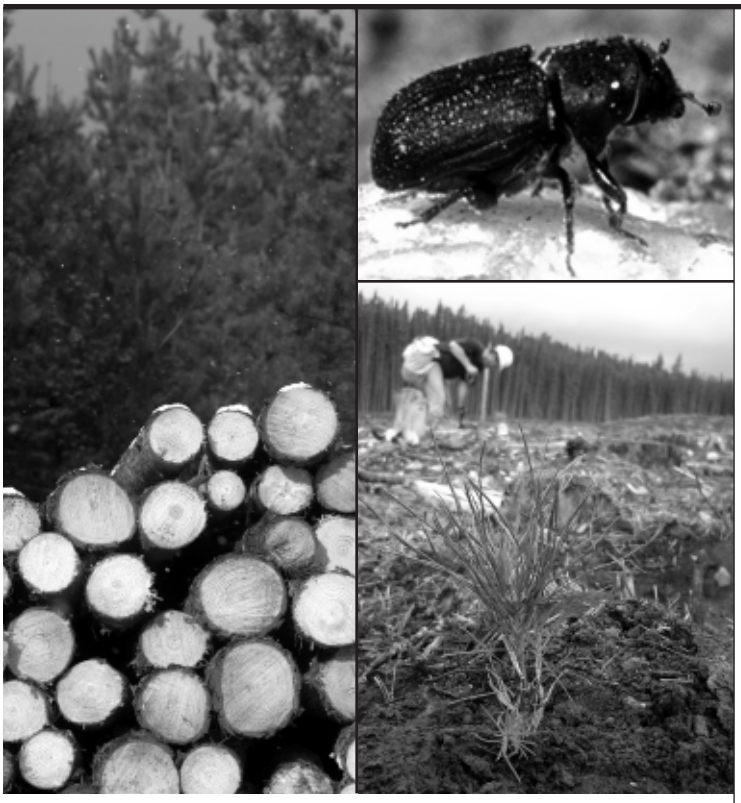
BATTLING THE BEETLE

Taking Action to Restore British Columbia's Interior Forests



By Ben Parfitt

JULY 2005

CCPA
CANADIAN CENTRE
for POLICY ALTERNATIVES
BC Office

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By Ben Parfitt

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ABOUT THE AUTHOR

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Summary

British Columbia is on the cusp of the greatest forest health crisis ever to confront the province since forestry emerged as a major economic activity within its borders more than a century ago.

There are numerous reasons for the crisis. First and foremost is a large and as yet far from over beetle infestation that is killing millions of pine trees in the province's Interior. Second, generally warmer and drier weather, which many scientists believe will be with us for some time to come, is allowing more and more beetles to thrive. Third, a preponderance of older pine trees is exacerbating the outbreak by providing the beetles with the ideal food and breeding source. Last, and not least, Interior logging rates are rocketing upward in response to the beetles, fuelling concerns about the future of our forests, resource-dependent Interior communities and the provincial economy as a whole.

Once the current logging boom runs its course, harvesting rates will plummet leaving many forest dependent communities facing an uncertain economic future. That is why this paper argues that there must be a concerted effort now to address the unfolding crisis, an effort that goes far beyond the current response.

Thus far, the provincial government has narrowly focussed on increasing logging rates to capture income from the beetle-attacked trees before they lose their economic value. Comparatively little has been said about the need to invest in our forests, where those investments should be focussed, and where the funds to pay for those investments should come from.

In addition, little has been said about a number of disquieting trends that have exacerbated the current forest health crisis. For example:

- Public investments in reforestation have steadily declined as the area of beetle-attacked forest skyrocketed.
- Deep cuts to provincial Forest Service staff have robbed British Columbians of their collective eyes and ears on public forestlands at precisely the time when more, not fewer, public servants are needed.

- Companies continue to pay the province nominal stumpage fees of just 25 cents per cubic metre for beetle-attacked trees that are profitably turned to lumber, when there is evidence that the trees are worth much more.
- Pine remains the most commonly planted tree species following logging, thus setting the stage for future beetle outbreaks of potentially great severity.
- The beetle build-up is so great that the bugs are attacking trees less than half as old as the 80-year-plus trees they traditionally target.
- The presence of the beetles on the eastern side of the Rocky Mountains near Chetwynd puts the bugs perilously close to the cross-country, northern boreal forest where they could attack jack pine, a common tree species in that forest.
- The provincial government continues to promote fire suppression at all costs, despite evidence that fires make our forests less vulnerable to widespread insect attacks.

In addition to noting these trends and their implications, this paper presents a more comprehensive and hopeful action plan than that endorsed by the province. It states that substantial increases in reforestation investments must be made now and that the province, in particular, should properly shoulder that responsibility — a responsibility it has shunned in recent years. The provincial government must also do much more to promote new research and management regimes that help to restore a greater diversity of tree species and tree ages to our Interior forests, as it is with diversity that we are better protected from the kinds of devastating events we are witnessing in our forests today.

Through an approach based on the three Rs of research, restoration and reforestation, the provincial government could go a long way to ensuring that the current forest health crisis is addressed meaningfully and that the actions taken today are of lasting social, economic and environmental benefit.

To do a proper job, the provincial government would have to firmly commit to the three Rs approach and — equally important — put in place the funding mechanisms and strengthened public service oversight required to ensure the job is done, and done right.

The report is divided into two distinct sections. The first outlines the broad elements of a three Rs response to the current crisis and discusses some of the ecological and economic benefits associated with creating more of a patchwork landscape in our Interior forests. Through logging, deliberate burning of some forests, conservation, replanting and tree tending efforts, the report shows how our Interior forests can be made more diverse and less vulnerable to sweeping insect attacks.

The second section focuses on ensuring that the public gets fair value from its forests and identifies the funding mechanisms that would allow the three Rs strategy to be implemented. A recurring theme in discussions about the future of forestry in BC is the need to make adequate investments in one of our most important natural resources, without which our still largely resource-dependent economy would founder. Having steadily withdrawn financial support for reforestation efforts on public forestlands, it is time the province committed adequate funds for much needed research, restoration and reforestation work.

The report concludes with 15 recommendations.

1. Given the sizeable area of forest that will be killed by beetles and not logged by the forest industry, the BC government should immediately fund an initial five-year reforestation and restoration program at an annual rate of $100 million.
2. Once the provincial government commits to fund an initial five-year reforestation effort, it should immediately seek the federal government's participation, ideally on the basis of matching funding. Failure to secure federal funds should not, however, lessen provincial obligations.

3. Given the threats posed to resource-dependent communities by both the beetles and today's escalated logging activities, the BC government should immediately chanel $18 million per year for the next five years into intensive silviculture efforts in the Interior. This initial commitment should be in addition to the annual $100 million reforestation investment recommended above.
4. The BC Forest Service should immediately hire additional staff in districts most directly affected by the outbreak. New personnel would form district forest health teams and have adequate fieldwork budgets. Each team would consist of people with research and field expertise in forest ecology, entomology, inventory, reforestation, climate modeling and ecosystem restoration. Their primary task would be to coordinate industry and government responses to pest outbreaks and other forest disturbances now and in the future.
5. As with the dramatic uplift in logging rates in response to the beetles, there should be a corresponding increase in the area ruled off limits to commercial logging.
6. The Forest Service should immediately initiate discussions with forestry firms and tree-planting companies to prioritize which areas of unlogged, beetle-attacked forest are most suited to replanting efforts, and which are not.
7. The Forest Service should work closely with climate scientists, forest geneticists and others to ensure that a wide range of planting strategies are employed and that they are carefully monitored over time. Such a diversity of approaches is critical if the aim is to create a patchwork landscape in our Interior forest that is more resilient to future insect infestations.
8. The Forest Service should work closely with forest companies to ensure that as much as possible clearcutting does not occur in mixed forests where beetle-attacked trees are interspersed among other tree species.
9. The Forest Service, in consultation with communities, the forest industry and other government agencies, should immediately initiate a comprehensive controlled-burning program.
10. With Interior logging rates temporarily increased by nearly 11 million cubic metres per year in response to the beetles, a stand-alone reforestation and restoration fund should be set up and all stumpage revenues derived from the temporary increase placed in it. As long as beetle-related logging increases remain in place, so should such a fund.
11. After consulting with Interior communities, the province should decide how such funds should be invested in reforestation or other related activities such as tree thinning, tree spacing and tree pruning, or some combination of both. These activities are vital if we are to have something of value to log in future generations.
12. The Ministry of Forests should immediately publish annual reports that clearly identify the additional volume of timber logged in response to the beetles, and the stumpage payments derived from it.
13. For stumpage fees, the province should:
    - scrap the nominal 25-cents-per-cubic-metre stumpage charge on dead and dry pine logs (many of which have been attacked by beetles and are subject to salvage logging);
    - immediately increase the stumpage fees on those logs and raise overall revenue targets accordingly;
    - channel the increased funds into the above-mentioned special account; and
    - base pricing on logical terms, with arbitrarily set stumpage rates replaced by a more appropriate pricing mechanism such as log yards or market-based pricing as currently practiced on the Coast.

14. The Forest Service should immediately hire additional staff to ensure that the increased number of logging trucks entering Interior mill yards are properly assessed in terms of the volume and value of their log loads.
15. The province should require Interior mills to provide annual reports to the Forest Service detailing how they utilize beetle-attacked logs entering their facilities and the selling price of end products, with these findings confirmed through periodic mill visits.

Collectively, these recommendations constitute an integrated and, more importantly, hopeful course of action than the plan put forward by the provincial government — one that if followed will help to restore a greater diversity to our Interior forests.

Diversity is the key element to any viable, long-term and ultimately sustainable forestry plan. By following such a course of action now, we begin to lay the foundation for healthier forests and a healthier forest economy for future generations.

More importantly, this report maintains that one of the best ways to fund an integrated package of reforms is by getting a higher dollar value now from our publicly-owned forests. If we can achieve that, and then reinvest that money where it is most needed, we can go a long way to ensuring that at least some of the windfall from today's logging boom is used to build a better tomorrow.

Introduction

As the British Columbia Ministry of Forests notes in its current *Mountain Pine Beetle Action Plan*, the speed at which beetles are moving through British Columbia's Interior forests and killing pine trees is outpacing logging activities by as much as 23 times in some regions.

Millions of hectares of forest will be affected by the time the beetles run their course. While a significant portion of the trees attacked will be profitably logged, an even greater portion will not, leading to a looming gap in available timber that will result in the loss of one quarter of existing income in many Interior communities.[1]

Given the severity of the outbreak and its implications for the wellbeing of forests and communities, the BC government's action plan speaks comparatively little to two key questions that should be asked during this challenging time for forest management in the province: How, exactly, are we to approach what is likely to be the greatest reforestation challenge ever to confront the province? And what are some of the mechanisms we need to put in place now to fund that reforestation effort?

The action plan touches on both topics, but provides startlingly little detail. In fact, it seriously underplays the reforestation responsibilities that ought properly to be shouldered by the province. For example, the government points out the need to "reforest on a priority basis [and] to return the best sites to timber productivity quickly." It goes on to say that such activities "will be planned in conjunction with timber salvage planning" — in other words, alongside the companies doing the logging.

This sounds fine, but fails to tell the bigger story. Under provincial forestry law, companies that log public lands are normally responsible for all reforestation costs. They can choose to immediately plant seedlings on those lands or wait for a period of time in the hope that new trees establish themselves through natural regeneration. In either case, companies must get the lands they log restocked with trees that are deemed to be growing well — a requirement that may prove increasingly challenging given the current warming trend.

What the government's action plan does not mention is that millions of hectares of forestland will eventually be overrun by the beetles and not commercially logged. In fact, its own upper estimate places the amount of beetle-attacked trees not logged and left standing on the landscape at 700 million cubic metres.[2] That equates to 10 years worth of logging for the entire province, not just the Interior. Such a huge volume of dead wood poses obvious reforestation challenges. Should some of these stands be replanted, and if so, with what species, and how (see *Replanting Beetle-attacked Forests*)?

Significantly, legal responsibilities for reforesting such lands once rested squarely with the provincial government. However, the BC government changed the rules in 2002, removing itself from such duties.[3] Still, forestry remains a provincial responsibility and the government should ensure that at least some of the forests attacked by the beetles and not commercially logged are reforested.

In 1985, the provincial and federal governments began spending the first of what ended up being $500 million on reforestation efforts in BC. The spending was cost-shared over 10 years, with each government contributing an average of $25 million per year. At the time, the area of denuded and not adequately reforested land (some of which resulted from previous beetle attacks) was estimated to be 2 million hectares. These denuded lands came to be called NSR or Not Satisfactorily Restocked. It is not beyond the realm of possibility that even after all of the present salvage logging activities run their course, there will be a far greater area of NSR than there was in the 1980s, perhaps double that. At least a portion of those NSR lands would benefit from some reforestation efforts.

In its pine beetle action plan, the provincial government states that approximately $800 million to $1 billion is required for a range of silviculture activities, including fertilizing plantations to make seedlings

Replanting Beetle-attacked Forests

Planting trees in tracts of forest that have been attacked by beetles but not commercially logged will pose significant challenges.

However, a number of avenues are open.

First, if the attacked and dead trees are still root firm and not in immediate danger of falling down, planting crews could go in and hand plant new seedlings. The downside to such work is that at least some of the planted trees would sustain damage when the dead trees lose their root strength and topple over.

Another option involves spreading seed cones either from the air or on the ground. This would probably first require some kind of "scarification" or ground disturbance that exposes the soil, making it easier for the seed cones to germinate.

Fires might also be used as a means of opening beetle-attacked stands for subsequent planting. Heavy equipment could be used, such as having cats or tractors working in tandem with chains strung between them to move through forests sheering off trees at their base. The felled trees could then be pushed or piled into rows for burning. In between the burn piles, new trees could be planted.

Finally, it may be possible to pay contractors to log some tracts of forest that have not been logged for traditional commercial purposes such as lumber and pulp production. There is some discussion, for example, of using some of the dead trees as sources of fuel for electrical co-generation plants that would burn wood as a source of energy. These endeavors would likely require some kind of government subsidy (a waiving of stumpage fees, for example) and would become less and less economically viable the further away the forests were from sawmills and pulp mills, where co-generation plants would tend to be located.

grow faster, planting fast-growing tree species, and other measures that presumably include strategies such as tree-spacing and tree-thinning. Unfortunately, the plan provides very little detail on how the money would be spent, and makes no concrete commitments for the long-term funding needed to do the work. The action plan goes on to say that the province "will continue discussions with the federal government for funding necessary activities."[4]

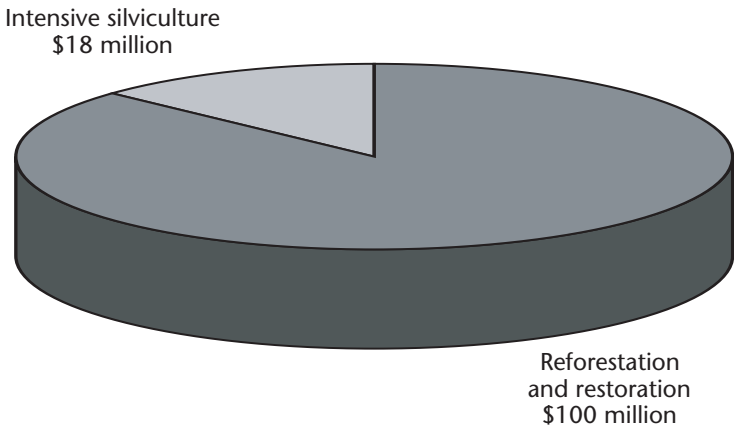
This paper proposes that any effective provincial government action plan to address the beetle infestation must be of long duration — at least a decade and likely longer, rather than the current five year plan — and that an initial financial commitment of $100 million per year over five years is warranted, with that money spent primarily on reforestation and restoration efforts. Further funds in the neighborhood of $18 million per year should also be committed from existing provincial funds such as the Forest Investment Account to do important tree-tending work, which will improve the yield and quality of wood in forests used by future generations.

Given the magnitude of today's forest health challenges, a $118-million commitment in each of the next five years would be an important *initial* step and should be made regardless of what the federal government does. After all, forestry is a provincial responsibility, BC disproportionately benefits from forest industry activities through the collection of stumpage fees, and Ottawa has already committed $140 million to various pine beetle initiatives in the province.[5]

This paper identifies key areas where the provincial government should commit additional funds, either for purposes of more intensive silviculture (tree-thinning, tree-pruning and the like), or for purposes of better managing the huge range of ecological, social and economic values associated with our public forestlands. To be effective in restoring forest health to the Interior, government investments must be long-term and cover a diverse array of actions including replanting or reforestation activities, restoration efforts (which could take the form of deliberately set and carefully controlled fires), and a wide range of research activities. This three Rs approach is discussed in greater detail in the pages ahead.

