Over-cutting and Waste in B.C.'s Interior:

A Call to Rethink B.C.'s Pine Beetle Logging Strategy

By Ben Parfitt
June 2007

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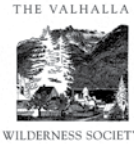

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Summary

British Columbia's mountain pine beetle infestation is among the most intense ever witnessed. It has killed millions of trees. As a result, the forest industry equivalent of a gold rush is on, with annual logging rates now more than 15 million cubic metres over previous and already unsustainable levels.

The reason for the logging increases is simple. Companies want to salvage some dollar value from the dead trees before they degrade to the point where they can't be used. But if logging rates and methods fail to conform to ecological realities, the consequences will be dire for the environment, forest industry workers and communities alike.

Yet that is precisely what is happening. The cure is turning out to be far worse than the disease. Too many trees are being logged in today's salvage logging boom. In particular, too many trees in the wrong places. While media accounts tend to portray the beetle outbreak in apocalyptic terms, it is misleading and irresponsible to suggest that Interior forests are one giant dead zone. In truth, Interior forests are highly diverse. Yes, many of them are composed almost entirely of older and now dead pine trees, making them reasonable candidates for salvage logging. But many more are mixed forests where pine trees intermingle with spruce, fir and other trees. And still others have large numbers of dead pine, but underneath the dead trees new generations of healthy trees flourish.

Clear-cutting mixed forests, or forests with healthy numbers of understorey trees, in the guise of salvage logging is doubly irresponsible. First, because lands are unnecessarily denuded, with all the negative consequences this implies for wildlife and water quality. Second, because when such forests are logged the reforestation clock is set back to zero. The seedlings planted in place of the logged trees will take 80 or more years to reach harvesting age. Yet, were such forests left alone for now and their healthy trees allowed to grow bigger still, they would be available to log in a fraction of the time – 20 to 40 years.

Such actions bode ill for the environment and economy alike. But they are far from the only problems noted in this report. Other findings are that:

- One or more fir or spruce trees are being logged for every two pine trees, with little to indicate that there has been a marked decline in the harvesting of non-pine trees at a time when every effort should be made to log just dead trees.

- Massive numbers of usable logs are being left behind on logging sites. In 2006 alone, nearly 1,300 more mill workers could have been employed in the Interior turning "waste" wood into forest products.

- Greenhouse gas emissions are swelling thanks to the burning of usable logs throughout BC. In 2006 alone, the combined CO_2 emissions associated with the burning of usable logs at Interior logging sites was an estimated 4 million tonnes.

- Only a fraction of beetle-attacked forests are reasonable candidates for logging. Failure to heed this lesson means an even harsher "fall down" in future logging rates with all that implies for workers and communities. As well, it places threatened wildlife species such as mountain caribou at increased risk.

While these and other findings are not encouraging, there is a constructive way forward. The report concludes with five policy recommendations. If implemented, these simple changes would better protect the environment and ensure a more stable future for forest industry workers and Interior communities. The rationale for each of the recommendations is provided at the end of the report.

The five recommendations are:

1. Increase forest conservation by banning clearcut salvage logging in mixed forests in the Interior.

2. Immediately reduce logging rates on the basis of an end to salvage logging in mixed forests.

3. Halt all logging of purer pine forests where sufficient numbers of living trees grow beneath the beetle-attacked dead trees.

4. Stop the egregious wasting and burning of usable logs and scrap the "take-or-pay" system that perpetuates it.

5. Immediately identify those beetle-attacked forests that will not be logged by the forest industry and that make sense to reforest or rehabilitate, with the province assuming those costs and responsibilities.

In the absence of thoughtful and informed responses to the beetle outbreak, the outlook for Interior forests and forestry-dependent communities is poor. Significant declines in future logging rates are already predicted. Perpetuating the unnecessary over-cutting of Interior forests only makes a dire situation worse. Instead, we need to manage our forests carefully and use their resources wisely.

Introduction: Cutting Out Our Future

In the past few years, logging rates in BC's Interior have climbed to levels never before seen. The forest industry equivalent of a gold rush is on, with annual logging rates now more than 15 million cubic metres over previous and already unsustainable levels. The provincial government's rationale for the increases is twofold. First, an unprecedented mountain pine beetle attack has killed massive numbers of lodgepole pine – BC's most prevalent tree species. Second, use must be made of the beetle-killed trees now, otherwise a one-time opportunity to capture economic value from them will be lost.

