



“Mitigating the Impacts of BC’s Mountain Pine Beetle Epidemic”

A forest industry submission to the
BC Government



Council of Forest Industries

February 18, 2004

About the Council of Forest Industries

The Council of Forest Industries (COFI) is the provincial voice of the BC interior forest industry.

COFI companies operate over 120 production facilities in more than 60 forest dependent communities in the interior of British Columbia. COFI member company operations accounted for approximately 80 percent of all BC softwood lumber shipments and 30 percent of Canadian softwood lumber shipments in 2002.

COFI members practice sound, sustainable forest management while producing about 11 billion board feet of lumber, 3.5 million metric tons of pulp and paper, 2.5 billion square feet of panels and veneer, and other value added wood products that are sold around the world. The combined value of the products our members produce is approximately \$10 billion annually resulting in COFI member companies contributing about \$2.4 billion annually to government revenues.

COFI members employ approximately 50,000 people directly. About 150,000 families directly or indirectly depend on COFI member companies for their livelihood.

COFI's vision is: **"To positively influence the revitalization of British Columbia's forest industry as the recognized primary contributor to the economic growth and stability of the Province, now and into the future".**

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Executive Summary

i) Introduction

British Columbia is experiencing the worst Mountain Pine Beetle outbreak in its history. The 2003 bark beetle survey determined that 173.5 million cubic meters of Lodgepole pine have been cumulatively attacked in the Interior over the last 8 years.

The Chief Forester's October 2003 report on the timber supply impacts of the epidemic documents the potential for significant impacts beginning in 5 to 15 years and lasting 30 to 80 years. In this context it will be important to supplement the current Ministry of Forests' operational beetle measures with a longer term socio-economic planning process across multiple agencies with provision for community or sub-regional based involvement and solutions.

Actions to deal with the epidemic can fall into three categories;

- Managing beetle populations in green attack areas in order to reduce beetle populations and reduce future spread rates;
- Mitigating the impacts on timber supply; and,
- Implementing community economic diversification options unrelated to timber supply.

ii) A Recommended Structure and Process

It is now clear this epidemic will have negative impacts to industry and community stability. Therefore it is imperative that we develop and implement mitigative measures as soon as possible. We recommend:

1. Appointment of a senior individual in government with overall management responsibility for this initiative;
2. Appointment of a provincial level, multi sectoral task team that includes representation from communities, First Nations, the forest industry, other resource industries, business and economic development experts;
3. Appointment of sub-regional based task teams made up of community, First Nations, industry and business representatives as needed to develop and tailor options and opportunities to specific sub-regional circumstances; and,
4. Adoption of an "objectives framework" approach to defining government's desired outcomes to guide the provincial and sub-regional task teams.

iii) Actions to Mitigate Timber Supply Impacts

A 5 to 15 year surplus of fibre will be followed by a significant decrease in available wood supply. It is imperative that salvage strategies and actions be developed to minimize the degree and duration of timber supply decline. We recommend:

- 1) Completion of “shelf life” studies to provide the information necessary to mitigate timber supply and government revenue impacts through commercial use of the dead and dying fiber that otherwise will not have value in 5 to 15 years.
- 2) Stand level inventory status updates and application of the “shelf life” findings to analyze timber supply impacts under different sub-regional mitigation scenarios.
- 3) Investigation of “fiber consolidation/fiber trade” opportunities among and between sub-regions to buffer impacts on any one community.
- 4) Quantification of the impacts to existing land use plans and review of existing resource management constraints.
- 5) Maximum use of low timber value stands for other resource value considerations in order to concentrate harvesting in higher value timber stands.
- 6) Reducing the proportion of susceptible stands in areas not yet under serious attack.
- 7) Development of funding mechanisms and plans to rehabilitate and reforest stands not commercially salvaged and not required to be left for other resource values.
- 8) Implementing planning, reforestation and rehabilitation practices to help “beetle proof” future landscapes and stands.
- 9) Introduction of flexibility in existing cutting authorities with respect to mandatory expiry in 2007 and the new “take-or-pay” policies.
- 10) Immediate re-advertising at a significantly reduced upset price BCTS beetle timber sales not successfully awarded when first auctioned.
- 11) Improvement of sub-regional transportation infrastructures where they represent a barrier to beetle harvest.