Significantly, one component of a future funding approach is addressed in the provincial government's beetle action plan, although details are scant: What should logging companies pay for beetle-attacked trees? Historically, the thinking was that companies needed financial incentives to log insect-attacked trees. But there are signs this may be changing. First, recent history shows that many trees retain their value for some time following a beetle attack. Second, there is now a massive volume of additional timber

Figure 1: Proposed Future Funding — $118 Million in Annual Povincial Expenditures



slated to be logged in response to the beetles. By 2010, this could amount to some 63 million cubic metres of wood, enough to fill a line of logging trucks that, bumper-to-bumper, would cross Canada six times.[6]

According to the province's action plan, beetle-attacked trees could retain their commercial value for between five and 18 years. That's a considerable range, and could profoundly influence how many beetle-attacked trees are logged and over what time frame. The plan goes on to say that much of that wood will be just as valuable to the companies doing the logging as the "green" or non-attacked wood they will also be harvesting. "The damaged timber retains most or all of its 'green' value for some time before beginning to split and decay," the plan states. "Timber will be priced in a manner that reflects its market value, providing revenue to the province and encouraging a competitive industry."[7]

What the plan doesn't report is that at present much of the beetle-attacked timber logged on public forestlands is assessed only a nominal stumpage charge of just 25 cents per cubic metre. There is only one stumpage charge lower: Zero.

This paper includes a recent analysis showing that a huge amount of the timber currently logged in response to the mountain pine beetle generates 25 cents per cubic metre in stumpage payments. That means that for each telephone pole's worth of wood coming off of public forestlands, British Columbians receive just one quarter.

At present, much of the beetle-attacked timber logged on public forestlands is assessed only a nominal stumpage charge of just 25 cents per cubic metre. There is only one stumpage charge lower: Zero.

While the nominal 25 cents per cubic metre stumpage rate may have had its place decades ago, it almost certainly does not today.

In the latter half of this paper the topic of low stumpage fees is addressed and suggestions are made about doing away with the nominal 25-cent rate. Further suggestions are put forward to ensure that every dollar collected in stumpage for any tree logged in response to the beetles is immediately placed into a stand-alone account. This should be easy to do since we know the extra volume of timber that is being made available to the companies and can simply ascribe a dollar value to it. Once placed into the special account, the money would be used to fund additional reforestation, silviculture, research and restoration activities.

A final topic not mentioned in the BC government's action plan, but that bears mention here, is the deep budgetary and staff cuts that have been sustained within the provincial Forest Service in the past decade. These staff cuts have robbed British Columbians of their collective eyes and ears in public forestlands at the worst possible time. Given the severity of the ongoing outbreak, efforts must be made now to put more people into the field on the public's behalf.

As the beetle outbreak continues to unfold, and its implications begin to sink in, the need for substantial public investments becomes more and more obvious. The extent of the outbreak demands such investments be made. It also demands a thoughtful array of responses.

Finally, two things bear a brief mention here as they are important backdrops to the present forest health crisis.

The first is global warming. Mountain pine beetles are natural inhabitants of forests where lodgepole pine trees are found. When warming trends occur during periods of typical climate variation, beetle numbers expand exponentially. But such buildups are often brought to a sudden halt by the arrival of very cold temperatures, particularly in the late fall before heavy winter snows have a chance to insulate the attacked trees. Unfortunately this natural control mechanism is unlikely to work in the present circumstances. For one, we are experiencing generally warmer winters. And second, today's outbreak is now so widespread that even if cold temperatures arrived they would unlikely be cold enough over a wide enough area to make a significant dent in beetle numbers. Clearly, global warming is exacerbating a bad situation. Just as clearly, how we deal with that reality will determine whether we have healthier, more diverse and more resilient forests in the future.

The second is the role that the longstanding practice of fire suppression has played in contributing to the severity of the current outbreak. The choice to fight forest fires wherever and whenever possible has resulted in a situation where we now have many more older pine trees on the landscape than we did just a century ago. Today's preponderance of older pine trees is thus a byproduct of a management decision that seeks to control a recurring natural event that is a vital part of the recycling of pine-dominated forests. In other words, if we choose to reduce or eliminate fires in such landscapes we set the stage for insect infestations of the severity we are witnessing today.

THE REMAINDER OF THE REPORT IS DIVIDED INTO TWO MAIN SECTIONS. The first addresses reforestation challenges. The second examines how we can ensure that the public gets a fair return from its forest resource and suggests how to finance the policies advocated in the first section. A number of recommendations conclude each section.

Before exploring those two important topics, a short overview of the outbreak is in order.

The Beetle Attack: Far From Over

In describing the magnitude of the mountain pine beetle infestation now well underway in British Columbia's Interior, foresters and entomologists use the word "unprecedented" with good reason.

The attack is already considered "the most extensive mountain pine beetle epidemic in recorded history."[8] Two important factors explain why. First, beetle populations have been growing for years due to the large amount of older lodgepole pine trees on the landscape. Estimates by Canadian Forest Service scientists are that there may be as many as three times more mature pine trees in the province's Interior than there were a century ago.[9] The greater number of older trees is partly due to human efforts to suppress forest fires, which are the key natural building block in pine forests and also nature's way of controlling the available feedstock for beetles.[10] The other significant contributor is global warming, in particular our generally drier summer weather and milder winters.[11] Draught-like conditions in summer set the stage for staggering rates of new attack, while the milder winter months mean that most of the beetle pupae inside the trees survive the traditionally cold season, allowing new waves of beetles to emerge from their arboreal homes the following summer.

Beetle-attacked pine trees are easily spotted because their needles turn a bright rusty red. But forest scientists and technicians studying the problem are "always playing a catch-up game" when chronicling the growth in area of forest attacked because the giveaway change in needle colour from green to red usually takes a year to materialize.[12] With the help of aerial surveys done under contract to British Columbia's Forest Service, however, an alarming picture of the attack's spread has emerged. In 1999, the telltale sign of "red-attacked" pine showed that the beetles had killed trees over an area of more than 164,000 hectares. Two years later the number had leapfrogged to nearly 785,500 hectares, and by 2003 it had skyrocketed to 4.2 million hectares.[13] The troubling doubling trend may now be over, a sign perhaps that the beetles are simply running out of pine trees to kill. Still, the more than 7 million hectares of red-attacked pine trees documented in aerial surveys in 2004 shows that an area more than twice the size of Vancouver Island is now effected, by any account a staggering area of forest.[14]

Joan Westfall, a forestry consultant based in Kamloops and a former Forest Service employee, has been the lead person coordinating the aerial survey data. The data she has amassed also shows a smaller, although not insignificant area of BC forest that has been damaged by other pests, particularly insects that defoliate (although not necessarily kill) trees.[15]

Westfall's survey work also suggests that the pine beetles could infest huge areas of additional forest in the years ahead. In many areas of newly attacked forest only a small fraction of the trees have been

killed. A total of 2 million hectares of surveyed forest falls into what is called a "trace category," where less than 1 per cent of the trees surveyed are "red-attacked" trees. Another 2.5 million hectares is currently classified in the "light" category, meaning 10 per cent or less of the trees are red-attacked. A further 1.8 million hectares of aerially surveyed forest are classified as moderately attacked, meaning somewhere between 11 and 29 per cent of the pine trees are red-attacked and dead.[16] These areas and others may yet see all of their older pine trees killed by the beetles. Indications that this is the case are gleaned from periodic ground surveys. On the ground it is not uncommon to find five recently attacked trees whose needles are still green for every one red-attacked tree, Westfall says, adding there are anecdotal reports of as many as 70 "green-attacked" trees for every one tree whose needles are red.

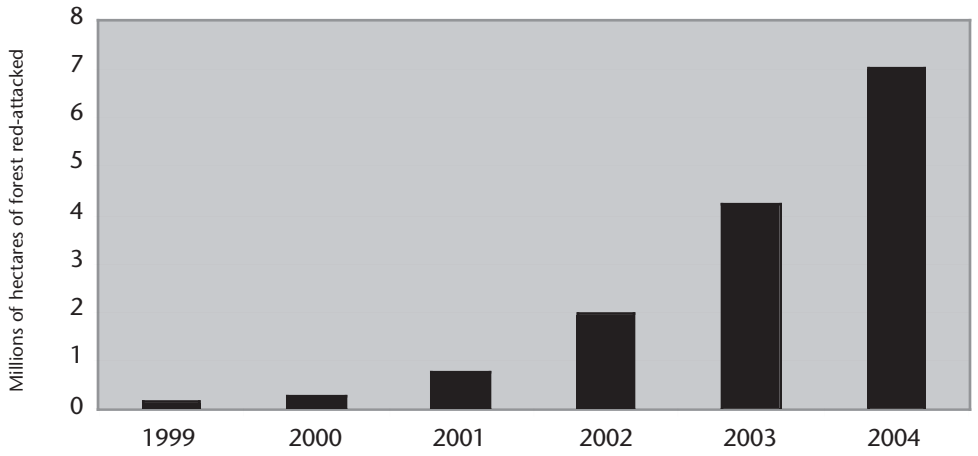
In addition to the preponderance of red-attacked trees, there is a growing area of pine forest whose trees have lost their red needles. The extent of this rapidly expanding area of "gray attacked" forest is not well understood because there has been a declining amount of forest inventory or tree-counting work by the provincial government. As detailed in a December 2004 report this paper's writer co-authored for the Sierra Club of Canada's BC Chapter, forest inventory staff in the Ministry of Forests has declined by 85 per cent since 1995.[17] The paucity of reliable and consistently available forest inventory information has been of concern for a number of years and was raised as a substantive issue in one of the earliest reports to the provincial government describing the challenges posed by the mountain pine beetle outbreak. The report, prepared by R&S Rogers Consulting Inc. for the Ministry of Forests and published in September 2001, noted that:

> The attack is already considered "the most extensive mountain pine beetle epidemic in recorded history."

> *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 impact infested area and volume numbers by attack category for each MoF [Ministry of Forests] district and TSA [timber supply area] on a twice annually basis province-wide.*[18]

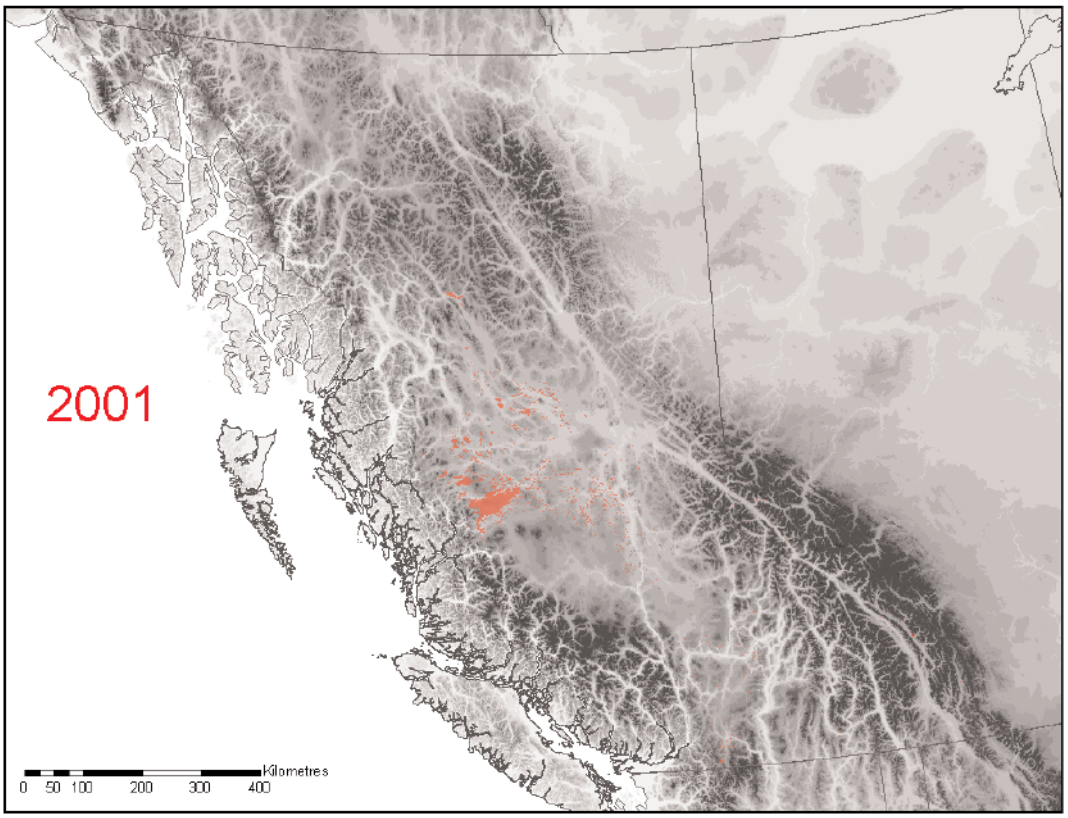
More recently, the Association of BC Forest Professionals (representing the province's 3,500 Registered Professional Foresters and Registered Forest Technologists) wrote BC Premier Gordon Campbell high-

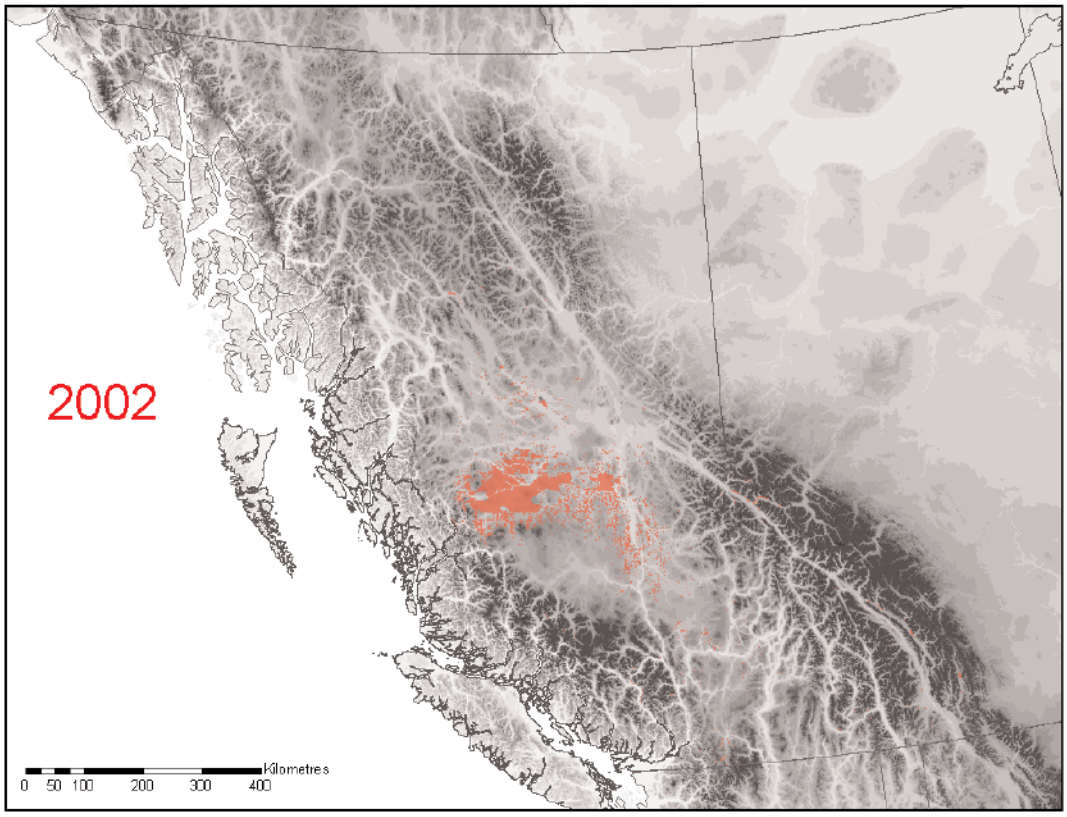
Figure 2: Seeing Red: The Telltale Sign of Beetle Attack