This report concludes that today's response to the beetle attack ultimately raises more challenges than the attack itself. If society, and rural communities in particular, are to be shielded from the worst aspects of the attack, then logging and tree-planting activities ought only to occur where they make sense. Almost certainly, this means further logging and associated burning in response to the beetles, which are now well outside their historic range in BC's Peace River country and Alberta, to try and prevent the beetles entering Canada's cross-country boreal forest. But equally important, it means a halt to the logging of forests where healthy numbers of living trees have survived beetle attacks.

"Logging healthy trees in the guise of salvaging economic value from dead pine is dubious at best and criminal at worst."

A common misconception is that once mountain pine beetles have attacked a forest all the trees are dead. This is true where most of the trees are older pine. But there are many, many forests where pine trees are part of a mix that includes spruce, Douglas fir and true fir. These tree species (along with younger pine in some cases) will emerge unscathed from the attack.

Yet the dominant cookie-cutter response is to clearcut huge swaths of pine beetle attacked forests, regardless of whether the trees are alive or dead. Logging healthy trees in the guise of salvaging economic value from dead pine is dubious at best and criminal at worst. It cripples resilient, healthy forest ecosystems at the worst possible time and it guarantees future hardship for workers and communities.

While there are innumerable mixed forests throughout BC's Interior that should not be logged, it is also true that significant tracts of forest attacked by pine beetles are mainly pine. In such forests, logging and replanting may be prudent. Provided, that is, that logging activities are appropriate in scale and that the right decisions are made about what to plant in place of the logged trees – a big challenge given global warming, prolonged periods of drier weather and significantly altered rain and snow patterns. Even here, however, caution is warranted (*see Forestry and Inconvenient Truths* on page 9).

Forestry and Inconvenient Truths

In the world of forestry, one of the inconvenient truths about global warming is its influence on what trees will grow where. As temperatures warm and new precipitation patterns emerge, dramatic shifts will occur.

Richard Hebda is one man who thinks about such things. Curator of botany and earth history at the Royal BC Museum, he is also an adjunct associate professor of biology at the University of Victoria. In a recent article in BC Forest Professional,[1] Hebda noted that following the last great glaciation a period of warmer weather occurred that may be similar to what BC is likely to experience later this century.

> *Ten to seven thousand years ago cyclical high solar radiation fostered in BC a warmer (2°-4°C) and drier summer climate than today, much as is expected in the next decades. Grassland steppes were much more extensive than today. Forest types without modern equivalent in BC, may have been widespread. Fires burned widely and tree lines reached higher. Wetlands had different characteristics and many interior lakes were smaller than today.*

Hebda went on to suggest that in light of current climate projections "we must anticipate a transformation" of BC's forests over the coming decades. The transformation will include changes in the number of older versus younger trees and living versus dead trees, and may also mean that in future years we simply have no forests in some areas where they presently are. For example, more southern forests may migrate north and grasslands may replace some forests.

Given the complexity of forests and the inconvenient truths of climate change, Hebda said a "holistic" approach to land use is vital. That approach should eschew managing lands on a tree-species-by-tree-species basis and even on a site-by-site basis, in favour of broader landscapes. Such an approach would place a premium on forest health and resilience over time and space, important ecosystem processes such as hydrology and biological diversity, and productivity of lands for tree growth.

Very importantly, Hebda said, "not all forests will be affected in the same way and to the same degree. A provincial map of potential sensitivity of forests to climate change is essential for setting geographic priorities and developing an adaptation timetable."

In the context of this report, Hebda's observations are noteworthy. Forest management is going to get more complicated. Wise decisions must be made that address both present realities and anticipated changes. With Hebda's work in mind, a prudent approach in response to unfolding climate-change-related crises such as the mountain pine beetle outbreak would be to:

- Promote adequate conservation of large areas of forest, but be prepared to be flexible. What is good habitat today for mountain caribou, for example, may not be tomorrow.
- Not salvage log everywhere.
- Think carefully about where logging and tree-planting takes place. Climate change means that what is ideally suited to grow in one area today may not be tomorrow.
- Make adequate use of other management tools such as prescribed burns to create a patchy landscape that is more resilient to wildfires and insect infestations.

Emerging scientific study of beetle-attacked forests, even those where pine trees dominate, shows that in many cases there is a healthy amount of smaller trees growing up under the branches of their taller (and often dead) cousins. These understorey trees, which may include vigorously growing pine and other species, are often heavily damaged or destroyed during salvage logging. When this happens, workers and rural communities lose again because those healthy trees could provide a much-needed source of timber in the medium term.