iv) Action for Community Economic Diversification

The above recommendations are intended to mitigate the magnitude and duration of timber supply shortages. However, it is expected there will still be a negative impact to rural BC communities. Consequently it will be important that mitigation strategies include development of economic activities unrelated to timber supply. To achieve this we recommend inclusion of economic development expertise and involvement from one or more other business sectors such as oil and gas, mining, tourism, recreation, transportation, agriculture, etc. in both the provincial public task team as well as sub-regional task teams.

v) Impacting Beetle Populations

The short term work of addressing green attack and susceptible stands must be continued and strengthened. It is important to maintain aggressive detection and removal of green attack trees and stands that contain live beetles. We recommend:

1. Recognition of the additional cost to industry of these kinds of operations, without the economically crippling effect of the waterbed;
2. Improvement of inter-agency coordination in the streamlining of administrative processes including capitalizing on the professional reliance, results oriented direction of the current forest policy changes;
3. Review of the business case behind last spring's decision limiting the use of the haul differential if more harvest and milling capacity is to be drawn from adjacent less attacked areas; and,
4. Piloting in BC parks and protected areas the single tree and patch cutting practices used in Banff National Park.

vi) Federal Government's Role

It is reasonable and justifiable to expect the federal government to assist in mitigating the effects of this natural disaster. We recommend the following federal government involvement:

1. Economic and strategic analysis.
2. Environmental impact mitigation.
3. Fisheries and water quality protection.
4. Rehabilitation and reforestation of sites that have lost their commercial value.
5. University and College research and teaching chairs.
6. Economic diversification incentives and support.

vii) Economic Rationale

This paper does not contain detailed economic rationale or specific benefit/cost analysis in support of its recommendations. Should government decide to implement these recommendations we welcome the opportunity to work collaboratively to carry out the necessary business case work.

viii) Conclusion

BC's Mountain Pine Beetle epidemic is unprecedented in its magnitude and potential to destabilize the interior forest industry, rural communities and provincial revenues. However, COFI members are confident that the recommendations in this submission will contribute positively to mitigating the impacts of the epidemic. We urge our recommendations be adopted as quickly as possible.

1. Introduction

British Columbia is experiencing the worst Mountain Pine Beetle outbreak in its history, indeed in Canada's history. The Council of Forest Industries Mountain Pine Beetle Task Force in cooperation with Ministry of Forests annually surveys forest companies and Forest Service Districts to quantify the magnitude of the epidemic. The 2003 survey determined that 173.5 million cubic meters of Lodgepole pine have been cumulatively attacked over the last 8 years. This volume represents about 3 times the allowable annual cut of the Interior. The area of the epidemic extends from Smithers and Takla Lake in the north to Cranbrook in the South (*Appendix 3*).

At risk from this epidemic is the economic stability of the interior forest industry and of communities in rural BC. This report is submitted to the BC Government with recommendations for community based actions to mitigate the anticipated impacts of this epidemic.

2. A Provincial Strategic Planning Framework and Process for Action

As this epidemic expands to encompass almost the entire interior of BC west of the Rocky Mountains it becomes increasingly important to supplement the current operational beetle planning processes with a longer term strategic socio-economic planning process. It will also be important to expand involvement beyond the Ministry of Forests across different government agencies and adopt interior wide oversight but still provide for community or sub-regional based involvement and solutions.

The Chief Forester's October 2003 report "*Timber Supply and the Mountain Pine Beetle Infestation in British Columbia*" documents significant longer term impacts beginning in 5 to 15 years and lasting 30 to 80 years. The opportunity exists now to develop and implement mitigative strategies and actions. We recommend examining these measures in three broad categories:

- Strategies and actions aimed at managing beetle populations in green attack areas in order to reduce the population growth and future spread rate of the epidemic;
- Strategies and actions aimed at mitigating the impacts on timber supply and industry economic stability; and,
- Strategies and actions aimed at implementing community economic diversification options unrelated to timber supply.

It is important to note that these three strategic categories will be relevant to individual sub-regions differently depending on the stages of the epidemic being experienced in that area.

As a consequence the strategies and actions in each category will need to be structured so as to be deliverable both independently and simultaneously in any one sub-region.