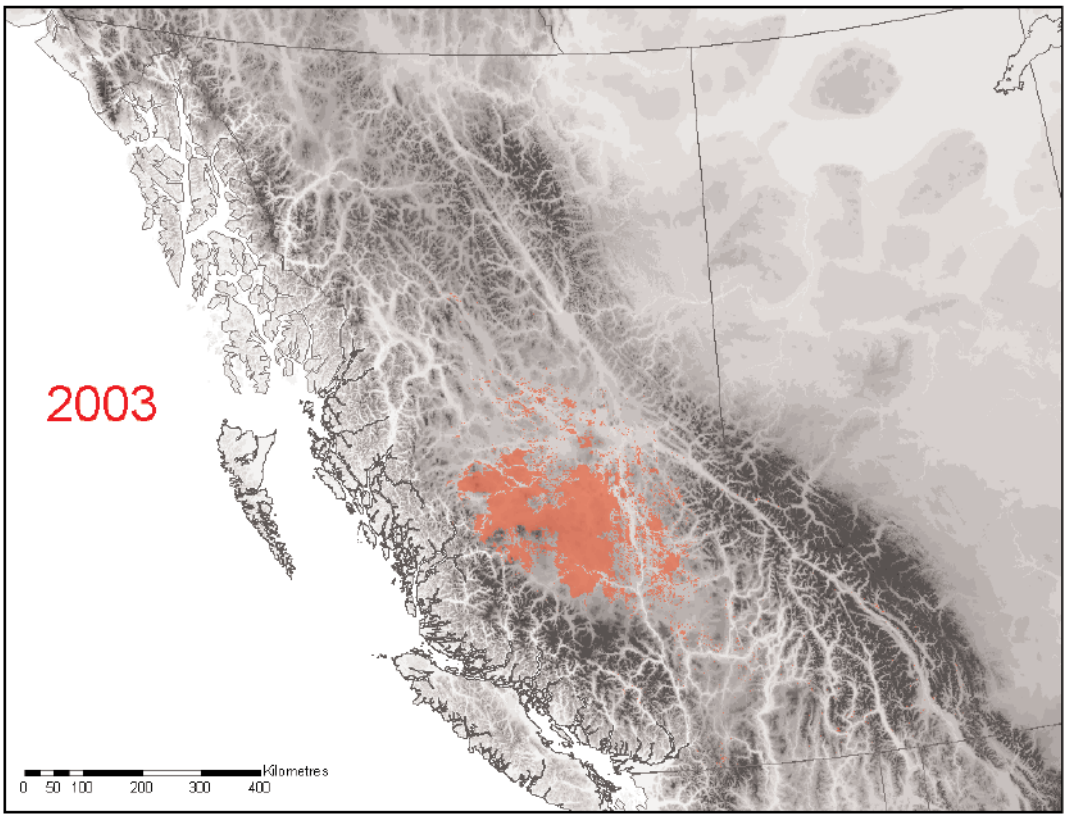


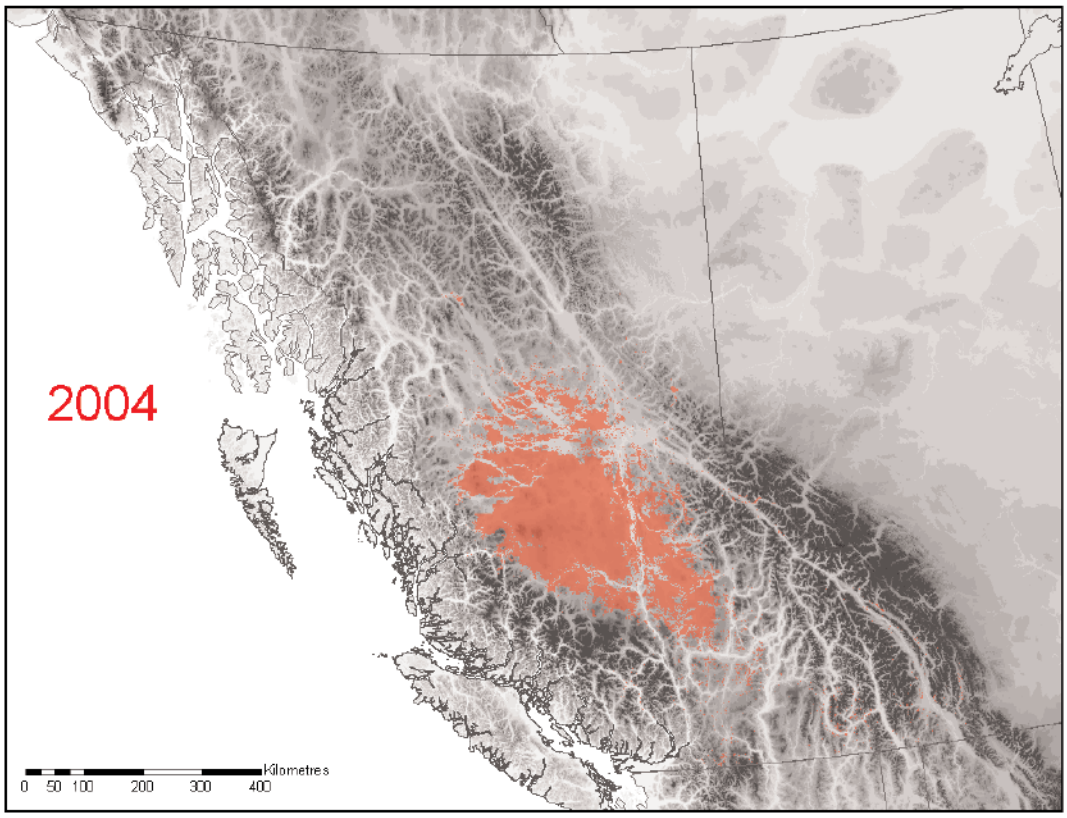
Source: *Timber Supply and the Mountain Pine Beetle Infestation in British Columbia.* Ministry of Forests, Forest Analysis Branch. October, 2003.

Spread of Pine Beetle Red-Attacked Forest in BC's Interior, 2001 to 2004









Maps can be viewed in colour on the PDF version of this report available at www.policyalterntives.ca IMAGES COURTESY OF THE CANADIAN FOREST SERVICE

lighting its concerns over the loss of public sector forestry positions. Of particular concern, ABCFP president Rick Sommer wrote, was the loss of Ministry of Forests' inventory, research and forest health positions.

"Without a solid foundation of information it will become increasingly difficult for our members to make sound, science-based, forest resource management decisions," Sommer wrote. "The bottom line is that forests remain vital to BC's future. This fact, together with the reality that forestry is a very long-term discipline, involving social, economic and environmental elements and requiring science of the highest order, make it clear that forest resource management is no place for minimalist, short-term thinking."[19]

In the absence of rigorous forest inventory work the full extent of the beetle attack remains poorly quantified. But it is safe to say that it is vast and that it has serious repercussions for many still largely resource-dependent Interior communities.

As the authors of the Rogers report noted, lodgepole pine trees are logged more than any other tree species. "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," states the report. The area includes 30-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.[20]

The full extent of the beetle attack remains poorly quantified. But it is safe to say that it is vast and that it has serious repercussions for many still largely resource-dependent Interior communities.

What the authors of that report could not have known was that in the ensuing three years the very definition of "susceptible" has changed along with the area of forest historically considered vulnerable to beetle attack. For example, pine trees of 80-plus years were historically the most susceptible to attack. But in the course of this outbreak trees as young as 30 years of age have been infested — a phenomenon that raises disturbing questions about the susceptibility of pine plantations to future beetle attacks. The other troubling development is a movement of beetles into areas where they previously were not seen, for example an incursion over the northern Rocky Mountains into the Chetwynd area. This development is of particular concern because from there the beetles need travel only a few hundred kilometres before being firmly established in the northern boreal forest, where the prevalent tree species is jack pine. In studies at the Pacific Forestry Centre in Saanich, Canadian Forest Service scientists have shown that the beetles do not distinguish between lodgepole pine and jack pine. The implications of such research are that if warmer and drier conditions prevail in the northern boreal forest, the pine beetles could be poised for a cross-country sweep.

Two central questions before British Columbians are whether the province is responding adequately to the challenges posed by the beetles, in particular in the area of reforestation, and whether we are getting a fair return from logging companies in the midst of an unprecedented, government-mandated, logging increase in response to the beetles. The remainder of this paper addresses both of those questions and makes recommendations for future courses of action.

PART ONE

From Deforestation to Reforestation

It was not long ago that the British Columbia government routinely boasted of its efforts to clean up a horrendous backlog of denuded forestlands in the province.

Typical of such pronouncements was a Ministry of Forests publication in 2000. It chronicled how, from reforestation's infancy in 1930 when the first seedling was planted in British Columbia, tree-planting efforts took off. By 1997, tree-planting crews planted the four billionth seedling in the province. Five years later, they were projected to plant a further one billion.[21]

Throughout the years of most intense reforestation in the 1980s and 1990s government and industry replanting efforts were widely publicized in attempts to counter arguments that one of our most important natural resources was being mismanaged. Conservationists charged that some sites of intense logging activity now covered such vast areas that they were visible from outer space. Industry and government spokespeople responded by saying that, while areas of continuous clearcut logging such as the Bowron Lakes region near Prince George were indeed that large, such sites had become among the largest and most rapidly greening plantations in the world. Industry-funded "Forests Forever" ads were so pervasive they were virtually impossible to miss, while anyone driving one of the province's highways was certain to pass signs detailing when an area had been logged and subsequently replanted.

All of this was meant to address the criticism that a cut-and-run approach to forestry in BC prevailed — that the province's forestlands were not adequately rehabilitated following logging activities.

As a direct result of public investments in reforestation activities, the gap between what was denuded as a result of logging, forest fires or disease and pest outbreaks and what was replanted steadily declined. This suggested that on the stewardship side of the equation at least government and industry were not dragging their feet.

Unfortunately, the provincial government's ability to lay continued claim to the good forest stewardship mantle is doubtful at best and dishonest at worst. What the 1980s and 1990s were to reforestation, the first decade of the new century may well be to deforestation. And if present trends continue, so too will the decade beginning in 2010 and the decade after that.

When BC's forests are in equilibrium, the area of forest replanted offsets the area that has been denuded. At such times, a value of 1 is ascribed for the ratio of area reforested to the area logged or lost to fires or pests. In other words, one hectare in for one hectare out. In 2003/2004, however, the ratio stood at .82. This meant that the area of forest that was denuded exceeded the area of forest that was replanted.

The .82 figure is the first of five presented in a chart in the Ministry of Forests' most recent Service Plan, which was released along with the provincial budget in February 2005. The report goes on to present figures for the next four years. The following year — 2004/2005 — the figure is once again listed as .82. It is unclear why, since the projected rate of beetle attack is upwards. A year later, the gap between what is deforested and replanted widens ever so slightly to .80. But in the following two years it is estimated to grow considerably, hitting a projected .69 in 2006/2007 and .59 in 2007/2008.[22]

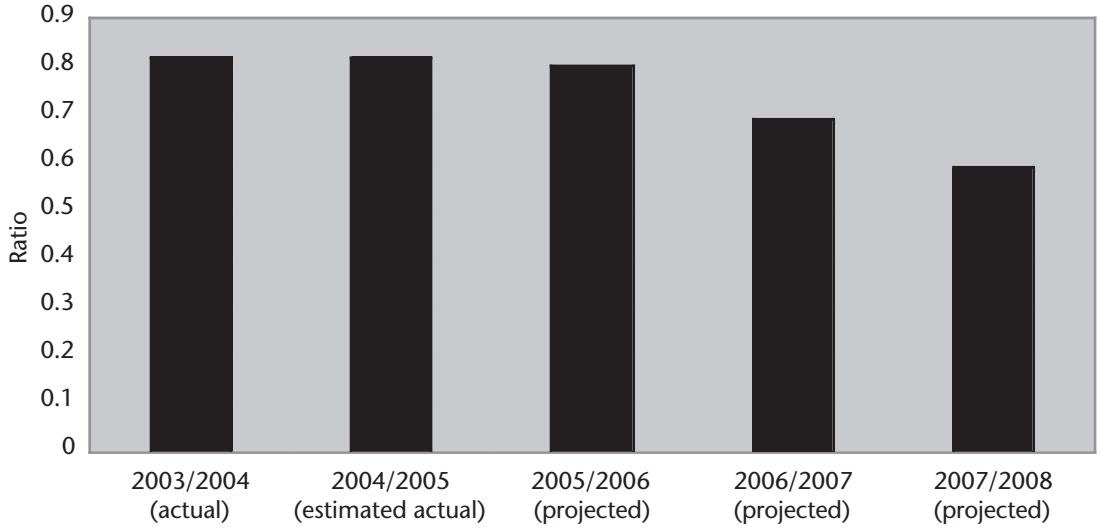
In other words, by the Ministry of Forests own estimate, we are on the cusp of an accelerating period of deforestation, with the ongoing mountain pine beetle attack being the primary cause of the increasing gap. Add to the mix a period of escalated logging activities and the wildcard of forest fires, and the prognosis for healthy tracts of mature trees is not good.

Given the obvious downward trend and its disturbing implication for future forest health, the same Service Plan speaks very little about what, if anything, the government intends to do to close the gap. All it offers is the following:

> *As stewards of British Columbia's forest and range resources, the Ministry of Forests (MoF) has the responsibility to ensure that the use of these resources to generate economic benefits is balanced with their long-term viability. The ministry will ensure that appropriate forest and range management*

Figure 3: The Widening Deforestation Gap – Projected Ratio of Land Reforested to Land Denuded

A ratio of 1 means that the area of forest reforested equals the area of forest denuded.
A ratio of less than one indicates that the area denuded exceeds the area reforested.
The further away from 1, the greater the percentage of land denuded.



Source: *Ministry of Forests Service Plan 2005/06–2007/08*. British Columbia. Ministry of Forests. 2005.

practices are used to maintain and improve the long-term sustainability and health of the province's forest, range and recreation resources. The ministry will also ensure that incremental investments in the forest resource are effective through the Forest Investment Account.[23]

This is hardly the kind of language to inspire confidence. No matter how effectively the government spends its reforestation dollars, "incremental" investments will not deal sufficiently with the magnitude of the unfolding forest health crisis. But before exploring what may be required, it is useful to first consider what has been achieved when additional reforestation activities were undertaken as a result of increased public funding.

The Last Great Reforestation Effort

Between 1985 and 1995 the province of British Columbia and the government of Canada poured half a billion dollars into reforestation initiatives, with impressive results.

The decision to commit the funds grew out of a realization that there was a significant backlog of lands where forests once stood but did no longer. Following logging, pest outbreaks or fire, these lands had not sufficiently re-colonized with new trees, either as a result of not being planted and failing to rebound on their own, or as a byproduct of insufficient planting and tending efforts.

Significantly, the growing gap between what was deforested and replanted became something of a cause célèbre in environmental, labour, community economic development and industry circles during the 1980s. It also heavily influenced the thinking of government-appointed bodies such as the Forest Resources Commission, which made many recommendations to the province in 1991 on the need for permanent and secured investment pools for reforestation efforts.

> By the Ministry of Forests own estimate, we are on the cusp of an accelerating period of deforestation, with the ongoing mountain pine beetle attack being the primary cause of the increasing gap.

At the time, the phrase used to describe denuded lands that had not been properly replanted was Not Satisfactorily Restocked. As is often the way, the acronym NSR quickly replaced the longer phrase in the forestry lexicon.

The provincial and federal governments jointly signed the first of two cost-shared reforestation programs known as Forest Resource Development Agreements (FRDA) in 1985, committing $300 million over five years. A second five-year FRDA followed the first and a further $200 million was allotted to reforestation efforts. In addition to this important funding, further public dollars were channeled into a host of tree planting, spacing, thinning and pruning programs through the now defunct Crown corporation Forest Renewal BC (FRBC). When all of the work generated as a result of that funding is taken into account, there is clear evidence that human intervention played a key role in reforestation.

Between 1988/89, when the first analysis was done to determine net changes in NSR, and 1997/98 forestlands designated as NSR steadily declined. In fact, the decline was just shy of 62 per cent, meaning that over 10 years the backlog diminished from nearly 2 million hectares to 752,532 hectares.[24]

Most of this success was directly attributed to tree planting and tending crews that fanned out across the province to do the needed work. But it is also true that there was a steady increase in the area of forest annually surveyed. This work made it possible to know where, exactly, the problems were and what needed to be done to address them. Ministry of Forests employees and contractors under the employ of the Ministry did much of the survey work, which clearly took off with the support of FRDA and later FRBC funds.

