximize on-stump shelf life for MPB infested trees/stands.***
- ***That A GO SLOW policy be adopted for large scale site rehab as a result of the current west central mountain pine beetle epidemic***
- ***That the MoF and industry exhaust all efforts to maximize the harvest of green attack timber within the framework of revised cost recognition, tenure and operating area transfers and SBFEP revenue focused licence opportunities <u>before</u> further AAC uplifts are proposed.***
- ***That MPB strategies and strategic land use plans be integrated during this evolving MPB epidemic and that***
- ***That responsible Regional Resource Boards and associated monitoring committees for each Strategic Land-use Plan address the synergies, conflicts and prudent means for integrating the MPB strategies and land-use plan targets over both the short and long-term.***
- ***That the MPB strategy be effectively resourced to ensure results***

- ***We recommend that the MoF be the sole spending authority for Provincial resource allocation and spending on beetle control within the working forest.***
- ***That the MoF actively support and fund applied research to develop effective early detection techniques.***

- ***That within 30 days the Deputy Minister of Forests confirm a coordinated provincial approach for MPB management through a 3 year appointment of a designated ranking senior staff position within the Operations Division of the MoF.***

9.0 PRIORITY ACTIONS GOING FORWARD

With recognition of efforts to date, we suggest that the Ministry of Forests and Government give serious consideration to acting on the following priority actions as they go forward. We recommend that the action timeline commence October 1, 2001.

1. **Within 30 days the Deputy Minister of Forests confirm a coordinated provincial approach for MPB management through a 3 year appointment of a designated ranking senior staff position within the Operations Division of the MoF.**

2. **Within 30 days the MoF and licensees identify the magnitude of quota in non-priority cutting areas that is available for cost effective cut transfers and agree upon an action plan for those transfers. Further, that Regional Managers direct cut transfers according to that action plan including the adjudication of any operating area allocation disputes within a further 15 days.**

3. **That in 30 days an action plan, complete with a MoTH decision and commitment to an enhanced transportation infrastructure in the southern portion of the Lakes Forest District, be adopted and immediately implemented.**

4. **Within 30 days develop definitions of cost neutral and profit neutral that are accepted by both the MoF and industry.**

5. **Within 30 days implement strategic changes to the Interior Appraisal system to recognize that it should <u>support</u> rather than hinder sound beetle control and harvest/manufacturing practices and economic results.**

6. **Within 45 days conclude an agreement with industry to complete a composite LRF/AMV study for milling of MPB infested trees in all categories of attack.**

7. **Within 45 days put in place effective means to reduce planning and approval timelines, including identification of timeline targets.**

8. **Within 45 days confirm any MoF policy and administrative changes necessary to accommodate warranted cut control variances for all tenures that result from approved tenure holder efforts to assist in beetle control (not salvage).**

9. **Within 45 days confirm actions to strengthen MoF and industry implementation and two-way transfer of MPB related Best Practices.**

10. **Within 45 days initiate a study to identify the parameters of maximizing on-stump shelf life for MPB infested trees/stands.**

11. **Within 90 days confirm the Province's commitment to fund up-front planning and development costs of initiating new *Market Priced* MPB SBFEP and other NRFL licenses on a provincial treasury priority basis.**

12. **Keeping stakeholders on side, within 90 days the Ministry of Sustainable Resource Management convene separate strategic land use plan monitoring committee meetings for all districts to review the integration of MPB strategies with the requirements and targets of the respective strategic level plans.**

13. **Within 90 days conduct a three-region meeting of senior regional, district, fire centre staff to review MPB related fire issues and action on recommendations in this report.**