Having said that, given the extent of the beetle outbreak there is a large area of pine-dominated forest that has been attacked and where there is little significant growth of younger trees. One estimate is that over the entire forested area susceptible to beetle attack, approximately 39 per cent comprises forests where 90 to 100 per cent of the trees are pine.[2] While some of these pine-dominated forests have healthy numbers of younger trees that would be wasted if logged today, a large area of land falls into the category of dead pine forest. But even this area is so vast that the forest industry cannot log it all before the dead trees lose their economic value.

So to reiterate, a case exists for logging and rehabilitating some beetle-attacked forests. But we need to proceed with caution, first identifying those forests that should be left alone and those that may be prudent to cut. And where logging does occur, it is vital that the trees are put to maximum use. This is no time to squander public resources.

Unfortunately, provincial government data discussed elsewhere in this report shows that wood waste levels are skyrocketing in BC with millions of usable salvaged trees being skidded to roadsides and burned in huge slash piles.

Rather than turning that wood into lumber framing for houses or higher value items – products that fill the additional and valuable role of locking up carbon – perfectly usable logs are being burned by the drove, with massive amounts of CO_2 released in the process.

In much of Interior BC, the manner in which government and the forest industry respond to the mountain pine beetle in the months and years ahead will have implications for workers, communities and the environment. Attention must be focused on where we log and why, and on ensuring that we maximize returns in terms of jobs from the forest products we make. Failure to do this ensures that when future logging rates fall – and they *will* fall – the drop will be steeper and more prolonged than it otherwise would be and the environmental consequences even more severe.

Five questions are addressed in the following pages.

- Just how many trees other than pine are coming down in our Interior forests?
- What does science say about where salvage logging should occur? And what is at stake for forest ecosystems if we fail to heed the important lesson that a reasonable number of dead trees are actually a good thing?
- How much usable wood is wasted in logging operations, and what does it imply for working people and the environment?
- Are there conservation opportunities in light of the expanding number of dead trees?
- Do some unique reforestation challenges and opportunities present themselves with the current outbreak and what might they be?

The report concludes with recommendations aimed at ensuring a higher level of forest protection and a more secure future for workers and communities.

What Trees are Falling in Today's Logging Boom and Why Should We Care?

The rationale behind today's logging increases is to harvest as many dead pine trees as quickly as possible before their commercial value declines.

Yet research demonstrates that many healthy forests are falling under the guise of beetle salvage. This is cause for serious concern, because a live tree logged in lieu of a dead one is likely a double loss. This is especially true if the dead tree rapidly loses its economic value[3] and is subsequently not harvested.

Forest managers are well aware of these risks. For example, in September 2006 BC's Chief Forester Jim Snetsinger set a new allowable annual cut for the 100 Mile House Timber Supply Area.[4] The decision included a 50 per cent increase in logging rates in response to the pine beetle. However, Snetsinger cautioned, if "mid-term" timber supplies are to be maintained – in other words if workers and communities hope to avoid a severe fall down in future logging rates – much will depend on the type of trees logged.

"Protecting mid-term timber supply requires that mixed stands containing some dead pine not be harvested," Snetsinger cautioned. "Increased harvest levels can salvage significantly more timber without compromising the mid term, provided that the entire cut is directed at pine-dominated stands." [5] Sadly, this advice is late in coming and is not being heeded in many Interior locations. Industry and government owes a duty to the public to explain why.

We will talk later about mixed stands. For now, the point to be drawn from the above is that the more live, non-pine trees that companies log today the higher the price the environment, workers and communities will pay. BC's Forest Practices Board is also cognizant of this. In November 2006, it decided to quantify how many healthy non-pine trees are being logged during the present salvage-logging boom.

"The significantly-increased harvest level has raised concerns about maintaining mid-term and long-term timber supply," the Board noted in announcing the launch of its investigation. "While it may be desirable to recover as much value from the dead pine as possible, research indicates that increasing harvest levels to do so may also dramatically increase the amount of non-pine that is harvested as 'a bycatch.'" [6]

Recent (2-3 years) MPB attack south of Burns Lake. Photo: Dave Coates

The Board is expected to produce a report detailing the so-called bycatch problem and to do so at a fine level of detail. For purposes of this report, a summary of how many pine trees are logged versus other key tree species is tabulated using a provincial government database.[7]

Tables 1 and 2 clearly indicate that while a great deal of pine has been logged, large numbers of non-pine species continue falling too, with potentially disastrous consequences for some forest ecosystems, forest industry workers and the future economic sustainability of rural communities.