2.1 Strategies Aimed at Impacting Beetle Populations

Strategies and actions in freshly attacked areas should continue to focus on detecting and removing the green attack trees and stands that still have live beetles in them. Taking action to remove these trees and thereby reduce the beetle populations will reduce the rate of spread until there is a killing cold event.

Based on the collaborative work done to date between the Council of Forest Industries (COFI) Beetle Task Force and the MoF, strategies and actions that have proven to be effective in green attack areas include:

- Accurate, early information in the late summer and fall to refine mapping of red attack areas, determine the location of new green attack areas and develop joint industry and MoF action plans.
- Tailoring harvest method to the stage of the epidemic in each area.

For example harvest method options to be considered are small patch salvage, use of bladed trails with a smaller footprint to access the many small patches instead of building roads, bait and hold in medium size blocks, multi year multi pass harvesting of larger cut blocks and, as the epidemic progresses, medium and large scale harvesting to capture timber values as beetle population control becomes less relevant. The main objectives are to maximize the proportion of green attack volume removed and to capture the timber values before they are lost.

- Aggressive but judicious use of non-commercial single tree and small group treatments in remote and protected areas where such action will delay expansion into valuable unattacked stands.
- Continued streamlining of administrative processes and maximum use of the Bark Beetle Regulation developed collaboratively with MoF two years ago.

The beetles one year life cycle demands we move through the detection, planning, cutting authorization and road/trail construction cycle in 2-3 months, not the normal 2-3 years.

- The landlord (government) sharing in the costs of addressing this natural disaster through a stumpage system responsive to the additional cost of beetle operations without the economically crippling effect of the waterbed.

While the above measures have proven successful in maximizing the effect of existing harvest capacity and must continue it is also necessary to draw more harvest capacity from adjacent, less attacked areas. A number of operating conditions need to be present to do this:

- Industry and government agencies must capitalize on the professional reliance, results oriented direction of the current forest policy changes.

Recent timber pricing changes have increased the economic hurdles to operating in beetle attack stands. This has resulted in less capacity being directed at beetles than might otherwise have occurred. This in turn has resulted in a trend back to a “command and control” approach to regulating industry behavior, a trend that is counter to the new and improved *Forest and Range Practices Act (FRPA)* policy environment. Failure to capitalize on the new results based approach to regulating industry behaviour will exacerbate problems and lead to increased hurdles in addressing the larger salvage volumes expected in the coming years.

- Government agencies and departments need to better coordinate and align their policy changes in order to achieve maximum effectiveness.

The original effectiveness of policy changes that helped streamline issuance of beetle permits and provided recognition of the additional costs of operating in beetle attacked stands were undermined by changes to the cost estimation system and by limiting the application of the haul differential. Similarly, recent changes to limit the term of cutting authorities, and application of the take or pay policy undermines the ability of licensees to maximize the volume directed at attacked and susceptible stands.

- The combination of timber profile and economic circumstances must be favourable to manufacturing facilities, or at least be neutral in order to provide the business basis necessary for sustained action in beetle attack stands.
- The province’s economic test evaluating the merit of bringing outside harvesting capacity to bear needs to put a heavier emphasis on future revenue benefits that arise from an expense today that protects timber assets and future revenue streams.

Last spring’s decision to discontinue the waterbed adjustment and limit the use of the haul differential tool has eroded our collective ability to bring more volume to bear on green attack stands and reduce the spread rates. The business case behind this decision needs to be reviewed.

Evidence that these actions in green attack areas are worthwhile, are having an effect and must continue is contained in a series of performance indicators used jointly by the COFI Task Force and the MoF Bark Beetle Coordinator (*see appendix 2*):

- The harvest volume directed at the beetle climbed from 6 million m³ in 1999 to over 23 million m³ last year. Plans are in place to direct over 26 million m³ towards beetle attacked stands during 2004.
- The percentage of harvest directed at green attack climbed from under 65% in 1999 to over 81% last year. Plans are in place to direct 82% towards green attack areas during 2004.
- The expansion rate ratios for both green attack and overall expansion are declining, or at least are steady.

In the context of last spring's decision to limit the use of the haul differential tool and to discontinue the waterbed adjustment it should be noted that the three performance indicators referenced above now show a declining rate of improvement. We should be targeting an increased rate of improvement.