In the five years ending in 1985/86, the area of land surveyed averaged 336,000 hectares per year. In the following 12 years, during which FRDA and FRBC funds were readily available, survey activities

mushroomed to an average 837,000 hectares per year, well over a twofold increase.[25] Significantly, one of the benefits of this survey work was that it showed that on some sites previously identified as NSR there were, in fact, sufficient numbers of trees growing. In other words, increased surveying alone helped reduce the backlog.

During these years of increased public sector investment, a wide range of forestry research was also conducted. The research had, and still has, direct application to the forests of most concern in this report, namely, those dominated by lodgepole pine trees and susceptible to beetle attack.

For example, a November 1996 study noted that "nitrogen deficiencies are widespread and serious in lodgepole pine forests throughout the interior of British Columbia, especially in fire-origin stands."[26] The same report went on to note that by applying fertilizers to select stands of pine-dominated forest, the increase in the mean diameter of fertilized trees was nearly one third greater than those of adjacent unfertilized trees over a three-year period. Significantly, the same study showed there were "surprisingly small" overall gains in growth by doubling the amount of fertilizer from 100 to 200 kilograms per hectare. In other words, overdoing things was worthless, not to mention ecologically risky.[27] (Use of nitrogen fertilizers to enhance tree growth is controversial, as it can contaminate water bodies. For that reason it must be very carefully applied, with special effort made to avoid use in riparian forests near streams, rivers and lakes.)[28]

Another study strongly suggested that from a reforestation perspective conditions were far from ideal in the province's pine-dominated forests. Foresters needed to be vigilant in ensuring that logged areas of pine forest were properly stocked with new trees, particularly those sites that had been logged and left to "naturally regenerate" — in other words, logged and not replanted. Of particular concern were logged areas at higher elevations, where cold winter temperatures could work against the successful re-establishment of new and healthy crops of trees.[29]

On many recently logged sites it was not a lack of new trees that was the problem but the inverse — *too many trees*. To reverse that trend would likely require human intervention — cutting down or thinning a portion of the trees.

The same study also highlighted another concern. On many recently logged sites it was not a lack of new trees that was the problem but the inverse — *too many trees*. Crowded together, the young trees on these sites were experiencing "significantly reduced" growth. To reverse that trend would likely require human intervention — work crews going onto such sites and cutting down or thinning a portion of the trees in order that the surrounding ones could grow more freely.

Still another study suggested that when work crews manually cleared competing brush species away from young pine trees or applied chemical herbicides the trees on treated sites grew better than those on untreated sites.[30]

Concern over declining timber supplies was the driving force behind another study.[31] Significantly, the study looked at pine forests that thickly re-seeded following fires. Thinning such forests not only provided volumes of wood right away, but it encouraged the remaining trees to grow faster and possibly assisted in discouraging future pest attacks.

This latter point was the subject of another study conducted by the Forest Engineering Research Institute of Canada for the Canada Forest Service and BC Ministry of Forests. It specifically examined how commercial thinning of individual trees in pine forests could help reduce the risk of those forests later being overrun by beetles. The study concluded that while "commercial thinning costs more than clearcutting … if mountain pine beetle infestation is likely to occur before the block is scheduled for harvest, a thinning operation could decrease the risk of attack and ensure that the stand is available for harvest in the future."[32] Since then, more recent studies have confirmed that thinning select forests can significantly reduce the impact of beetle attacks, provided it is part of a wider and more proactive approach

to "beetle-proofing" pine forests (see *Beetle-Proofing Forests*).

The executive summary of the Forest Engineering Research Institute report concludes with words highly relevant to today's forest health crisis.

> *Preventing beetle attacks from reaching epidemic proportions, and thereby decreasing the volume of timber lost to beetle infestation, could justify the higher cost of thinning treatments as an investment in the future.*[35]

All of this research and more occurred over a brief but intense period of study in the 1990s. It did much to reinforce the notion that active management of publicly owned forests could achieve results; results that improved both the overall dollar value of select stands of trees and that better equipped them to withstand future pest outbreaks.

Overall, the late 1980s and the 1990s were years of intense reforestation and related activities in the province. A summary of the achievements recorded during this period stands in stark contrast to the years prior to the implementation of the first Forest Resource Development Agreement in 1985. Table 1

Beetle-Proofing Forests

If foresters work hard in areas where beetles have not built up to extremely high levels, they can successfully beetle-proof some forests. But their efforts will be in vain if actions are not aggressive or if they lose sight of the bigger picture, which is what is happening at the broader landscape level.

In particular, two recent studies by the Canadian Forest Service show that when tracts of forest are thinned in advance of beetles moving in, the thinned forests are more resilient to attack than adjacent forests that have not been thinned.

Thinning, which involves cutting down select trees amidst standing ones, is effective in several ways. Thinning results in a forest with more open area between the remaining trees, increasing their exposure to sunlight and helping them grow more vigorously. More vigorous growth increases a tree's ability to produce resin, a pine tree's primary defense against beetle attack. In addition, a thinned forest is generally subject to higher temperatures, more light intensity and stronger winds, all of which discourage incoming pine beetles.[33]

Studies conducted by forest researchers show that in four separate areas of BC the use of thinning dramatically increased a forest's ability to fend off beetles. Indeed, in the Cranbrook, Parson and Hall Lake areas in the Kootenay region and in the 100 Mile House area in the Cariboo-Chilcotin region, the thinned forests did not develop incipient beetle populations, whereas adjacent areas of unthinned forest did.[34]

Where thinning had little success, however, was in the Quesnel area where beetle populations had built to such extreme levels that "unacceptably high" damage occurred in the thinned stand. In other words, the outbreak was so far advanced that little if anything could be done to stop the beetles' incursion.

The success of thinning operations in the Cranbrook and Parson regions in particular seems to reflect an approach to forestry that anticipates the trouble that the beetles can cause. As a result, a quite aggressive approach has been adapted, wherein beetle-attacked tracts of forest are quickly logged before the beetles have a chance to increase in number and run out of control.

Another key factor in the success in this area, however, is that the region is mountainous and blessed with a much higher percentage of "mixed" forest. The variety of species and the changing climatic conditions in the mountains make this area less friendly to beetles than places like Quesnel, where vast expanses of almost pure pine forest roll on for mile after mile across a vast plateau — terrain that favours more rapid beetle movement.

sets out an abbreviated summary of achievements gleaned from a compendium of statistics published by BC's Forest Service in 2000. For the purposes of this report, the findings are grouped prior to and following the first FRDA and are averaged on an annualized basis.[36]

The magnitude of accomplishments is even greater than what is presented in Table 1, as it does not include reforestation and forest tending expenditures that occurred from 1994/95 onward when reforestation spending under the now defunct Crown corporation Forest Renewal BC accelerated. Suffice to say that the table shows that in many areas of silvicultural endeavour significant achievements were recorded in the post 1984/85 period.

As the following discussion shows, these achievements were followed by drastic declines in public investments over the last several years, cuts made all the more disturbing by the unfolding forest health crisis and the evident need for reforestation efforts.

The Beetles Attack, Public Sector Forest Investments Decline

While the 1980s and much of the 1990s saw huge increases in public spending on reforestation, the latter 1990s and first half of the current decade were years of curtailed public sector investments. In fact, public sector reforestation dollars virtually dried up by 2004, and have only recently shown a slight resurgence.

Part of the reason for the decline in spending is that planting and stand-tending activity through the 1980s and 1990s had demonstrable effects in reducing the area of forestland deemed NSR. As the backlog of not satisfactorily restocked lands was reduced, further public investments in tree planting were somewhat negated.

Table 1: Silviculture Statistics in the Years Before and After the First Forest Resource Development Agreement

Accomplishment	Annual average pre- FRDA (1981/82 to 1985/86)	Annual average post- FRDA (1985/86 to 1997/98)
Number of trees planted	100.08 million	210.5 million
Hectares planted	87,634 hectares	175,519 hectares
Brush treatment	7,811 hectares	53,100 hectares
Area of trees spaced	11,722 hectares	35,544 hectares
Area of trees pruned	not reported until 92/93	5,875 hectares
Area surveyed	316,887 hectares	742,031 hectares
Area of site prepared	70,892 hectares	127,501 hectares
Public reforestation spending	$91.2 million	$164.7 million

Source: *Just the Facts: A review of silviculture and other forestry statistics.* Province of British Columbia. Ministry of Forests. 2000.

Figures published by the Forest Practices Branch of the Ministry of Forests show that the high water mark for public expenditures on backlog reforestation was in the years 1988/89 and 1989/90 when a total of $175.4 million per year was spent. Over the next seven years, public sector expenditures on NSR lands dropped considerably, ranging from a high of approximately $125 million to a low in the $60 million range. Then, for a five-year period commencing in 1997/98, funding flat-lined at close to $45 million per year. During this time, dollars were provided through Forest Renewal BC. Following FRBC's demise and the creation of the new Forest Investment Account, public reforestation spending virtually disappeared, slumping to approximately $7 million in 2002/03 and just $4.5 million in 2003/04.

Significantly, as public reforestation funding diminished, a new and potentially far more serious forest health crisis than that which confronted the province in the 1980s came sharply into focus. Yet with all indications that the unfolding beetle attack would dwarf anything previously seen, public investments in reforestation plummeted almost as rapidly as the area of beetle-attacked forest grew (see Table 2).

With all indications that the unfolding beetle attack would dwarf anything previously seen, public investments in reforestation plummeted almost as rapidly as the area of beetle-attacked forest grew.

At first glance, the latest provincial budget provides some solace. In it, the government notes that "Budget 2005 includes $266 million in funding for initiatives to address the economic impacts of mountain pine beetle epidemics and forest fires, while providing new opportunities to communities."[37] On closer inspection, however, it is clear that just $101 million (37 per cent) is earmarked for "beetle response and reforestation." The document does not explain what "beetle response" is, and fails to say how much funding will be devoted to beetle response versus reforestation. There is also no indication as to how much of that money may be directed toward rehabilitating forests overrun by fires, though presumably some is destined for such purposes given the preamble.

Of the $101 million, however, $12 million was already spent in fiscal year 2004/05, leaving a *projected* $89 million for "beetle response and reforestation" over the next three years. The projected expenditures over a short three-year period also fluctuate dramatically, with no explanation provided for a pronounced downswing in 2006/07 and a sharp increase in 2007/08 (see Figure 4).[38]

Table 2: The Attack Spreads, Public Reforestation Investments Decline

Year	Area of beetle-attacked forest	Public spending on NSR
2000	284,041 hectares	$45 million
2001	785,497 hectares	$45 million
2002	1.96 million hectares	$7 million
2003	4.20 million hectares	$4.5 million
2004	7.02 million hectares	$3 million

Source: Forest Practices Branch. Ministry of Forests. 2005.

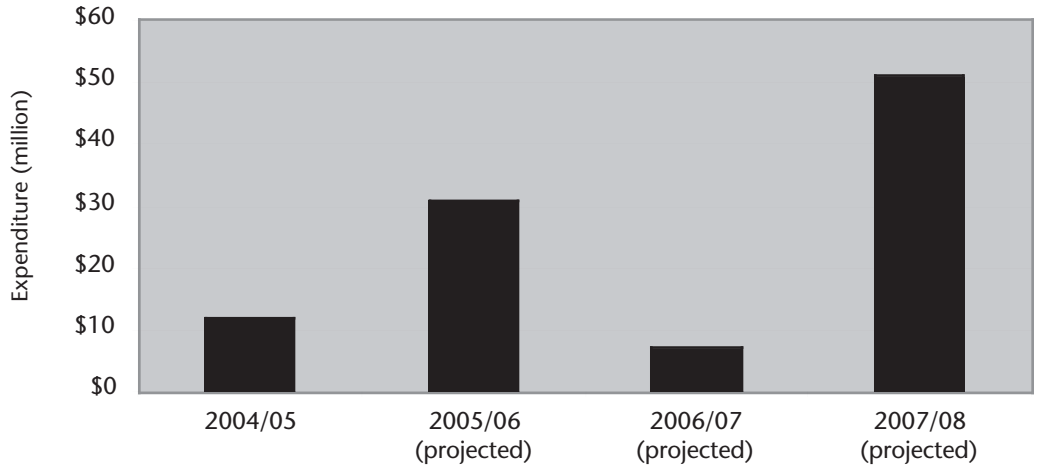
Beyond the expenditure of these limited reforestation funds, the province makes clear that its hope is that the federal government will commit renewed funds to reforestation. BC's Ministry of Finance reports in the 2005 budget:

> *The province is also actively pursuing federal funding for … forestry initiatives in recognition of the potential impact of the mountain pine beetle and forest fires on communities and industry, the need for adjustments in this sector and the continuing contribution of a sustainable provincial forest to Canada's climate change initiatives. Any federal funding will be incremental to the $101 million provincial commitment for these initiatives.*[39]

The federal budget released in February 2005 made no mention of spending in this area. And a few weeks after the budget was tabled, Ottawa went a step further saying there would be no formal decision on funding support for two to three months. The response drew fire from some BC Members of Parliament, including Dick Harris, the Conservative MP for Cariboo-Prince George. Then on March 24, 2005 the federal government announced it would invest "$100 million to fight the mountain pine beetle epidemic in British Columbia."[40]

The announcement was fairly vague as to what parameters would be placed around the spending. However, it appears that the funds may not necessarily be devoted to reforestation efforts. Federal Minister of Industry David Emerson, for example, said the money would "allow the province to ramp up its efforts to stamp out the beetle before it ravages the forests, which is far more important than waiting to remediate after the fact."[41] If indeed that is the case, it suggests that the money will be spent in support of efforts to log forests deemed at risk of future beetle attacks, perhaps paying for the building of roads and other infrastructure costs. The federal announcement makes no mention of planting or stand-tending efforts or the successes recorded under previous cost-shared reforestation agreements.

Figure 4: Beetle Response and Reforestation



Source: *Budget and Fiscal Plan 2005/06–2007/08*. British Columbia. Ministry of Finance. 2005.

Reforestation Obligations: Just Who is Responsible?

Reforestation obligations in British Columbia took a dramatic turn in 1987 when responsibility for re-planting logged lands transferred from the Crown to the companies doing the logging.

The backlog of Not Satisfactorily Restocked forestlands discussed previously really pertains to those areas that lost their trees as a result of logging, fire or pests and that were denuded prior to 1987. Reforesting these lands was considered the responsibility of the provincial government. Through negotiations, the province convinced the federal government to assist in reforestation efforts. As we have seen, that partnership, coupled with subsequent spending through Forest Renewal BC, was instrumental in cleaning up much of the backlog.

With the transfer in the latter 1980s of reforestation obligations to the forest companies, it became a company responsibility to ensure that all lands it logged were sufficiently restocked with crops of trees deemed healthy and "free to grow".[42] This did not necessarily obligate companies to plant trees. Companies could and still can choose to let logged areas naturally regenerate, in other words leave them to re-seed on their own. Whatever reforestation method is chosen, however, the trees that replace those that are logged must reach a sufficient height such that they are growing freely, unhindered by brush or grasses.

The fact that companies are responsible for all reforestation costs on the lands they log is particularly germane to the subject at hand. To date, the government's most significant response to the ongoing beetle attack has been to approve dramatic increases in allowable logging rates on public forestlands. If the companies respond accordingly, and preliminary indications are that they will, they are on the hook for all reforestation costs. The province also bears some direct responsibility for reforestation, in particular those tracts of publicly owned timber auctioned through BC Timber Sales, a branch of the Ministry of Forests. Public timber so auctioned is put up for bid with the highest bidder securing the right to log. A portion of the money paid for the timber is then used by BC Timber Sales to pay for reforestation costs.

With amendments to the *Forest Practices Code Act* the Ministry of Forests' obligation to devise a reforestation plan for forestlands lost to fires or pests has been waived. In effect, the province has washed its hands of its legal responsibility to replant beetle-attacked forests.

But what about forests that are overrun by pests or fires and that are not logged either directly by the companies or through BC Timber Sales? Should some of these lands be replanted, and if so with what kind of trees? These are questions that the public deserves answers to and that it should have some reasonable assurance will be acted on once the answers have been arrived at. Yet action may not be forthcoming.

Why?

Prior to mid December 2002, provincial forestry legislation required a Ministry of Forests District Manager, acting on behalf of the Crown, to devise a reforestation plan for forestlands lost to fires or pests. The requirement was waived only in the event that the lands were considered too remote, too small or too inaccessible. With amendments to the *Forest Practices Code Act*, however, that obligation has been waived. In effect, the province has washed its hands of its legal responsibility to replant beetle-attacked forests.