Table 1 itemizes the logging of pine, spruce and fir, the three main "bread and butter" commercial tree species found in coniferous forests that are most likely to experience mountain pine beetle attacks. Details on specific stands of forest subject to salvage logging will be the subject of the upcoming Forest Practices Board report and, no doubt, future comment by BC's Chief Forester.

"...while a great deal of pine has been logged, large numbers of non-pine species continue falling too, with potentially disastrous consequences..."

However, as Table 1 indicates, a broad-brush analysis shows that significant numbers of spruce and fir trees continue to be logged in the midst of the present salvage logging boom.

The data in Table 1 is instructive for two reasons. First, it shows that pine logging climbed upward in 2002 and that it jumped dramatically in 2004 in response to government decisions to approve logging increases. Second, while pine harvests sharply increased there was no corresponding sharp decline in spruce and fir logging. Indeed, annual spruce/fir harvests over seven years averaged nearly 8 million cubic metres, a level virtually unchanged from that prior to the first uplifts in logging rates in response to the mountain pine beetle. If such trends continue, it almost certainly means a more severe fall down than would otherwise be the case.

Similar patterns exist in the Southern Interior and are presented in Table 2.

Table 1: Northern Interior Pine and Spruce Harvests

Year	Pine Harvest	Spruce/Fir Harvest
(February to January)	(cubic metres)	
2000/2001	9,716,110	7,568,059
2001/2002	10,057,602	8,086,541
2002/2003	12,653,882	8,756,008
2003/2004	12,506,400	7,640,260
2004/2005	17,996,917	8,573,604
2005/2006	19,203,257	7,751,264
2006/2007	18,478,054	6,941,542
Total Harvests	**100,612,222**	**55,317,278**

Source: BC's Harvest Billing System www.for.gov.bc.ca/hva/hbs/index.htm. The system, maintained by the Ministry of Forests, contains information on trees logged by volume, species and stumpage rates paid by location. The February to January period was selected to capture the most recent 12 months when research for this report commenced.

As expected, there is a sharp (40 per cent) increase in the logging of pine trees beginning in 2004. But that increase is more than matched the same year by a 52 per cent increase in the spruce/fir harvest. If anything, one would expect there to be a decline in the logging of non-pine species at a time when the industry is supposed to be making every effort to target dead pine trees.

Clearly, elevated logging of pine forests has not been mirrored by reduced logging of mixed forests. In short, Interior forests are being unnecessarily over-cut. Predictions for staggering drops in future logging rates have already been made.

"Clearly, elevated logging of pine forests has not been mirrored by reduced logging of mixed forests. In short, interior forests are being unnecessarily over-cut."

A report for the Council of Forest Industries in 2006, for example, stated that in as few as 15 years, logging rates around Quesnel could be 80 per cent below current levels.[8] How much worse will the declines for forestry dependent communities be if, in addition to over-cutting pine, companies persist in logging healthy non-pine forests? Clearly, a lot.

Having looked at logging trends, what do recent and pertinent field studies say about conditions in our Interior forests? Without question, the spread of the beetle attack is humbling. But there is healthy skepticism about just how "dead" our forests really are. If many beetle-attacked forests do, indeed, have healthy numbers of living trees, why log them now?

Table 2: Southern Interior Pine and Fir/Spruce Harvests

Year	Pine Harvest	Spruce/Fir Harvest
(February to January)	(cubic metres)	
2000/2001	12,311,572	8,296,214
2001/2002	12,055,032	8,030,981
2002/2003	13,531,946	8,252,127
2003/2004	12,084,115	6,948,253
2004/2005	16,977,473	10,577,632
2005/2006	18,120,127	8,569,128
2006/2007	18,034,254	8,139,907
Total Harvests	**103,114,519**	**58,814,242**

Source: BC's Harvest Billing System www.for.gov.bc.ca/hva/hbs/index.htm.

Proceed with Caution: Not all Forests are Alike

Lodgepole pine is BC's most common tree. But there is a great deal of variation in terms of where it is found. BC's Central Interior, for example, has much more pine than does the area known as the Interior Wetbelt, where cedar and hemlock predominate at lower elevations and where spruce and fir tend to dominate higher up. While wetter Interior forests have pine, it tends to be just one of a diverse mix of trees. Purer lodgepole pine forests tend to grow on sites where forest fires have frequently burned, whereas wetter forests by their very nature have fewer fires and fewer pine.