A note of caution in moving to attract additional capacity into green attack areas; it will remain important to maintain some capacity in unattacked areas to address other forest health problems so they too do not expand out of control. It is also important that volume be available in unattacked areas to reduce the number of stands susceptible to attack before they are also lost to the epidemic. The Chief Forester's recent actions to raise the allowable harvest levels in certain management units recognized the need to simultaneously address green attack, unattacked susceptible and salvage stands if the best possible outcome is to be achieved. Examination of harvest levels in other management units is also necessary.

2.2 Strategies Aimed at Mitigating the Long Term Effects of the Epidemic

Having urged a continued emphasis on preventative strategies and actions directed at green attack and unattacked areas it is acknowledged that in many circumstances the beetle has "passed through". In these cases it is time to bring a significant amount of attention to developing and delivering strategies and actions aimed at dealing with "life after beetles", to managing timber supply, industry viability and community stability issues rather than just beetle populations.

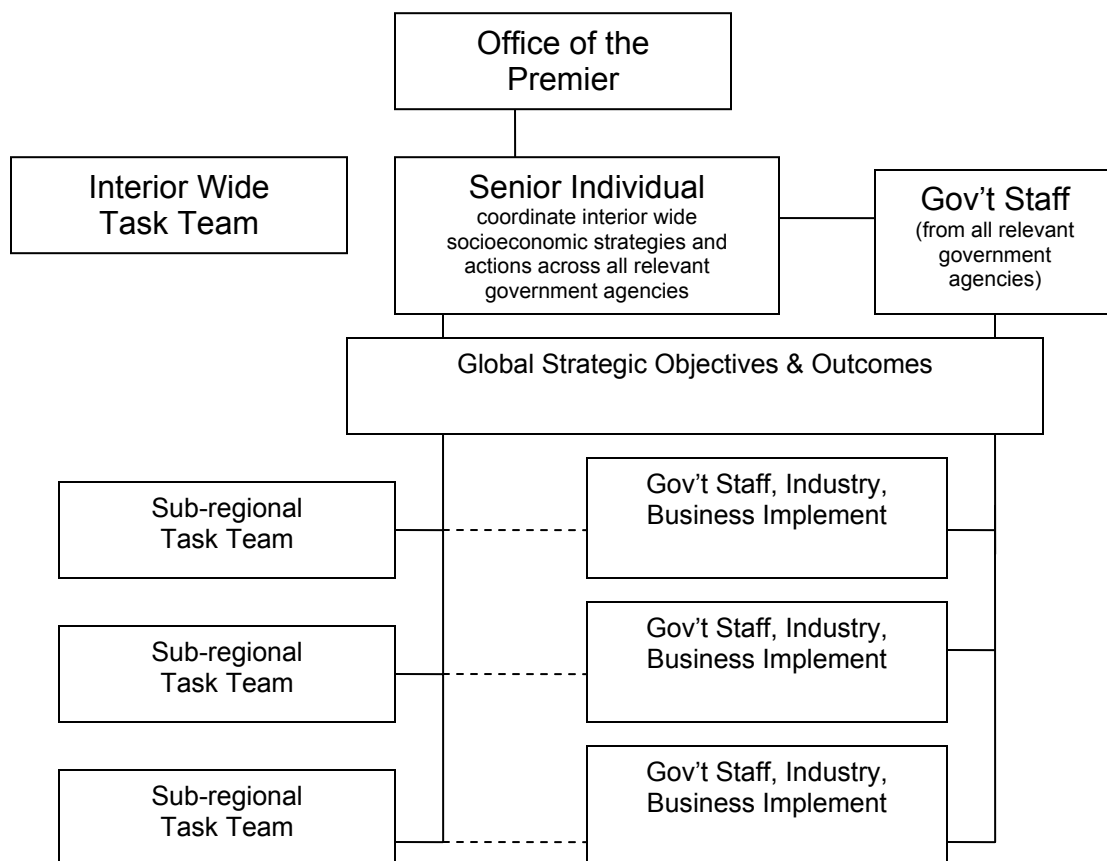
The Chief Forester's recent work suggests we have 5 – 15 years in which to prepare and implement mitigative measures. We need to take advantage of this time and begin this second process immediately.