A not insignificant consideration is what that means in the present context. Because the beetle attack is far from over, and because we do not know for certain when the attacked trees will lose their economic value, we have only a partially formed idea of how much attacked forest will remain on the landscape following the salvage logging bonanza. But clearly it will be a lot.

While the provincial government may not be legally obliged to address the situation in those forests, there are many reasons why it makes social, economic and ecological sense for it to do so. And there is at least some acknowledgement by the provincial government that it feels it has a duty to act. Otherwise, why would it have a line item for beetle response and reforestation in its budget documents? And why would the provincial Ministry of Forests, on the public's behalf, publish figures showing reforestation efforts lagging behind the area of forest lost annually to pests and fires?

What Role Should the Companies Play?

Beyond the companies doing more logging, processing more wood, and planting more trees on lands they log, it is unlikely they will take additional action. It may be that higher stumpage fees can be charged to the companies doing the logging and those added funds used to assist the province in reforestation initiatives (a topic we will address shortly). But that is likely to be it.

By far, most logging in BC's Interior services the interests of softwood, panel, market pulp and paper producers. These sectors of the forest industry are all capital intensive, and the products produced compete in markets that are often dangerously close to being over-supplied.

The booms and busts of forest commodity prices are well documented. So it goes without saying that the companies are assuming some risks by processing a whole bunch more wood and flooding the market with more lumber and market pulp; even more so when the major export market for BC softwood lumber is the United States, a country whose powerful softwood lumber lobby continues to exact a heavy financial toll on Canadian softwood lumber producers.

These realities are among many highlighted in a consultant's report submitted to the provincial government in September 2001. In it, the writers argue that there are likely to be significant economic constraints associated with increased softwood lumber production in the Interior, mostly because of "significant excess production capacity" throughout North America and a "pricing environment [that] will remain weak."[43]

Table 3: Spruce, Pine and Fir Lumber Exports Up: Prices Down

Year	World value ($ billion Cdn.)	Volume exported from BC (million m^3)	Price per unit ($)
1995	3.51	18.55	189
1996	4.10	18.45	222
1997	4.28	17.67	242
1998	3.62	16.60	218
1999	4.23	16.83	251
2000	3.54	16.34	217
2001	3.66	17.86	205
2002	3.69	20.25	182
2003	3.09	21.33	145
2004	4.27	23.07	185

Source: BC Stats. 2005.

Significantly, given what soon followed, the consultants recommended to the government that there be no appreciable "increase in total net timber harvested across west central BC in support of MPB [mountain pine beetle] control."[44]

The government chose to do the opposite.

In July and August 2001, the province's Chief Forester approved significant logging increases in the Quesnel, Lakes and Prince George Timber Supply Areas or TSAs. Combined, the approved logging increases meant that the companies were free to log an additional 5.5 million cubic metres of timber *per year*.[45] Following the release of a public discussion paper in June 2004, the Chief Forester ratcheted up the approved annual logging rates even more, this time for an additional five years. Whether these decisions are wise remains to be seen, in large part because insufficient research has been done to determine how long the attacked trees will hold their value. If it turns out that it is a matter of many years, ratcheting up the logging rates by the amount the Chief Forester has will prematurely deplete our forests, causing unnecessary environmental and economic hardship. But the fact of the matter remains that this is what has been done. And if the companies log all of the additional timber the Chief Forester has so far made available, it amounts to 63 million cubic metres, an amount that comes close to matching a single year's logging activity for the entire province.

"This is all about salvaging the dead wood," then Chief Forester Larry Pedersen said in making the announcement, adding later: "We are expecting these timber supply areas to be over-run … Vast areas of the forested landscape are dead, and there is a one-time opportunity to capture the economic value."[46]

If the companies log all of the additional timber the Chief Forester has so far made available, it amounts to 63 million cubic metres, an amount that comes close to matching a single year's logging activity for the entire province.

The industry appears to have heeded the call. Exports of spruce, pine and fir (SPF) lumber from BC have risen dramatically in recent years. But not without downward pressure on price.[47]

Table 3 clearly shows that from 2001 the volume of SPF lumber exported was dramatically higher than in the six years previously. On average in the six years prior to the upswing, the amount of SPF lumber exported from BC amounted to 17.40 million cubic metres. In the four years since the added logging began, the average export volume was 20.62 million cubic metres, an increase of 18.5 per cent. There has, however, been a corresponding decline in price. The average price per unit in the six years prior to the logging upswing in 2001 was $223. In the four years following it was $179, a decline of just under 20 per cent. The one notable exception to this occurred in the most recent full year for which data is available, 2004. That year's sharp jump in prices was most likely attributed to high demand in the US, some of which was tied to rebuilding efforts following the destruction of large numbers of houses due to hurricanes. The jump in prices and strong sales helped propel the province's forest industry to a record-breaking $1.5 billion in earnings in 2004.[48] Even so, SPF prices in 2004 were 17 per cent below the average prices recorded in the pre-2001 period.

It is difficult to predict with any certainty whether these trends will continue, however. Downturns and upswings in US housing starts (the vast majority of BC's SPF exports are US-bound) will continue to have a profound influence on selling prices. And it is the prices paid, much more than government policies encouraging accelerated harvesting, that will drive future logging rates.

Having said that, forest companies are clearly logging more in the Interior today than they were a few years ago. Almost all of that logging occurs on public forestlands where the companies are legally obliged to cover reforestation costs. With the possible exception of collecting more stumpage revenues from the companies, and applying those added funds to further reforestation efforts (a subject we will address momentarily), this is about all that can be expected from the companies. The one important

caveat is that the provincial government remains the landowner. As such, it has the power to set the rate at which the timber in publicly owned forests is depleted, how logging activities are carried out, and what constitutes proper reforestation. These responsibilities are of crucial importance as the current forest health crisis unfolds, particularly so when the wildcard of global warming is thrown into the equation.

What Role Should the Provincial Government Play?

As mentioned earlier, an important and as yet largely unanswered question is how much forestland beyond that which the companies log will be affected by the beetles. It is difficult to answer and necessarily involves estimates. How extensive will the beetle attack be? How aggressively will forest companies log beetle-attacked forests? How long will it take the attacked trees to lose enough of their economic value that they are no longer viable to harvest?

A recent estimate by the Forest Service is that even with all of the energy being thrown at salvage logging beetle-attacked forests, there will be somewhere between 300 million and 700 million cubic metres of dead pine remaining on the landscape. Just what this represents in terms of forested area is difficult to answer. Much depends on whether the affected forests are dominated by pine or mixed forests comprising different species. Whatever the figure, however, it is likely to be significant. Consider that in years past it was not uncommon for 70 million cubic metres of timber to be logged annually *province-wide*, with logging activities occurring on some 200,000 hectares of land. Seen from this perspective, it is easy to envision a situation where NSR levels in the province quickly surpass those of two decades ago, prior to implementation of the first FRDAs.

The issue then becomes what the province, on the public's behalf, does with those lands. Because ultimately it is the responsibility of the province, not industry or the federal government.

A multi-faceted (as opposed to narrowly focussed) approach of sizeable magnitude is probably best suited to the task at hand, if for no other reason than the province and in particular the provincial Forest Service has never faced circumstances quite like this before. By pursuing a range of actions, different outcomes will result. This provides more room to maneuver as people learn the outcomes of various actions and make the necessary adjustments.

The Three Rs: Research, Restoration and Reforestation

This paper proposes that, to be effective, any future provincial government action should be grounded in the three Rs of research, restoration and reforestation. These are areas in which provincial Forest Service personnel are already well versed. And they are all needed in the tool kit employed to address the unfolding pine beetle outbreak.

Research

Fortunately, when it comes to the first of our three Rs, BC's Forest Service can draw on the expertise of members of the Canadian Forest Service, who are in the midst of a five-year, $40-million research initiative focussed solely on the unfolding mountain pine beetle outbreak.

Ongoing research by both agencies will be needed for some time to come, particularly in the area of reforestation, given the important backdrop to the unfolding beetle attack: global warming (see *A Warming World and Shifting Forests*).

Regular Surveys

Given the vast area that will be affected by the beetles and the large tracts of forestland that will be logged in response, it will become increasingly important to do regular site surveys or assessments of forested areas, particularly in light of our changing climate. Such surveys can also be used to identify the spread of other pests and their impacts on forest health.

A prudent survey program would look at a range of sites including areas of pure pine forest and mixed forests where lodgepole pine trees comprise part of the species mix. It would track responses in both tracts of unlogged forest that were attacked by the beetles and adjacent areas that were logged and either left to re-seed on their own or replanted. It would also involve compiling a database of information on various planting programs to better assess what works and what doesn't work over time in terms of reforestation choices.

A Warming World and Shifting Forests

The heat is on. And based on projections by Andreas Hamann, a University of British Columbia forest geneticist who spoke at a March 2005 gathering of BC's Forest Practices Board, it means huge changes may be in store for BC's vast and varied public forestlands.

Hamann set out how, based on current projections, the Interior of the province could experience mean annual temperature increases of 3.8 degrees Celsius by 2085, and mean annual winter temperature increases of 4.7 degrees. This could result in the loss of lodgepole pine over about seven per cent of its current range by 2025, nine per cent by 2055, and 27 per cent by 2085: in other words, the loss of about one third of the area in which pine is currently growing in just 80 years. Concurrently, new areas could open up, generally further to the north and at higher elevations. Here, the growth opportunities for lodgepole pine could be 16 per cent by 2025, 24 per cent by 2055, and 31 per cent by 2085.

These are big changes. And they would be far from the only ones.

Take two significant Interior forest ecosystems — the sub-boreal spruce and the sub-boreal pine-spruce zones. In just 80 years, the "climate envelope" in these two ecosystems could shift completely from the plant communities currently there to species that previously did not occupy these spaces. By 2085, Hamann suggests, the climate envelope in the sub-boreal spruce zone could favour a mixture of Ponderosa pine, Interior Douglas fir and Interior Coastal hemlock trees. Ponderosa pine and its associated plant community would be favoured to grow on 30 per cent of the land base, fir on 44 per cent and hemlock on 24 per cent. Meanwhile, in the sub-boreal pine-spruce zone, climate change could result in a landscape favouring Ponderosa pine (11 per cent), Douglas fir (74 per cent) and bunchgrass (8 per cent).

As the research suggests, huge challenges await foresters. As Hamann said in a later interview: "If climate change really takes off as predicted, reforestation will be the only thing we'll be worrying about. Redesigning planting strategies will be everything." Indeed it will. And what a challenge it will be. Imagine picking a species to grow now that may be marginally suited to today's climate, but that may be perfectly suited to a warmer world waiting just around the corner.

To be clear, Hamann is not saying that if we fast-forward 80 years pine trees or other tree species will simply drop out of certain landscapes. What he is saying — and what makes it so important — is what ought to be there based on our understanding of warming trends and our knowledge of our province's rich and varied ecosystems. In other words, the reforestation decisions we make now will likely have huge implications down the road for a province that relies heavily on the health of its forests for its social and economic wellbeing.

This is particularly important given past trends in reforestation efforts, trends that have tended to favour the planting of pine trees over those of other tree species. Approximately one in every four trees in the province is a lodgepole pine. Yet when one looks at the total number of seedlings planted in the province, well over one in four are pine trees. In other words, historic planting activities may be contributing to future pest outbreaks by increasing the number of pine trees on the landscape (see *Reaping What We Sow — Are Past Planting Activities Contributing to Tomorrow's Outbreaks?*).

Rigorous Sampling

Ongoing research is needed to determine how long beetle-attacked trees hold their commercial value as sources of lumber and pulp. Foresters generally understand what tracts of trees were the first to be attacked during the current outbreak. By taking into account that trees in some attacked forests will degrade faster than others due to variations in precipitation, rigorous sampling work would provide valuable information for determining logging rates. For example, if it is shown that sizeable numbers of trees retain their commercial value for many years after they are attacked, salvage rates could perhaps be reduced, softening somewhat the predicted decline in future logging rates and helping to stabilize lumber prices.

Because forests are more than just sources of wood for sawmills and pulp mills, there is also a pressing need to understand how the massive changes occurring on the landscape will affect a range of wildlife species. Some of the forests hardest hit by the beetles and by escalated logging activities are home to woodland caribou, for example. These creatures need expansive and contiguous areas of undeveloped older forest in order to minimize contact with natural predators such as wolves. Older forests are also where woodland caribou tend to find lichens, a favoured food source. Research will be crucial in determining whether beetle-attacked forests retain value for these and other animals, and if so which of these attacked forests should be ruled off-limits from current salvage logging activities. Ongoing research can also be a valuable tool in assessing the overall health and diversity of forest ecosystems, allowing companies and government regulators alike to better promote the kind of forest diversity that will conserve desired animal and plant species while safeguarding against future beetle outbreaks of the magnitude witnessed today.

BC's Forest Service has played an important role in forestry research. However, its ability to do so has been sorely tested over the past decade. Since 1995, budget cuts by successive provincial governments have resulted in research staff declines of 40 per cent.

It is not the purpose of this paper to develop a comprehensive list of research priorities, however. The point is simply to say that in the absence of ongoing field study, mistakes are likely to be made. And when mistakes are made in forestry, the consequences are long-term.

Historically, BC's Forest Service has played an important role in forestry research. However, its ability to do so has been sorely tested over the past decade. Since 1995, budget cuts by successive provincial governments have resulted in research staff declines of 40 per cent.[50] (Even steeper staff declines have occurred in two other areas of historic Forest Service responsibility: since 1995 forest inventory staff, critical to the setting of sustainable logging rates, have been cut by 85 per cent, while reforestation staff have been cut by 80 per cent.[51]) While ongoing studies by the Canadian Forest Service will continue to be of immense value, its five-year, $40-million mountain pine beetle research initiative is now half over. It is unlikely that the few suggested areas of research described above are likely to be taken on by corporate forestry staff, whose primary duties are to ensure wood supply to company mills. So, in the absence of public sector initiatives, much of this important work may not be done.

Reaping What We Sow: Are Past Planting Activities Contributing to Tomorrow's Beetle Attacks?

One in four trees in BC's forests are lodgepole pine. Yet the ratio of pine currently being planted far surpasses that number. In fact, there has been a tendency to "off plant" pine, meaning that after logging forests where pine trees were only nominally present, companies replanted pine in droves. Why? Because pine grows fast, and it's a cheap way for companies to meet their reforestation obligations.

Successive Ministry of Forests annual reports show that lodgepole pine is among the most prevalently planted trees in the province today. In the 10 years ending in 2002/2003, pine comprised over 42 per cent of all trees planted. And in 2000/2001, close to one in two of all the trees planted were lodgepole pines.

Significantly, the data contained in the following table does not capture what may be a huge upswing in the number of pine trees planted. The first of two big logging increases occurred in 2002, and there is often a lag of two years between when companies place their requests for new seedlings and when planting occurs.

Year	Total seedlings planted (million)	Lodgepole pine planted (million)	Per cent pine
1993/94	226.49	87.17	38.4
1994/95	249.56	96.93	38.8
1995/96	259.80	107.63	41.4
1996/97	238.48	97.51	40.8
1997/98	232.98	97.14	41.6
1998/99	206.04	94.07	45.6
1999/00	230.50	96.21	41.7
2000/01	201.08	93.55	46.5
2001/02	201.25	90.43	44.9
2002/03	184.39	82.78	44.8
TOTAL	2.23 billion	943.42	42.3

Source: British Columbia. Ministry of Forests. Annual Reports 1993/94 through 2002/03.

There are significant reasons to be concerned about favouring pine over other species when replanting decisions are made. First, entomologists and foresters are alarmed by the unprecedented severity of the current beetle outbreak. Normally, beetles favour attacking older trees (80-plus years). But recent field studies confirm that a preponderance of beetles and a finite number of pine trees are resulting in trees as young as 30 years of age being attacked. This suggests pine plantations may be vulnerable to attack.

While not directly addressing a pine-centric planting history, the Ministry of Forests, in a 2004 public discussion paper acknowledged that planting decisions may prove to be a decisive factor in curbing future beetle outbreaks. It notes: "Where ecologically acceptable, plant species other than pine to lessen future problems with mountain pine beetle outbreaks."[49]

Restoration

Restoration in the context of ecosystems is challenging because things are never static. In fact, they are often quite dynamic. Prior to industrial forestry's arrival in the Interior, for example, lodgepole pine forests were regularly subject to fires, many the result of lightning strikes, others deliberately set by First Nations intent upon creating forage for game species and to encourage the growth of edible plants. Without the dramatic changes following fires, our Interior pine forests would not be here. Fire was essential to their regeneration. Now, of course, we have the ability to plant seedlings on a massive scale following disturbances of a different kind, such as logging.