But even within purer pine forests there is often more variation than first meets the eye. For example, there may be many young pine and other tree species growing up beneath the taller and older pine trees on such sites.

"...while the outbreak has killed millions of pine trees and is often described in near apocalyptic terms, many beetle-attacked forests are far from dead."

This is important because while the outbreak has killed millions of pine trees and is often described in near apocalyptic terms, many beetle-attacked forests are far from dead.

First, as forest science has shown, even in many of the purer pine forests there is an abundance of living things following beetle attacks. While the older pine trees are dead, young pine trees may be pushing upward from the forest floor.

Second, in mixed forests that may consist of pine, spruce, Douglas fir, hemlock, true firs, alder, aspen and other trees, it is only the pine trees themselves that are vulnerable to attack by mountain pine beetles. Following an attack, these mixed forests will consist of varying numbers of healthy non-pine trees, with the dead pine interspersed among them. There may also be younger trees (including pine) growing beneath the larger older trees.

In light of this, a cautionary approach is best. While there is little debate that beetle-killed trees will, over time, lose their most commonly desired commercial properties, it is a matter of great ecological, social and economic concern if healthy living trees are felled or wasted in the name of logging the dead trees in their midst.

This is one reason why a Canadian Centre for Policy Alternatives report concluded in 2005 that the province should work closely with forest companies to ensure that salvage logging did not occur in mixed forests.[9]

Such a recommendation is bolstered by forest scientists who have shed light on why the current cookie-cutter approach to dealing with beetle attacked forests is problematic.

This important work originates at BC's Ministry of Forests, BC's Forest Practices Board, and the Canadian Forest Service, and can hardly have escaped the provincial government's or the forest industry's attention.

For example, a report published by the Forest Practices Board is a timely reminder that life does, indeed, go on and that beetle-attacked forests are far from ecological dead zones.[10] The report is noteworthy because it focuses on lands attacked during the last significant beetle outbreak 25 years ago *(see We've Been Here Before* on page 15).

We've Been Here Before

Pine beetles have always been part of the living mosaic in BC's Interior forests and have, on occasion, built to spectacular numbers and caused considerable damage as they bored into and killed large numbers of predominantly older pine trees. Prior to the current outbreak, a sizeable infestation got underway in 1979 and lasted several years before ending with the onset of an extended period of bitterly cold winter weather.

In response, the province approved large increases in Interior logging rates, giving the industry the green light to cut down as many trees as quickly as possible in order to capture maximum economic value. Significantly, while the "temporary" logging increases have since dropped dramatically, some elevated logging rates in response to that earlier outbreak continue. That is because the area of attack was in drier forests, where the relative lack of moisture allowed the dead trees to retain their commercially desired properties long after they were attacked. Despite the years of elevated logging activities, portions of beetle-attacked forest from the 1979 beetle outbreak remain undisturbed. A recent Forest Practices Board report set out to look at these unsalvaged forests.[11] What it found was that in the absence of conventional intervention (clearcut logging followed by replanting) these stands had weathered the earlier beetle attack very well.

Twenty-five years after attack, they were filled with both dead and healthy trees of different ages. This was good for ecological and economic reasons, the Board report stated, adding that the number of pine trees growing on some sites actually exceeded the number of trees forest companies would have been required to replant had such sites been logged.[12]

The report's central conclusion was that if natural processes in at least some beetle-attacked forests unfold in the absence of human intervention new forests will emerge over time.

Far from being biological deserts, such forests "may provide more diverse wildlife habitat than a mature lodgepole pine forest or a stand regenerating after clearcut or fire," the Board said. It added that such stands also moderate water flows and water tables – a critical concern in light of global warming and generally hotter and drier conditions prevailing across much of BC's Interior.[13] Additionally, in approximately a third of the cases there was enough tree growth on such sites to contribute to "mid-term timber supply." What this means is that in less time than it would take a logged forest to be replanted and producing trees suitable for conversion into wood products, these unlogged forests could provide economic benefits to workers and communities.

"...in less time than it would take a logged forest to be replanted and producing trees suitable for conversion into wood products, these unlogged forests could provide economic benefits to workers and communities."

The Board's work was preceded in May 2006 by a report to BC's Chief Forester from a team of scientists that included staff with the provincial Ministry of Forests and the Canadian Forest Service. What that report concluded was that in light of the beetle outbreak it makes sense to prioritize what forests are logged and what are left alone.