It is our recommendation that these strategic efforts be managed interior wide by a single senior individual. Much like the MoF Bark Beetle Coordinator or "Beetle Boss" has added value by coordinating strategic and operational activities in beetle attacked areas a single accountable senior individual should provincially oversee the development and delivery of medium and long term strategic work.

Further, because we see the best and most relevant solutions arising through sub-regional and community based work we recommend this single accountable individual work with:

- A provincial multi sectoral public task team that includes representation from communities, First Nations, the forest industry, other resource industries, business and economic development experts;
- Individual sub-regional based task teams made up of community, First Nations, industry and business representatives to develop and tailor options and opportunities to specific community circumstances; and,
- Industry, business and government agencies to implement the strategies and actions.

As part of developing this overall strategic framework we recommend that government adopt an “objectives driven” approach to defining government’s desired outcomes. Modeled on the *FRPA* approach, these strategic objectives would then guide MoF, licensees and the sub-regional task teams in developing implementation strategies and actions that would be consistent with these objectives. This model is diagrammed below:



It will be important that the provincial oversight group develop clear, concise, measurable objectives for each epidemic circumstance. For example, objectives for the

green attack and unattacked areas of the epidemic will need to focus on factors controlling bark beetle populations and susceptible stands while objectives for red and grey attack areas will need to focus on factors mitigating impacts on timber supply and on options for economic activity unrelated to timber supply. These objectives will then provide the frame within which sub-regional task teams can develop localized strategies and actions.

2.2.1 Strategies and Actions Related to Timber Supply

The Chief Forester's October 2003 timber supply analysis illustrates that a 5 to 15 year surplus of fiber will be followed by a significant decrease in available wood supply. It is imperative that salvage strategies and actions be developed to minimize the degree and duration of timber supply decline. In order to do this we recommend:

- Updating the timber inventory information to reflect the post attack volume status of stands, use the results of the shelf life studies to project the damage going forward and, based on the results, carry out more geographically specific timber supply analysis.

The Chief Forester's current 12 unit combined analysis is not adequate for the development of salvage strategies specific to a Timber Supply Area (TSA) or sub-regional area. Good quality, up to date, geographically specific inventory information and timber supply analysis will be essential to properly test mitigation strategies. It is recommended the provincial government provide the resources necessary to carry out these stand level inventory updates and baseline analyses that can then be used at the sub-regional task team level.

- Re-examining existing land use plans and reconsider the accompanying resource management constraints if impacts on timber supply and other resource values are to be mitigated.
- Examining the single tree and patch cutting of beetle attacked stands in Banff National Park for options in more aggressively managing beetles in parks and protected areas.
- Examining existing sub-regional transportation infrastructure with a view to removing obstacles.

In the interim, while the senior individual, the public task team and the sub-regional task teams are being formed there are a number of sound forest management strategies and operational activities that can and should occur immediately to begin the process of mitigating impacts:

- Bring the maximum amount of harvesting and manufacturing capacity to bear on dead, dying and susceptible timber stands in order to leave unattacked non-susceptible stands for the future.

Impediments to accomplishing this (forest policy, administrative, timber pricing) must be overcome quickly using the new professional reliance results oriented policy environment fostered under FRPA. By way of example, the new 4 year limit to terms of replaceable tenure cutting authorities and the new take-or-pay policies are impediments to management of the epidemic and need to be modified for existing cutting authorities.

- Complete stand level inventory updates and shelf life studies to accurately determine what the value status is of attacked stands and then direct maximum effort at those stands that have the highest residual value and that will deteriorate the soonest.

The results of shelf life studies and inventory updates have good potential to buffer impacts to provincial stumpage revenues and mitigate community and economic stability issues. Shelf life and merchantability study results will also be important when considering how to maximize use of low timber value stands for other resource value considerations and concentrate harvesting in higher value timber stands.

- Immediately re-advertise at a significantly reduced upset price those BC Timber beetle sales not successfully awarded when first auctioned in order to both capture the value of this timber before it is lost and properly drive the pricing of tenured volumes when market pricing is implemented in the Interior.