Today's beetle outbreak highlights just how dynamic the forces at play in our Interior forests are. Layer on top of that the dynamics of climate change, and the only certainty about what lies ahead is uncertainty.

What *is* clear, however, is that a more varied landscape will be less prone to the kind of widespread devastation now being witnessed throughout the Interior. Through adapting our management techniques we can create more of a patchwork quilt of forests of different ages and species on the landscape and encourage the breakup of continuous expanses of even-age forest through restoring or creating grasslands. In so doing, we promote greater biological diversity and make it less likely that beetle attacks of the severity now being seen will be replicated in the future.

Doing Nothing Has its Place

Part of any restoration plan should be to view the preponderance of dead trees on the landscape as — in some respects — a good thing, and good both from an ecological and economic perspective. Take, for example, areas of mixed forest where beetle-attacked pine trees intermingle with trees of other species. In such settings, the dead trees provide important habitat and structure. They are vitally important to a range of wildlife species, cavity-nesting birds being one example. When these dead trees fall over, they provide further ecological benefits as they decay. They also provide economic benefits. Dead trees, particularly when they fall over, provide openings in the forest. This natural means of thinning the forest has tangible benefits from a wood fibre perspective. We know, for example, that when forests are thinned, the surrounding trees respond by growing more rapidly, and that the small openings created by fallen trees also provide space and light for new trees to take seed — all of which benefits those who one day may take timber out of such forests.

Simply doing nothing in some expanses of pure pine forests that have been attacked by the beetles may also make sense for ecological reasons and for purposes of research. For example, if reasonably large pockets of dead pine trees are left behind as untouched islands in otherwise logged areas, the islands may provide important sources of shade that moderate snow melt and precipitation. They also may provide important structure and habitat for other plants and animals. And, because they are in logged areas with roads built to them, they are more easily accessible to researchers. Scientists can use these islands of dead trees to learn how natural processes unfold — for example, how these areas naturally regenerate with new trees.

Large expanses of dead pine trees on the periphery of protected areas or in the winter range of certain wildlife species such as woodland caribou could also be beneficial. For example, terrestrial lichens may continue to grow in such areas, providing a vital food source for caribou — a food source that would not be readily available in clear-cuts, and most certainly not in densely stocked, young tree plantations.

Thus, doing nothing has its place and can play an important role in restoring greater diversity to our Interior forests. But just as doing nothing has its place, so too does doing something. The following sections provide a range of options open to the provincial government that could have important ecological and economic payoffs.

Learning to Live with Fire

At some point in time, the provincial government must recognize that fire needs to be used as a management tool in Interior forests. The strongest argument for this is that fires built our Interior pine forests in the first place. Fires destroyed trees, yes, but they also caused pinecones to fall and open, triggering new rounds of renewal. The fact that we have so many older pine trees on the landscape today — much more, in fact, than a century ago, and despite all of our logging activity — is explained in part by our attempts to suppress fires. It stands to reason then that if fires are nature's way of regenerating pine forests, and we do our best to take fires out of such ecosystems, we are — excuse the pun — playing with fire. Something will step in to take the fires' place, claiming the pine trees by other means. In this case, the beetles, and, following on their flights, a logging industry engaged in an unprecedented mop-up operation.

Controlled burning of both beetle-attacked and non-beetle-attacked forests may be a worthwhile area of future endeavour, one that the provincial government, as guardian of our public forests, is best positioned to oversee.

Deliberately set and carefully managed burns would have enormous benefits. For one thing, they would create more of a patchwork quilt on the landscape. And patches of uneven-aged trees are precisely what are needed to break up the homogenous tracts of even-age pine trees that are fuelling the current outbreak.[52]

Another byproduct of deliberately set fires, particularly those set in areas where new trees have potential to grow and grow well, is that they may assist in efforts to replant or reforest such lands. A tricky and as yet largely ignored issue pertaining to replanting efforts in unlogged tracts of beetle-attacked forests is that standing dead trees may with the increased passage of time present hazards to workers and seedlings alike. Dead trees eventually fall, damaging what is underneath. To the extent that deliberately set and carefully controlled fires might set the stage for future replanting efforts, they should be used as part of a broader reforestation strategy.

Deliberately set and carefully managed burns would have enormous benefits. For one thing, they would create more of a patchwork quilt on the landscape. And patches of uneven-aged trees are precisely what are needed to break up the homogenous tracts of even-age pine trees that are fuelling the current outbreak.

Expanding Grasslands

There is a great deal of evidence that fire suppression contributes to what ecologists call forest encroachment. Areas that were once free of trees are now covered in them. In many cases, these areas were once open grasslands where trees were largely absent due to frequent fires.

Today, grasslands are among our rarest and most threatened ecosystems. By deliberately setting and carefully controlling fires, the province could play a pivotal role in expanding grasslands in BC, thereby increasing biological diversity. An added benefit of such work is that grasslands would serve to break up continuous expanses of forest, thereby disrupting the ease with which future pest populations could spread.

Deliberately set and carefully controlled fires in areas filled with dead pine trees might also be more desirable than taking chances on future wildfires occurring at times and in places where our ability to respond was compromised or where human populations could be at imminent risk. And make no mistake, the potential for such fires covering widespread areas is real given the preponderance of dead and dry pine trees that are quickly increasing in number.

Reforestation

The last of our three Rs, reforestation, brings us back to where this discussion began. As previously noted, government funding of reforestation and stand-tending efforts throughout much of the 1980s and 1990s was significant. It played a pivotal role in reducing a large backlog of lands that were denuded by previous logging activities, forest fires and pest outbreaks. Once again, we are on the cusp of what is likely to be the greatest reforestation challenge yet confronted in the province. It is a challenge that must be addressed if we hope to have a viable and strong forest industry contributing to the social and economic wellbeing of the province in the years ahead. And it must be very carefully carried out so that the decisions we make today fit with our understanding of the warmer climate that awaits us in the future.

We need firm commitments from the provincial government now on reforesting a portion of the lands attacked by the beetles and not logged by forest companies (who bear legal responsibility to restock whatever lands they harvest). The key two words in the preceding sentence are *a portion*. It would be ecologically, not to mention economically, irresponsible to attempt to plant all such lands. As noted, some lands should be left alone to evolve in their own ways. Many more would benefit from other human interventions — burning or mechanical clearing of trees to make way for grasslands being but two examples. Still other lands affected by the outbreak will likely be in marginal areas where vigorous tree growth is unlikely, making them poor candidates for investment. Finally, some lands will simply be too remote or isolated to warrant such investments.

We have also learned that replanting efforts must be more carefully managed than in the past. A changing climate and a preponderance of older pine on the landscape demands this. Future efforts should focus on ensuring we have a greater diversity of tree species and, equally important, tree ages across the landscape. The oversight of such a comprehensive reforestation or forest health program should not be left to the companies, but rather requires rigorous government oversight.

With 300 million to 700 million cubic metres of dead pine trees unlikely to be logged by industry, a sizeable area of public forestland would be suitable for replanting efforts. The primary responsibility for addressing reforestation challenges on those lands properly rests with the provincial government. Given Ottawa's already sizeable investments in beetle-related initiatives, it seems highly unlikely that BC can attract more federal dollars without first demonstrating its own commitment to invest substantially in research, restoration and reforestation efforts on those lands in the years ahead.

From Deforestation to Reforestation: Conclusions and Recommendations

1. *Given the sizeable area of forest that will be killed by beetles and not logged by the forest industry, the BC government should immediately fund an initial five-year reforestation and restoration program at an annual rate of $100 million.*

   There is historic precedent for such expenditures and measurable gains in terms of past areas of denuded forest rehabilitated. This commitment would in all likelihood be a vital first step in what is likely to be a prolonged period of public reforestation efforts.

2. *Once the provincial government commits to fund an initial five-year reforestation effort, it should immediately seek the federal government's participation, ideally on the basis of matching funding. Failure to secure federal funds should not, however, lessen provincial obligations.*

   Again, there is historic precedent for cost-shared, multi-year reforestation agreements. Ottawa may be convinced to participate for a number of reasons. First, the current outbreak has the potential

to spread into the boreal forest and across the country. This is not just a BC problem. Second, forestry activities in BC enrich Ottawa's coffers as well as BC's. Third, vigorously growing forests sequester carbon, whereas dead forests release carbon. A country such as Canada, struggling to meet international commitments to reduce CO_2 emissions, can use reforestation activities to meet at least part of its commitments. While the deliberate burns advocated elsewhere in this paper would undoubtedly offset some of the gains made through replanting efforts, such burns might reduce chances of larger, uncontrolled fires that pump even more carbon into the atmosphere.

3. *Given the threats posed to resource-dependent communities by both the beetles and today's escalated logging activities, the BC government should immediately chanel $18 million per year for the next five years into intensive silviculture efforts in the Interior. This initial commitment should be in addition to the annual $100 million reforestation investment recommended above.*

   Thinning and spacing of trees, two activities commonly associated with intensive silviculture, do at least two things that are of benefit to those interested in moving wood out of forests and into mills. First, they provide a small portion of wood now. Second, they encourage more rapid growth of the remaining trees by providing more light and space. Third, they can, as part of a broader forestry program, help to "beetle-proof" some tracts of forest, making them less vulnerable to attack.

   The proposal to utilize one quarter of the funds from the Forest Investment Account's land-based program for these activities is based on the fact that one quarter of the standing trees in our provincial forests are lodgepole pine and are therefore susceptible to attack. The above recommendation assumes that the provincial government will continue to move money out of general revenues into the Forest Investment Account in recognition of forestry's importance to the social, economic and environmental wellbeing of British Columbians.

4. *The BC Forest Service should immediately hire additional staff in districts most directly affected by the outbreak. New personnel would form district forest health teams and have adequate fieldwork budgets. Each team would consist of people with research and field expertise in forest ecology, entomology, inventory, reforestation, climate modeling and ecosystem restoration. Their primary task would be to coordinate industry and government responses to pest outbreaks and other forest disturbances now and in the future.*

   As with other provincial ministries, BC's Ministry of Forests has experienced deep staff and budget cuts in the past decade, the severity of which has been noted with concern by forestry professionals outside of government, including the Association of BC Forest Professionals. Given the obvious social, economic and environmental importance of our forests, additional Forest Service staff is required to meet the task of effectively responding to the outbreak. With the provincial government recording surpluses, the money exists for additional hires. Moreover, new hires are a justifiable public investment given the social, economic and environmental importance of the province's forests to the people of British Columbia.

5. *As with the dramatic uplift in logging rates in response to the beetles, there should be a corresponding increase in the area ruled off limits to commercial logging.*

   The elevated logging now underway is unprecedented, and will result in far more rapid growth of forest plantations than would otherwise be the case. Countering such growth with a corresponding rise in areas ruled off-limits to conventional forestry makes sense ecologically as well as economically. A contributing factor to the severity of today's beetle outbreak is the preponderance of even-age, older pine trees on the landscape. By interspersing new conservation areas with plantations, more of a patchwork quilt of forests would prevail, thus blunting the effects of future pest outbreaks. Forest conservation in this context would not be in the form of protected areas or parks. Rather, these areas would be managed with several objectives in mind. First, they would be left alone

following the beetle attack to recover on their own — a process that would unfold over decades. Later, they might be thinned to open the forest up, making it harder for beetles to move from tree to tree. Still later they might be burned to create new habitat. Or they might be managed with specific wildlife species or forest ecosystems in mind, for example woodland caribou or older "climax" forests.

6. *The BC Forest Service should immediately initiate discussions with forestry firms and tree-planting companies to prioritize which areas of unlogged, beetle-attacked forest are most suited to replanting efforts, and which are not.*

7. *The Forest Service should work closely with climate scientists, forest geneticists and others to ensure that a wide range of planting strategies are employed and that they are carefully monitored over time. Such a diversity of approaches is critical if the aim is to create a patchwork landscape in our Interior forest that is more resilient to future insect infestations.*

   Climate change is often cited as a major contributor to today's pest outbreaks. Simply logging beetle-attacked pine forests and converting them to extensive pine plantations may not be appropriate. Rising temperatures may make many logged sites more suitable to planting with alternate species.

8. *The Forest Service should work closely with forest companies to ensure that as much as possible clearcutting does not occur in mixed forests where beetle-attacked trees are interspersed among other tree species.*

   This will help to ensure that a greater diversity of trees of different ages are found on the landscape, which in turn will lessen the speed and spread of future beetle outbreaks.

9. *The Forest Service, in consultation with communities, the forest industry and other government agencies, should immediately initiate a comprehensive controlled-burning program.*

   Controlled burns hold the promise of reducing what are likely to be highly problematic fuel loads as dead, beetle-attacked trees age. By clearing away trees, burns can also be used as a tool in future reforestation efforts. In addition, they can help to break up the landscape into more of a patchwork of open and forested areas, which would make future forests less vulnerable to the kind of sweeping insect infestations now underway. Finally, deliberately set fires in the right places and at the right times might also make it harder for future and more severe uncontrolled forest fires to threaten human populations.

PART TWO

Fair Value for Public Timber: Paying for the Action Plan

As the British Columbia government's *Mountain Pine Beetle Action Plan* attests, the scale of the ongoing beetle attack is so great that there will be significant consequences for Interior communities and the general public as logging rates rocket up and then crash.

In the short-term, many communities will experience sharp upswings in economic activities related to the logging and processing of beetle-attacked timber. There will also be large increases in reforestation efforts as companies replant the lands they log. Replanting efforts may be further bolstered as a result of an infusion of provincial funds for reforestation and various silviculture initiatives on lands not commercially logged by the forest industry.

However, it must be remembered that any replanting or stand-tending efforts will be short-lived, providing only temporary and seasonal job opportunities. Moreover, the benefits that such work provides — new trees growing on denuded lands and/or more trees growing faster as a result of tree-thinning and other efforts — will yield tangible results only a long way down the road, several decades in most cases.

Knowing that challenging times lie ahead, it is vital that the provincial government, on the public's behalf, collects the proper amount of funds from the companies benefiting from today's increased salvage logging activities. Even more important, any additional funds collected must be reinvested where it matters most, in the rehabilitation of our publicly-owned forests.

It may seem obvious, but nonetheless deserves mention, that by logging an additional 11 million cubic metres of Crown timber per year, a lot more money is being made by forest companies and a lot more money is flowing into government coffers, and from there into various public programs. Critical, from a public policy perspective, is whether the added funds adequately capture the full value (economic rent) of what is logged — all the more so when considering a future decline in logging rates that must occur in order to bring logging rates back to sustainable levels.

During the last major beetle outbreak in the province — one that swept across the Chilcotin Plateau west of Williams Lake in the 1980s — the prevailing opinion in government and forest industry circles was that the attacked pine trees would quickly lose most if not all of their economic value; hence the need to log them and to do so as quickly as possible. This proved largely untrue. When the first five-year "salvage" licences issued to companies to log beetle-attacked wood ran out, new licences were offered. In essence, the temporary salvage-logging program became a semi-permanent fixture of forest industry activity on the Chilcotin Plateau, with more than 15.6 million cubic metres of additional timber logged.[53] There was a fairly simple reason for this. The tracts of attacked forest were generally dry to begin with. As a result, the dead pine trees retained their value for lumber and pulp production long after the beetles had moved on.

In addition to the favourable climate, one reason for the salvage program's longevity was that many of the trees logged under the program required payment of only the second-to-lowest stumpage charge (the lowest is zero, and applies to a tiny portion of virtually unusable wood). For each telephone pole's worth of wood coming out of the forest the provincial government, on the public's behalf, frequently collected just 25 cents from the logging companies.

Knowing that challenging times lie ahead, it is vital that the province, on the public's behalf, collects the proper amount of funds from the companies benefiting from today's increased salvage logging activities. Even more important, any additional funds collected must be reinvested where it matters most, in the rehabilitation of our publicly-owned forests.

The extent of the current beetle outbreak is far beyond anything seen in the 1980s, and the proposed response to today's outbreak — another dramatic escalation in logging rates — will easily dwarf the earlier salvage program. Once again, much of the additional wood coming out of beetle-attacked forests is assessed the 25-cent stumpage fee. (While it may be argued that forest companies might choose not to log in the event that the nominal 25-cent stumpage rate was set higher, the companies have been aware for quite some time that the provincial government was considering changes that might see that rate increased. This has not stopped some of them from making substantial investments in upgraded sawmills.)