The lead researcher on the report was David Coates. Coates and his colleagues focused on the fact that in many "pine-leading" forests that the beetles had or would attack there were many trees that would survive an infestation. What the team was particularly interested in was "secondary structure" – a term that applies broadly to a host of trees including young seedlings and saplings as well as older trees that grow in the so-called sub-canopy, in other words below the canopy of the taller trees that may dominate the site. Some of these trees may be pine; many others may be species other than pine.

"...between 20 and 30 per cent of pine-leading stands had enough secondary structure right now that they would provide a valuable source of timber in the mid-term if simply left alone."

Scientists are interested in such trees because among other things they help to moderate water flows and provide shelter, food and habitat for birds and animals. To conduct its research, the team analyzed nearly 1,100 "pine-leading" forest plots in the Nadina, Vanderhoof and Prince George forest districts of north central BC, all of which have been subjected to beetle-related logging increases. The plots were then analyzed to determine their secondary structure. Taking an "overly conservative" approach, the scientists did not include in their counts any living pine trees in the canopy or sub-canopy.

Only much younger pine seedlings and saplings were counted along with non-pine species. Thus, in the event a future wave of beetles wiped out the older living pine trees, such trees would not have been considered as part of the secondary structure.

Even taking such precautions, the team found that on many sites there were enough healthy understorey trees interspersed among the older pine to ensure that they would, in future years, achieve "full site occupancy."[14] In other words, given time and without logging these forests now, the remaining live trees would come to dominate these landscapes. Twenty, thirty of forty years down the line, these forests would be ready to log. The alternative – logging the dead trees and the living trees today – would mean the loss of all the trees, the planting of new seedlings, and no logging for 80 or more years.

The team concluded that somewhere between 20 and 30 per cent of pine-leading stands had enough secondary structure right now that they would provide a valuable source of timber in the mid-term if simply left alone.

Another 40 to 50 per cent of pine-leading stands also had significant numbers of understorey trees. But because these trees were somewhat less advanced than their counterparts in the first category, they were not predicted to yield trees of a commercially desirable age and height as quickly. However, the scientists concluded, if these forests were left alone for now there would be a payback down the road. "Such understory trees, if protected, may reduce rotations by 10-30

years compared to complete salvage and planting (rotation being the time between when one crop or generation of trees is logged and the same patch of ground yields another crop)," the scientists concluded.[15]

Taken together, these findings suggest that between 60 and 80 percent of certain beetle-attacked forests should not be logged at this time.

"… between 60 and 80 percent of certain beetle-attacked forests should not be logged at this time."

Conversely, the same report found, up to one quarter of all pine-leading forests in north central BC have "poor" secondary structure. In other words, they lack healthy numbers of understorey trees. Thus, they are "prime candidates" for salvage logging followed by replanting.[16]

Such research tells us that all is not as dire as what a sheer accounting of the number of dead trees or the spread of the beetle attack suggests. Hence the need to focus on what remains following a beetle attack and to carefully think through how to respond. Much is at stake if our response is inappropriate.

As team member Phillip Burton later wrote in the BC Journal of Ecosystems and Management, at this point in the beetle outbreak:

> *… all mortality of well-established non-pine species – whether in the overstorey or understorey, whether salvaged for fibre or as a result of incidental damage or to clear the way for planting – adds insult to injury, and further threatens mid-term timber supply and habitat values.*
>
> *… With foreseeable shortages in timber supply and mature-forest habitat in many parts of [the] interior in British Columbia, it is not compatible with the principles of sustainable forest management to salvage-log or rehabilitate all MPB-attacked stands. What is needed is a much more strategic approach to achieve the most effective balance of clearcut harvesting and regeneration, careful logging to protect advance regeneration, and conscious deferral to the processes of natural stand development and recovery.*[17]

In conclusion, taking too much today means taking much less tomorrow. Burton and others would no doubt also concur with the proposition that the less we *do* with the trees we log today, the deeper trouble we will be in.

Mountains of Wood Waste: A CO_2 Bomb and Lost Jobs

As logging rates have skyrocketed, so too has wood waste. While leaving some logs on the ground is good, for decaying logs provide organic matter that enhances soil fertility, the number of usable logs being left behind at logging sites is unconscionably high and threatens communities and the environment alike.