In the longer term we recommend:

- Developing and implementing plans and funding mechanisms to rehabilitate and reforest stands not commercially salvaged and not required to be left for other resource values. Strategies, actions and funding mechanisms to accomplish this could include:
 - Federal government involvement (*see section 3*);
 - A portion of stumpage and royalty revenues from salvaged stands;
 - Private sector funds attracted by opportunities to earn a return on forest management investments through for example, access to an additional secure fiber supply or opportunities for area based tenures in working forest areas;
 - Timber pricing options to encourage the use of otherwise non commercial beetle killed stands in existing non lumber facilities (pulp, paper, OSB, etc); and,
 - Timber pricing options to encourage the use of otherwise non commercial beetle killed stands in non traditional industries (co-generation, ethanol, value added denim products, pellet manufacturing, etc).
- Applying existing forest management knowledge to “beetle proof” future stands. We recommend:

- Re-establishing attacked stands with a mosaic of stand structures and species and age classes so as to reduce the risk of a repeat outbreak.
- Using seed and seedlings with known resistance to bark beetle and other forest health agents.
- Reducing the volume of susceptible stands in areas not yet under serious attack ahead of the epidemic.
- Planning and constructing good permanent access systems where needed in the working forest area for improved early response to future forest health problems.
- Helping workers, local business and communities understand the timber supply impacts to their specific communities in order to develop plans to use the “new source” of fiber and to re-trench and diversify their economies where possible.
- Buffering the impacts of the epidemic on any one community by examining “fiber consolidation/fiber trade” opportunities among and between sub-regions.

While the above recommendations are key to mitigating the impacts of the beetle epidemic no single solution or combination of solutions is expected to work across all communities and regions. It will be important to allow for different community specific solutions to evolve and be implemented. This is the purpose in section 2.2 of suggesting sub-regional based task teams. It is also important there be provincial wide strategic coordination, hence the recommendation for a senior accountable individual who works with a provincial task team across all the relevant government agencies.

2.2.2 Strategies and Actions Not Related to Timber Supply

While licensees and the Ministry of Forests’ BCTS programs will be instrumental in helping to mitigate economic and community stability issues related to impacts on the timber supply, a full suite of mitigation strategies needs to include development of economic activities unrelated to forestry. Not only will this help to buffer the impacts of the current epidemic, it will also help to diversify the economies of rural communities in the long term and with that diversification will come incrementally improved community stability.

That is not to say that the forest industry will fade from its position as the provinces main economic engine as a result of this epidemic. The negative medium term impacts to the industry and rural communities in the wake of this epidemic will be temporary and can be mitigated. The productive capacity of the basic resource, the forest land base, has not been reduced. In the long term the working forest will again support current or even increased levels of harvest. It is in this context that it is important to the forest industry that communities remain as healthy and vibrant as possible so the infrastructure supporting workers and their families remains in place as the province recovers from the epidemic and the forest industry in these areas returns to its sustainable size. To this end both the provincial task team as well as the sub-regional task teams will need to include economic development expertise

and involvement from one or more other business sectors such as oil and gas, mining, tourism, recreation, transportation, agriculture, etc.

3. Federal Government's Role

As part of the overall strategy to mitigate the impacts of the mountain pine beetle epidemic we need to persuade the federal government to bring more resources to bear on this natural disaster. The federal government extracts over \$350 million annually from the forest industry in direct payments alone. Millions more are paid to the federal government in employee and contractor income taxes and sales taxes. It is reasonable and justifiable to expect the federal government to assist the province and communities in ways that could not be construed as flowing to industry as subsidies. Activities seen as appropriate for federal government involvement include:

- Economic and strategic analysis funding including shelf life studies and water storage studies.
- Environmental impact mitigation.
- Fisheries and water quality protection.
- Rehabilitation and reforestation of productive sites that have lost their commercial value and will otherwise sit idle for years.
- Funding for University and College research and teaching chairs.
- Funding to support economic diversification initiatives.

The federal government has an important role to play in buffering communities and workers from the impacts of this natural disaster. The federal role must figure prominently in any strategic plan.

4. Economic Rationale

The purpose of this submission is to provide a framework for action. This paper does not contain detailed economic rationale or specific benefit/cost analysis in support of its recommendations. However, COFI members view development of such supporting rationale and benefit/cost analysis as important. Should government decide to implement a strategy and process along the lines recommended we make the offer to work collaboratively to carry out the necessary business case work.