Two reviews of the unfolding beetle outbreak spearheaded by the province's Chief Forester have resulted in dramatic logging increases in the areas most heavily hit by the beetles. As previously noted, the first increase upped annual logging rates by 5.5 million cubic metres of timber per year.[54] That increase was followed three years later by another of almost equal magnitude. The result is that in just seven years close to 63 million cubic metres of additional timber, or more than four times all the wood that was salvage-logged on the Chilcotin Plateau, could come out of Interior forests. Once again, this salvage-logging activity is well beyond what the government considers sustainable both in the short and long term. The end result will be a dramatic "falldown" in future logging rates — and in the not too distant future (see *The Coming Falldown*).

That at least a good portion of the soon-to-be-salvaged wood will retain its value for a number of years to come is confirmed in recent moves to dramatically increase sawmilling capacity in key communities in the province. In anticipation of all the extra public timber being made available to them, companies like Canfor and West Fraser Timber have invested or are poised to invest millions of dollars in upgrades to sawmills in Houston, Vanderhoof and Quesnel (see *More Dollars In, More Lumber Out*).

A key question from a public policy perspective is whether the increased number of logs flowing into those mills and others will be adequately assessed to confirm that the companies are paying sufficient stumpage fees on the trees they log.

Questions on this subject remain difficult to answer, and consequently suspicions abound, because

it falls largely to the companies doing the logging to determine the stumpage paid both for beetle-attacked and healthy green trees.

This wasn't always the case. Until the late 1980s, every tree logged in the province was hand measured by a government employee known as a scaler. These measurements determined what the companies paid in stumpage to the province.

Most log hauls contain a number of pieces. To properly assess a haul involves an accurate measure both of the volume and the value of the load, with values varying widely depending on the species of logs and their grade. Individual logs differ markedly in terms of their grade based on a host of physical

The Coming Falldown

For generations, foresters in British Columbia have known of a looming decline or "falldown" in future timber supplies.

The reason for the decline is generally understood to be a consequence of logging old-growth forests. Because they are dominated by older and generally larger trees, old-growth forests tend to have greater volumes of wood than do the younger tree plantations or forests that replace them — hence a projected decline in available wood over time.

What earlier generations of foresters may not have foreseen, however, is just how much deeper the decline could become in light of other events such as beetle outbreaks.

We now have an idea of just how bad it could be, and it comes straight from BC's Forest Service. In June 2004, the Forest Service's Forest Analysis Branch published what it called an "expedited timber supply review" for those regions of the Interior most severely affected by the mountain pine beetles and the escalated logging rates initiated in response to them.

The review looked at three large timber supply areas — the Lakes, Prince George and Quesnel — where logging rates had recently increased by a combined 5.5 million cubic metres of timber per year in response to the beetles. The review contemplated future logging increases of a similar magnitude, setting the stage for an announcement by BC's Chief Forester a few months later that did just that.

As the old saying goes, however, what goes up must come down. The following table displays the increased logging rates proposed in the review and later approved, and compares them with projected logging rates 10 years from now.

Timber Supply Area	Cut 2005 (million m^3)	Cut 2015 (million m^3)	Decline (per cent)
Lakes	3.17	1.4	55.8
Prince George	14.8	8.2	44.5
Quesnel TSA	6.0	2.0	66.6

Source: Expedited Timber Supply Review for the Lakes, Prince George and Quesnel Timber Supply Areas: Public Discussion Paper. British Columbia. Ministry of Forests. 2004.

The declines in logging rates actually begin sooner than one decade from now, in many cases dropping precipitously in about five years. They dip down even lower in subsequent decades.

But for purposes of this paper, the figures in this small table reveal the big picture, which is that where there are booms there are busts. This bust promises to be great, and it may be particularly prolonged if investments in reforestation and intensive silviculture fail to be made.

characteristics including frequency of rot and knots, diameter and twist. A log free of knots will always receive a higher grade than a log with a lot of knots. A log suited only for chipping and wood pulp is assigned a lower value still. Public servants used to make all of these determinations, with the work performed by Forest Service scaling staff. This work ultimately established what the companies paid in stumpage fees to the Crown.

Today, Forest Service scaling staff persons are essentially auditors. They "check scale" various log loads that have previously been scaled by forest company employees or contractors. The amount of auditing has, however, declined dramatically in recent years. As detailed in a 2004 report by the Sierra Club of Canada's BC Chapter, Forest Service scalers are 40 per cent fewer in number than they were just 10 years ago. The decline means that on average government scaling personnel audit just one out of every 147

More Dollars In, More Lumber Out

With armies of beetles having attacked millions of pine trees, forest companies are gearing up for what may be the last great sawmilling bonanza in BC's Interior.

Upgrades at facilities, including one in Houston, BC (which is today the largest production sawmill in the world), mean that record volumes of two-by-fours and other lumber products will be churned out for the next five to 10 years.

The most recent round of upgrades began in February 2004, when Canfor Corporation officially re-opened its refurbished Houston sawmill after an investment of $26.4 million. The upgrade meant the company was able to increase its annual output from 450 million metric board feet to 600 million. The sheer size of the Houston mill may explain why the upgrades at the facility helped increase Canfor's profitability across the board. According to Canfor divisional controller Leroy Reitsma, the upgrade was part of a wider company initiative called the Cost Reduction/Margin Improvement or CRMI program.

"While reducing conversion costs at this mill by 24%, the project has allowed us to reduce Canfor's overall conversion costs across the whole company by $4.51 per thousand board feet," Reitsma told the industry trade publication *Timber Processing* in September 2004. This came on the heels of a 30 per cent increase in production at the mill between 1996 and 2002, Reitsma added, a gain made without any capital investments.[55]

In February 2005, Canfor announced record net income for 2004 of $420.9 million. It also used the occasion to announce it would invest $104 million at a sawmill in Vanderhoof, which would land the company another mill on par with Houston. Canfor made clear that the investment was, at least in part, a response to all the added beetle-attacked wood being made available.[56]

Another major sawmill upgrade in the heart of one of the most intensely beetle-attacked areas is scheduled for Quesnel, where West Fraser plans to invest $100 million, a move that will increase the mill's production by more than one third.

While bigger mills are often the driving economic forces in Interior communities, there is a catch. As the Central Interior Lumber Association noted recently:

> *There's just one cloud on the horizon: What happens when the AAC [allowable annual cut, essentially the amount logged each year] falls back in five or seven years, after the best of the pine has been logged? Is there room for both these expanded, super-efficient mills and smaller mills operated by the same companies or their competitors in other communities?*[57]

It's a question much on people's minds. And the wait for an answer may not be long. Just as logging rates rapidly climbed in response to the beetle, the pendulum will inevitably swing back with a corresponding if not deeper decline in future logging rates.

truckloads of logs to determine whether company scales are accurate. In the absence of hiring additional public servants, the job of spot-checking or auditing forest companies will be even more onerous in the months ahead, as logging rates increase in response to the beetles.[58]

With government scaling activities reduced essentially to an auditing function, the work falls primarily to the companies to assess both the volume and value of the loads coming into their log yards.

Before this is done, however, companies submit estimates on the timber to be logged in the coming year. The estimates are stratified in a number of ways and then submitted to the Forest Service for approval. Once approved, log loads arriving at mill yards are placed into a particular stratum or classification based on the judgement of a company employee. With the decision on classification made and the log load weighed (known as a weigh-scale), a stumpage calculation is made for the load. The assigning of a classification determines how often forest company scaling staff are required to hand-measure an incoming load to gauge whether the weigh-scale accurately captures the full volume and value of the load. The Forest Service sets as an objective checking the limited number of company hand scales once every 10 times. To do this, a Forest Service scaling official will make a random, unannounced visit to a particular mill to re-measure a load previously hand-scaled by the company.

In interviews with existing Forest Service scaling staff this report's author was previously told that, in large part, government audits of forest company scales appear to confirm that the companies accurately report the volume and value of what they log. However, as noted in the Sierra Club's *Axing the Forest Service* report, a long-time scaler with the provincial government said Forest Service scaling staff were "pressed" to meet the objective of spot checking each active forest company scaler at least once every two months. And even then, it is quite common for the element of surprise to be absent from such inspections. That is because forest companies are told to leave the last load scaled at the mill yard each day on the ground for possible re-inspection. "In other words," the Sierra Club report concluded, "company scalers have great incentive to ensure that the last load of the day is scaled with precision because that is the load that is most likely to be inspected."[59]

Forest Service scalers are 40 per cent fewer in number than they were just 10 years ago. The decline means that on average government scaling personnel audit just one out of every 147 truckloads of logs to determine whether company scales are accurate.

Another important question relating to the public getting fair value for the timber from its forests is whether the 25-cents-per-cubic-metre stumpage payment should, in fact, apply to much of that wood. The nominal 25-cent payment has existed for decades, and was chiefly designed to deal with wood of low economic value. It applies to logs with assigned grades of 3, 4, 5 or 6. For purposes of this paper, the most important of those grades is Grade 3. A grade of 3 is assigned to so-called "dead and dry" logs. Depending on their age and condition, such logs may be difficult to process successfully into lumber. However, the fact remains that these logs are being turned by the drove into lumber at sawmills throughout the Interior.

Clearly, a lot of the pine that is currently logged is assigned the minimum stumpage rate. At present, salvage-logging activities are most pronounced in four Interior forest districts — Nadina, Prince George, Quesnel and Vanderhoof. Using the provincial government's harvest billing system, industry activities can be broken down by the tree species logged.[60] Table 4 presents information on the total amount of lodgepole pine trees logged in the four districts as of the 12 months ending March 31, 2005. It also shows the volume of pine that is considered sawlog material, but because of its dead and dry distinction is billed out at just 25 cents per cubic metre (m^3).

As Table 4 indicates, there is significant variation between districts. This occurs for a few reasons. First, the area of pine forest changes from district to district. Moreover, expanses of pure pine forest vary

widely from place to place. In other words, in some forests attacked by the beetles pine trees are more commonly intermingled with other tree species; in others the trees are almost completely pine. Second, companies are somewhat limited in the amount of attacked trees they can log in a season due to issues of access. Roads, bridges and in some cases barges must be in place to move logs from areas that are harvested onto trucks and from there into the mills. Third, because the outbreak was initially more intense in some areas, some districts have more of a problem on their hands right now than do others.

The high volume of Grade 3 logs in the Quesnel Forest District, for example, indicates an outbreak that was intense from the get-go. As a result, it has a more extensive area of attacked forest than other districts do at this time. The key words being *at this time*. Given what foresters know about the beetle outbreak's projected spread, it is very likely that we will see rises in the overall percentages of dead and dry pine in the other three districts that will be begin to rival Quesnel's. In addition, the province's Chief Forester could approve beetle-related logging increases in other parts of the province where the outbreak is also occurring, including the Kamloops, Chilcotin, 100 Mile House, Merritt and Kootenay Lake forest districts. Again, such increases would likely be accompanied by corresponding rises in the percentage of logs coming out of the bush that are deemed dead and dry and graded 3.

The stumpage paid on a log load of Grade 3 logs would be $8.75. If the truck carried sawlogs, however, the stumpage paid would ratchet up to between $1,050 and $1,540.

In the absence of changes to the schedule of log grades, this will result in a situation in which more and more of BC's annual log harvest is assessed a 25-cent-per-cubic-metre stumpage payment. To reach revenue target rates (something we will discuss in a moment), other logs that have not been attacked by the beetles will have to be assigned higher stumpage rates in order to compensate for a growing shortfall.

Why should the public be concerned about this?

The answer in one simple word is price. The prices paid for sawlogs vary a lot. For example, a log assigned a grade of 3 generates a 25-cent stumpage fee, whereas a sawlog from the same region might command between $30 and $44 a cubic metre. How do such differences play out on the ground? Consider the following example of two logging trucks, one loaded with Grade 3 logs, the other with sawlogs. The average highway logging load is roughly 35 cubic metres. The stumpage paid on a log load of Grade 3

Table 4: Percentage of "Dead and Dry" Pine Logged in Four Districts

District	Total pine logged (million m^3)	Pine sawlogs (million m^3)	Dead and dry pine sawlogs (million m^3)	Dead and dry (per cent)
Nadina	3.57	2.35	0.76	21.3
Prince George	5.05	2.46	1.87	37.0
Quesnel	3.84	1.75	1.84	47.9
Vanderhoof	4.13	2.17	1.38	33.4
Total	16.59	8.73	5.85	35.2*

* This means that more than one third of the pine logs harvested were assigned a grade of 3 and billed out at the nominal stumpage rate of 25 cents per cubic metre.
Source: Harvest Billing Data. British Columbia. Ministry of Forests. 2005.

logs would be $8.75. If the truck carried sawlogs, however, the stumpage paid would ratchet up to between $1,050 and $1,540.

Obviously, a shift from one log grade to another can have huge implications for the provincial government when it comes to stumpage revenues. At this time of heightened concern over the future of forest industry activities in the Interior it only makes sense to review whether some wood generating minimum stumpage charges could, in fact, be assigned a higher grade. And that is precisely what is happening. According to a qualified scaler familiar with the issue, but who asked to remain anonymous:

> *As far as changing the schedule of timber grades, there is a review underway. There is consideration being given to doing away with the dead and dry distinction, so that the moisture content would have no bearing on whether we grade it one way or the other. The talk to this point is there would be a premium sawlog with more stringent criteria — less twists and knots. The next would be a regular sawlog, and we would do away with the dead and dry distinction.*

The same scaler said that in many cases Grade 3 logs can actually be cheaper to process than green logs for the simple reason that their moisture content is much lower. Because green logs come from trees that were alive when they were cut, their moisture content is often high. When such logs are processed into lumber, the lumber must then be placed into kilns where heat is applied to lessen the moisture content. Lumber produced from Grade 3 logs does not have to be kiln-dried, or not for as long, meaning there is less cost, not more, to make the finished product. Given this reality, is it reasonable for companies processing such wood to pay less for it?

As for the value of the finished products produced from beetle-attacked trees, BC's biggest forest company reports that there is little to distinguish the wood produced from many dead and dry pine logs versus their green equivalents. In a September 2004 article on Canfor's Houston sawmill, which at 600 million board feet of annual production makes it the world's largest, it is noted that:

> *Although lumber that has been attacked by the Mountain Pine beetle will have some cosmetic imperfections, lumber produced from these logs does not suffer any structural damage and can still be used for most products, including MSR (machine stress rated) lumber.*[61]

In other words, the wood is just fine for what the company produces — lumber.

Paying for the Action Plan: Conclusions

Logging and processing large volumes of additional timber is not done without cost. As noted previously, some companies have invested substantially in upgrades at existing sawmills to handle the added beetle-attacked wood that is now, or soon will be, moving through their facilities. These investments should not be downplayed. In almost all commodity production, new investments must be made. Failure to do so results in diminished competitiveness, ultimately undermining the financial viability of operations and in the worst cases leading to closures, something no community or workforce wants. Recent investments in Interior sawmills should, at least in part, be viewed in this light.

There is, however, another important reason for such investments, namely, the desire to increase profits by moving more wood through mills at reduced per-unit costs.

The provincial government, and in particular the Forest Service, has every reason to be happy with the fact that there is active interest on the industry's part in logging much of the beetle-attacked forest. For one, every time a company logs such a forest, it is legally obliged to ensure that a new crop of trees, growing freely from competing brush, is established on the logged site. For another, it ensures that at least some social and economic value is extracted from those forests now rather than many decades down the road when those forests have regenerated on their own. The challenge, however, is to ensure that as much as possible any additional logging activity is spread out over as long a period as possible. This

allows for jobs and benefits over the long term as opposed to a one-time sharp increase followed by a significant falldown in future logging rates and related employment opportunities.

A desire to obtain optimum stumpage payments from the companies doing the salvage logging must be tempered with fiscal realities. A stumpage rate set too high may discourage logging, something the provincial government, through its response to the beetle outbreak, clearly does not want. On the other hand, a stumpage rate set too low undervalues the resource. When resources are undervalued, the public is short-changed.

Is a lot of the beetle-attacked timber, currently assigned a stumpage billing of 25 cents a cubic metre, worth more than that? This is something the current government review of timber grades seeks to address (the review and a new schedule of grades is to be completed and in place by April 1, 2006). With so much Grade 3 wood coming off of public forestlands, and with a looming falldown in not-too-distant logging rates, it is vital that the appropriateness of log grades and hence stumpage rates be reviewed and adjusted.