Tables 3 and 4 show wood waste levels in the Interior. The figures apply to those logs that the government and industry call "merchantable," or suitable for making lumber or pulp.[18] While the numbers for the north and south vary, the overall patterns do not. There is a sharp upward climb in the amount of waste left behind on logging sites. The trend in wood waste mirrors the rise in overall logging activities in response to the mountain pine beetle. It also closely mirrors changes in provincial forest policy, which from the end of 2004 on, allowed companies greater discretion to leave more usable wood behind as long as they paid a little something for it.

The projected figures on the lost jobs associated with wasted logs err on the conservative side. First, no estimate is made of the foregone log loading and log hauling jobs because the Harvest Billing System contains no information on the location of individual waste piles or their distance from sawmills. Also, it is difficult to say how many logging trucks would be required to move the logs when their lengths and weight are unknown. Beetle-killed, dry pine logs are far lighter than their moisture laden, green counterparts. But there are only so many logs (by volume) that can fit onto the bed of any one truck. However, it is safe to say that a significant number of jobs would be generated in the hauling of all of these merchantable logs. The combined usable waste in the Northern and Southern Interiors in 2006 was more than 1.62 million cubic metres. Using an admittedly crude estimate of an average of 40 tonnes of logs per payload, the usable waste logs in BC's Interior in 2006 would have required the loading of more than 32,400 logging trucks.

Table 3: Usable Wood Waste Northern Interior

Year (February to January)	**Usable Waste** (cubic metres)	**% change**	**Estimated Foregone Jobs**
2000/2001	239,332		189
2001/2002	255,301	+ 6.67	201
2002/2003	284,947	+ 11.61	225
2003/2004	127,233	- 55.34	100
2004/2005	437,075	+ 243.52	345
2005/2006	419,342	- 4.05	331
2006/2007	911,465	+ 117.35	720
Total Waste	**2,674,695**		

Sources: Usable Waste: BC Harvest Billing System (www.for.gov.bc.ca/hva/hbs/index.htm). Estimated Job Losses: Author's calculation based on Statistics Canada 2006 Canada Labour Force Survey.

Table 4: Usable Wood Waste Southern Interior			
Year (February to January)	**Usable Waste** (cubic metres)	**% change**	**Estimated Foregone Jobs**
2000/2001	141,626		111
2001/2002	108,713	- 23.23	86
2002/2003	114,502	+ 5.32	90
2003/2004	26,198	- 77.12	20
2004/2005	112,977	+ 331.24	89
2005/2006	375,469	+ 232.34	296
2006/2007	710,477	+ 89.22	561
Total Waste	**1,589,962**		

Sources: Usable Waste: BC Harvest Billing System (www.for.gov.bc.ca/hva/hbs/index.htm). Estimated Job Losses: Author's calculation based on Statistics Canada 2006 Canada Labour Force Survey.

The second reason why the projected job loss figures understate the true job loss picture is that they are based on the overall average number of manufacturing jobs in BC's forest sector, not on the more labour intensive value-added or secondary manufacturing sector.[19] By taking the forest manufacturing jobs listed by Statistics Canada and dividing them into the total number of logs harvested in the province, a jobs-per-cubic-metre ratio is arrived at and that ratio applied to the usable wood waste volumes. However, it is reasonable to argue that with different provincial policies in place the overall number of jobs associated with manufacturing forest products in BC could easily rise. BC has a lamentable record when it comes to capturing maximum social and economic returns from its publicly owned forest resources. A 2003 report by forest industry analyst Peter Woodbridge highlights this point.
The report notes that for every dollar's worth of lumber produced in BC just 31 cents in higher value products are made. In Ontario and Quebec, the forest industry produces $1.50 in value-added products for every dollar's worth of lumber.[20] Thus, the jobs foregone estimates in this report represent a minimum.

When the figures for the north and south are combined, they suggest that in 2006 nearly 1,300 jobs were foregone as waste logs were burned instead of milled.

Older grey attack (8-9 years) in Tweedsmuir Park.
Photo: Dave Coates

Just why are so many usable logs left behind? Partly it is a function of the rise in Interior logging rates – the more trees logged, the more waste. Another reason is the earlier noted changes to provincial forest policies that allowed companies to leave behind increasing volumes of logs. A third factor has to do with the nature of today's lumber industry. The Interior's lumber production is largely concentrated in the hands of two companies: Canfor Corporation and West Fraser Timber Co. Ltd. The two have among the largest and most efficient softwood lumber mills in the world. The mills are designed to run around-the-clock and are at optimum efficiency when fed a steady diet of logs of a similar size; the bottom line is that the more uniform the log diet, the cheaper the operating costs. Fourth, many of the logs left behind may have some defects, therefore requiring a greater level of work to turn them into finished products; hence the tendency to "highgrade," or take the best and leave the rest.