5. Conclusion

The Mountain Pine Beetle epidemic gripping the interior of BC is unprecedented in its magnitude and in its potential to destabilize the interior forest industry, rural communities and provincial government revenues. Identifying the potential negative effects of the epidemic and taking steps to mitigate them should be a priority of the industry, the provincial government, the federal government, communities and stakeholders.

Significant mitigation of the negative impacts is possible. Much of the knowledge and many of the tools are already available. With appropriate financial and human resources most knowledge gaps and implementation impediments can be overcome. What is important is that mitigation strategies and actions be developed and delivered quickly before the epidemic progresses further and some options are closed.

We are confident that the recommendations contained in this submission will contribute positively to the mitigation efforts and we urge they be adopted as quickly as possible.

Appendix I

COFI Mountain Pine Beetle Task Force

Mandate:

The industry's Mountain Pine Beetle Emergency Task Force was formed in the early summer of 1999 in response to calls for assistance from member companies, community leaders and Ministry of Forests District staff in the West Central portion of the province.

The assistance requested was to help raise awareness of a localized but rapidly expanding Mountain Pine Bark Beetle outbreak in the Tweedsmuir / Ootsa area. The companies, communities and MoF staff in that area had to that point been unsuccessful at drawing sufficient attention to the potentially serious and wide spread consequences of the outbreak and need for more aggressive action than was being taken.

The Task Force was formed with four key goals in mind.

- To raise public attention of the issue and develop public support for more aggressive action.
- To increase political and senior bureaucratic understanding of the issue and thereby attract greater financial and human resources for more aggressive action.
- To reduce the financial and administrative barriers to more timely action; and
- To document the story in a very public way so as to reduce the likelihood of a negative reaction in the market place.

The former Industry Task Force continues its work today under the newly re-organized Council of Forest Industries. The issue of industry and community economic stability in the wake of the epidemic has been added to the Task Force mandate.

Task Force Membership:

Abitibi Consolidated Company of
Canada Ltd.
Babine Forest Products Ltd.
Canfor Corporation
Carrier Lumber Ltd.
Dunkley Lumber Ltd.
Houston Forest Products Ltd.
Lakeland Mills Ltd.
Lignum Ltd.

Nechako Lumber Co. Ltd.
Riverside Forest Products Ltd.
Slocan Forest Products Ltd.
Stuart Lake Lumber Ltd.
Weldwood of Canada Limited
West Chilcoltin Forest Products Ltd.
West Fraser Mills Ltd.
Weyerhaeuser Company Limited

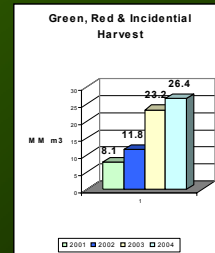
Appendix 2

Strategies for Mitigating - Performance Measures

□ So how are we doing?

➤ Volume directed at the beetle

- 1999/2000 - 4.2 million m³
- 2000/2001 - 8.1 million m³
- 2001/2002 - 11.8 million m³
- 2002/2003 - 23.2 million m³
- 2003/2004 - 26 to 27 million m³?



➤ Percentage directed at green attack stands

- 2000/2001 - 65% of available harvest capacity
- 2001/2002 - 67% of available harvest capacity
- 2002/2003 - 81% of available harvest capacity
- 2003/2004 - 82% of available harvest capacity?



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Strategies for Mitigating - Performance Measures

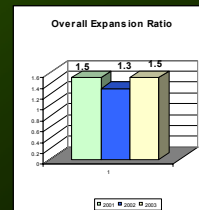
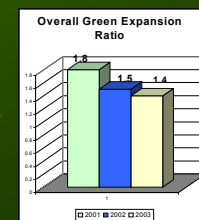
□ So how are we doing? (cont'd)

➤ Rate of expansion

- Highly variable (leading edge vs main body)
- 2001-2003 green 1.8/1.5/1.4
- 2001-2003 overall 1.5/1.3/1.5
- We ARE having an impact

➤ But, delaying tactic - need Mother Nature's help.

➤ Recent loss of tools.



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Appendix 3