A stumpage rate set too low undervalues the resource. When resources are undervalued, the public is short-changed.

Having said that, it does not necessarily follow that eliminating a log grade such as Grade 3 will result in increased overall stumpage revenues. Every three months, the provincial government establishes a new target or average stumpage rate for the Interior. To meet the revenue target, stumpage rates applied to logs of lower grades are offset by higher stumpage rates applied to logs of greater value. Using an overly simplistic example, if the total log harvest was just two cubic metres and the target rate was $20 per cubic metre, then if one cubic metre was assessed a stumpage fee of $10 the other would have to be charged out at $30.

The current review of log grades may conclude that there should be a new classification for sawlogs, with dead and dry logs currently graded 3 moving into a new category that lumps dead and dry logs in with green sawlogs of average value. The end result could be a new and significantly higher stumpage rate for logs that were previously assessed stumpage payments of 25 cents per cubic metre. But such an increase would not necessarily result in a jump in *overall* stumpage revenues. Depending on the revenue target rate, there could be a corresponding *decrease* in the stumpage rates applied to logs of higher value with overall revenues remaining neutral. It all depends on the setting of the target rate, a rate that takes into account the provincial government's fiscal objectives.

It is the position of this paper that if the government recognizes that many logs have historically been undervalued, then it should change the grades so that the full value of the logs is captured and raise its revenue target rates accordingly. Raising the target rates would provide an important source of new revenues to the government that it could then invest in reforestation and restoration efforts without having to divert funds from other public programs.

There are, of course, other means of determining the value of logs. Many people have suggested for quite some time, for example, that expanded and competitive log markets of one form or another would better determine what companies pay in stumpage and offer an attractive alternative to an administered timber pricing system. And, in fact, the provincial government has made significant moves in this direction through the recent implementation of a market-based pricing system on the Coast. Under the new system, prices paid for wood auctioned through BC Timber Sales are used to set the stumpage rates paid by companies on their tenured holdings. This has yet to occur in the Interior, however, where lumber production is much more closely tied to the US market, and where litigation and on-again, off-again negotiations drag on over American assertions that Canadian softwood lumber production is subsidized. Imposition of a market-based pricing system in the Interior has also been complicated by the beetle outbreak, which is resulting in massive increases in the amount of wood moving through the system, and the prospect of new log grades.

So, for the moment, the Interior is a hybrid. Most of the timber there is subject to an administered timber pricing system, while a sizeable minority is auctioned through BC Timber Sales. Significantly, the auctioned timber, including tracts of heavily beetle-attacked trees, have commanded prices well in excess of the stumpage rates companies pay on their forest tenures, which are subject to the administered pricing system. This suggests that more widespread auctioning of timber, or tying overall stumpage rates to the prices paid in auction, would be of overall benefit to British Columbians and should therefore be pursued (see *To the Highest Bidder — BC Timber Sales*).

Nevertheless, this paper focuses on what remains the predominant pricing system in the Interior and the immediate prospects for changes in log grades. Suffice it to say, if there is a change in lumber grades and in particular a reclassification of Grade 3 logs, the likely outcome is that stumpage rates for those logs will be higher than present. As a result, the additional revenues generated from that portion of the

To the Highest Bidder — BC Timber Sales

BC Timber Sales controls more public timber than BC's largest forest company, Canadian Forest Products Ltd., and in a few years will far surpass Canfor in the volume of timber it controls and sells in open, competitive markets.

In 2003–2004, BC Timber Sales, an arm of BC's Ministry of Forests, auctioned 9 million cubic metres of timber. If it meets its current Service Plan objectives it will, by 2007–2008, nearly double its sales hitting 16 million cubic metres. Canfor, by comparison, directly controls 11.4 million cubic metres of public timber.[62]

BC Timber Sales' main task is to sell tracts of Crown timber with sales awarded to the company or individual making the highest bid. Before auction an "upset" stumpage rate is set. The upset is essentially the minimum that BC Timber Sales will accept. It covers all the costs incurred in preparing a timber sale as well as the reforestation costs, for which BC Timber Sales is responsible. Once the upset rate is set, companies make bonus bids over and above the upset rate. The highest bonus bid secures the sale, with the winning company making a final stumpage payment that combines both the upset rate and the bonus bid.

Prices arrived at through BC Timber Sales auctions now determine what Coastal forest companies pay for public timber they log under Forest Licence and Tree Farm Licence agreements with the province. It is thought that the market-based pricing system in place on the Coast may one day extend to the Interior, but at present the Interior remains a hybrid. The majority of publicly-owned timber logged there is subject to an "administered" stumpage system, one where the Ministry of Forests analyzes markets and determines what the stumpage rates will be, while a significant minority goes through the BC Timber Sales program and is subject to competitive bid. While the objective remains to make BC's timber pricing system completely market-based, it remains unclear when the Coastal and Interior pricing systems will be harmonized.

In the interim, prices paid for tracts of beetle-attacked timber in the Interior and sold through BC Timber Sales suggest that administered stumpage prices, including prices as low as 25 cents per cubic metre, do not always capture the full value of what is logged.

For example, in the Vanderhoof and Fort St. James areas where the beetles have been active, a cursory look at timber auctioned through BC Timber Sales reveals that far higher prices are being paid. For example, on June 2, 2005 a bonus bid of $16.23 was accepted for 22,873 cubic metres of beetle-attacked wood. A week earlier, two winning bonus bids of $10.23 a cubic metre and $6.23 a cubic metre were made respectively on 11,875 cubic metres and 12,271 cubic metres of beetle-attacked wood. And the week before that, on May 19, 2005, a bonus bid of $45.07 was accepted for 18,112 cubic metres of timber in another heavily beetle-infested tract of forest.

total log harvest will also be higher. This raises an important issue. We know that much of the wood currently graded 3 has its origins in forestlands that are currently subject to highly inflated rates of logging. According to the Ministry of Forests' own projections, such logging cannot be sustained for very long. So the increases in revenues for that wood will be short-lived. Given the limited shelf-life of the salvage logging program, it makes a lot of sense to take the added stumpage revenues generated today and reinvest them in reforestation and other activities that improve forest health and economic prospects for forest-dependent communities years down the road.

Before turning to some recommendations, a general discussion on sustainable forestry is warranted. If we are guided in our thinking by a firm appreciation of the natural forces at play in forests, we establish logging rates that can, indeed, be sustained from year to year and generation to generation. That this rarely occurs is a sign that immediate social and economic needs have a nasty habit of trumping ecological considerations — even when people know at a most basic level that a healthy ecology is the foundation of healthy societies and healthy, functioning economies.

As the beetle epidemic continues to unfold, it is manifestly clear that our responses to it are seriously outstripping what our Interior forests are capable of growing. We are depleting our natural capital (whether or not much of that capital consists of dead trees is immaterial) faster than nature can replenish what we are taking.

Many people will argue that such an approach is folly. Not only does it drastically alter the landscape, but today's generation, like tomorrow's, pays the price when logging rates come crashing down. Look no further for proof of this than the BC Forest Service's own documents, which while calling for steep logging increases to salvage the dead wood, acknowledge even steeper reductions in the years ahead.[63]

Given that the government has chosen to ramp up the logging rates, however, the challenge is what should be done in response. This paper argues that the following recommendations would go a long way to ensuring that an effective response is mounted. And, more importantly, that the response is at least in part funded by higher returns to the province from the companies doing the logging.

Recommendations

1. *With Interior logging rates temporarily increased by nearly 11 million cubic metres per year in response to the beetles, a stand-alone reforestation and restoration fund should be set up and all stumpage revenues derived from the temporary increase placed in it. As long as beetle-related logging increases remain in place, so should such a fund.*

   Since this revenue stream is temporary and not something that can realistically be relied on for long-term financial planning or for the sustained funding of public programs, it ought to be treated differently — especially so when one considers that the additional logging now taking place will seriously alter the course of forestry-related activities in the Interior for years to come.

2. *After consulting with Interior communities, the province should decide how such funds should be invested in reforestation or other related activities such as tree thinning, tree spacing and tree pruning, or some combination of both. These activities are vital if we are to have something of value to log in future generations.*

3. *The Ministry of Forests should immediately publish annual reports that clearly identify the additional volume of timber logged in response to the beetles, and the stumpage payments derived from it.*

   Interior communities deserve to know the exact value of the beetle-attacked wood. At present, such information is not separated out in public accounts. This must be done so that members of the public know the exact value of this temporary revenue stream.

4. *For stumpage fees, the province should:*
    - *scrap the nominal 25-cents-per-cubic-metre stumpage charge on dead and dry pine logs (many of which have been attacked by beetles and are subject to salvage logging);*
    - *immediately increase the stumpage fees on those logs and raise overall revenue targets accordingly;*
    - *channel the increased funds into the above-mentioned special account; and*
    - *base pricing on logical terms, with arbitrarily set stumpage rates replaced by a more appropriate pricing mechanism such as log yards or market-based pricing as currently practiced on the Coast.*

    In many cases, dead and dry pine sawlogs retain their value as sources of lumber for several years after the beetles have killed the trees. For that reason BC's nominal 25-cent stumpage charges must be moved upward. If significant volumes of low-grade logs are, in fact, being successfully processed into lumber, there should be some corresponding increase in the overall stumpage fees paid by the companies doing the logging and wood-processing. Hence the need to increase historically low stumpage rates and the overall amount of stumpage paid to the Crown.

5. *The Forest Service should immediately hire additional staff to ensure that the increased number of logging trucks entering Interior mill yards are properly assessed in terms of the volume and value of their log loads.*

    In the past decade, there has been a 40 per cent decline in the number of Forest Service staff checking the activities of forest company scalers. Scalers have the important job of assessing the volume and value of log loads. Given the enormous increases in logging and processing activities taking place in the Interior today, public servants are stretched thin in monitoring industry activities. It is vital from a public policy perspective that there is a full and accurate accounting of the value of log loads entering Interior mills. Auditing activities on the public's behalf should, therefore, be increased.

6. *The province should require Interior mills to provide annual reports to the Forest Service detailing how they utilize beetle-attacked logs entering their facilities and the selling price of end products, with these findings confirmed through periodic mill visits.*

    As more and more beetle-attacked logs enter Interior sawmills, it is vital to know how such logs are processed, and what prices they fetch in lumber markets. This information can then be used to more confidently adjust revenue target rates up or down.

COLLECTIVELY, THE RECOMMENDATIONS made here and at the conclusion of Part One of this report constitute an integrated and, more importantly, hopeful course of action than the plan put forward by the provincial government — one that if followed will help to restore a greater diversity to our Interior forests.

Diversity is the key element to any viable, long-term and ultimately sustainable forestry plan. By following such a course of action now, we begin to lay the foundation for healthier forests and a healthier forest economy for future generations.

More importantly, this report maintains that one of the best ways to fund an integrated package of reforms is by getting a higher dollar value now from our publicly-owned forests. If we can achieve that, and then reinvest that money where it is most needed, we can go a long way to ensuring that at least some of the windfall from today's logging boom is used to build a better tomorrow.

Notes

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[2] Eng, Marvin et al. *Provincial-Level Projection of the Current Mountain Pine Beetle Outbreak: An Overview of the Model (BCMPB v2) and Results of Year 2 of the Project*. Canadian Forest Service and British Columbia Forest Service. April, 2005.

[3] See the *Forest Statutes Amendment Act (No. 2)*, known as Bill 75, which came into force on December 17, 2002 and which amended the *Forest Practices Code of British Columbia Act*.

[4] Province of British Columbia. *British Columbia's Mountain Pine Beetle Action Plan*. op. cit.

[5] The $140 million includes a five-year, $40-million research initiative through the Canadian Forest Service, now halfway complete, and a recent announcement of a one-time $100-million grant to the province to assist it in mountain pine beetle initiatives.

[6] This is based on an estimate of each logging truck carrying a highway load of approximately 35 cubic metres, and a truck and trailer length of 25 metres.

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[17] Parfitt, Ben and Kerri Garner. *Axing the Forest Service: How British Columbians are Losing Their Eyes and Ears in the Forest*. Sierra Club of Canada BC Chapter. 2004.

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[19] Sommer, Rick. *Government Re-structuring and the Public Interest*. Letter to BC Premier Gordon Campbell. December 20, 2004.

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[22] British Columbia Ministry of Forests. *Ministry of Forests Service Plan 2005/06–2007/08*. Province of British Columbia. 2005.

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[35] Mitchell, Janet. *Commercial Thinning of Mature Lodgepole Pine to Reduce Susceptibility to Mountain Pine Beetle*. op. cit.

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[37] British Columbia. *Budget and Fiscal Plan 2005/06–2007/08*. British Columbia. Ministry of Finance. 2005.

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[42] The responsibility to reforest logged lands extends to virtually all forest tenures held by forest companies, including Forest Licences and Tree Farm Licences. It does not apply to a relatively small number of what are called "non-replaceable" licence agreements wherein companies received one-time rights to cut a set volume of wood. Reforestation obligations also fall to BC Timber Sales, which puts a large amount of public timber up for auction and administers those sales.

[43] R&S Rogers Consulting Inc. op. cit.

[44] Ibid.

[45] B.C. Ministry of Forests. *Expedited Timber Supply Review for the Lakes, Prince George and Quesnel Timber Supply Areas*: *Public Discussion Paper.* B.C. Ministry of Forests, Forest Analysis Branch. June, 2004.

[46] Hamilton, Gordon. "B.C. raises timber cut because of pine beetle: The infestation can't be stopped, so loggers invited to salvage value." *The Vancouver Sun*. September 15, 2004.

[47] The information for the graph was supplied by BC STATS, a division of the provincial Ministry of Management Services. The data is derived from export figures supplied by Statistics Canada.

[48] Hamilton, Gordon. "B.C. forest industry the best in the world." *The Vancouver Sun*. June 2, 2005.

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[50] Parfitt, Ben and Kerri Garner. *Axing the Forest Service: How British Columbians are losing their eyes and ears in the forest.* op. cit.

[51] Ibid.

[52] For an informative discussion on the role that fires and logging can play in creating a more diversified forest land base that is less susceptible to the sort of massive beetle attack now underway, see the proceedings of the Mountain Pine Beetle Symposium: Challenges and Solutions. October 30–31, 2003, Kelowna, British Columbia. In particular, Silviculture to Reduce Landscape and Stand Susceptibility to the Mountain Pine Beetle. Whitehead, Roger, J. et al. pp 233–244. At p. 236 the authors write: "The primary action to lower current landscape susceptibility is reduction of the amount and concentration of old pine stands, which can only be done through planned stand replacement. Fire and logging are the main tools available. Targets for the desired future age-class distribution will differ depending on land use emphases, but in any case a planner should aim to create a landscape mosaic with less old pine, in smaller and more widely-separated parcels, where age-class, size and species mixes will not favour the development of large scale outbreaks."

[53] Parfitt, Ben. *Compromising the Future: Overcutting the Cariboo-Chilcotin*. Sierra Club of BC. November, 1996.

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[55] Tice, Bill. "At 600MMBF. Canfor's Houston mill emphasizes production volume and cost efficiencies." Timber Processing, September 2004. The article may be viewed at www.timberprocessing.com.

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[57] The Central Interior Logging Association. "What do mill expansions mean, long-term?" FactsFax. The Central Interior Logging Association's Weekly Log-Harvesting Industry Update. October 18, 2004.

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[59] Ibid.

[60] Harvest Billing Data for the Province of British Columbia is available at www.for.gov.bc.ca/hva/manuals/hbs/. Users can key in parameters for searches based on area, log species, log grade and revenues.

[61] Tice, Bill. "At 600MMBF, Canfor's Houston mill emphasizes production volume and cost efficiencies." op. cit.

[62] A thorough overview of BC Timber Sales and its objectives for the 2005/06 to 2008/08 period is contained in BCTS — BC Timber Sales: Service Plan 2005/06–2007/08. British Columbia Ministry of Forests. 2005. Information on forest companies and their tenured forest holdings is derived from the Ministry of Forests Apportionment System — Linkages and Licences, which is available at the Ministry of Forests' website — www.gov.bc.ca/for/. Once on the main website go to Branches and Executive, then Tenure and Revenue Division, then Resource Tenures and Engineering, then Apportionment and finally Linkages and Licences.

[63] British Columbia. *Timber Supply and the Mountain Pine Beetle Infestation in British Columbia*. op. cit.

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