Fifth, market conditions vary wildly in the forest products sector. When lumber prices decline, there is less incentive for some companies to deal with all logs at their disposal (which is not to say that what is rejected by one company could not be used by another).

Last but not least, beetle-attacked trees have a shelf life. They lose their commercial value over time, more rapidly on sites that are wetter and far less so on drier sites.

No doubt, some of the waste now occurring reflects a declining shelf life.

The lost economic opportunities associated with all the usable waste wood are not the only reason to decry the present situation. There is also a significant environmental impact, and it has to do with global warming.

Table 5: Usable Wood Waste in Interior BC and CO_2 Emissions

Year (February to January)	**Usable Waste (North & South)** (cubic metres)	**$C0_2$ Emitted** (tonnes)
2000/2001	380,958	349,529
2001/2002	364,014	333,983
2002/2003	399,449	366,494
2003/2004	153,431	140,773
2004/2005	550,052	504,673
2005/2006	794,811	729,239
2006/2007	1,621,942	1,488,132
Totals	**4,264,657**	**3,912,823**

Sources: Usable Waste: BC Harvest Billing System (www.for.gov.bc.ca/hva/hbs/index.htm). CO_2 emissions are calculated using a formula provided by Werner Kurz of the Canadian Forest Service. The formula is generally true for all wood species, but there is some variation between species. To begin, multiply the wood volume by .5 to arrive at weight. Then multiply weight by .5 to arrive at carbon content. Then multiply by 3.667 to convert carbon content to CO_2.

Nearly all of the waste wood noted here ends up in huge piles that are subsequently burned. The price paid for not turning those logs into usable wood products that could lock up carbon for decades is the sudden and massive release of carbon dioxide into the atmosphere. Worse yet, such CO_2 releases are unlikely to be easily offset by the planting of new trees. As a recent and widely cited British report on the economic implications of global warming observed:

> *While planting new trees is an excellent long-term policy, trees take decades to absorb the equivalent amount of carbon to that which is instantaneously released in the atmosphere when mature trees are cut down and burnt.* [21]

As Table 5 shows, the CO_2 release associated with the burning of usable wood is significant. And the figures likely tell only part of the story.

Why only part of the story?

First, the companies doing the logging generate the wood waste figures. Thus, the figures may well be higher. But because there is no rigorous monitoring of waste levels it is difficult to say. Second, usable wood left behind at Interior logging sites is not the only material that is burned. There is also the wood that is rejected for use because it has too many defects as well as smaller diameter logs, treetops and branches. Combined, all of the usable and unusable wood adds up to a major portion of all the wood hauled to roadsides and burned in logging operations.

Recently, the Forest Engineering Research Institute of Canada (FERIC) conducted field studies to determine just how much of this wood ended up at roadsides following logging operations. The idea was to see how much waste wood might be available for collection and conversion to wood-based energy sources and what the costs would be to pick up and transport that material. The FERIC report included a survey of 15 logging sites. It found that a significant amount of the original volume of wood that existed prior to these sites being logged later ended up as "roadside residual" waste. The range was from a low of 14 per cent to a high of 55 per cent.[22] In other words, on some sites more than half of the wood found in the standing forest later ended up as waste following logging. Waste levels were lower when companies consciously chose to transport logs with smaller diameters (small diameter logs can be turned into a range of forest products) and higher when they increased the minimum log size for transport. The report did not specifically address another related issue, which is that many companies now process their logs at roadsides rather than at mill sites. Processing involves cutting logs into shorter lengths to improve both the efficiency of log hauling and milling. But such gains may well be offset by the inefficiencies associated with increased levels of waste.

Thus, there is likely to be a far greater CO_2 release associated with the burning of usable wood and related wood waste than is captured in Table 5. And this doesn't even account for the wood waste burned in beehive burners, which may add a further 1 million tonnes of CO_2 to the atmosphere annually.

In 2004, the most recent year for which Environment Canada maintains data on emissions of greenhouse gasses, BC's CO_2 emissions were 66.8 million tonnes. If, in the intervening two years, the province's overall greenhouse gas emissions rose 1.3 per cent per year – the average yearly increase between 1995 and 2004 – BC's total greenhouse gas emissions for 2006 would be on the order of 68.5 million tonnes.

However, both the published figure for 2004 and the estimated figure for 2006 do not include CO_2 emissions from the burning or slow decaying of usable wood that companies have chosen to abandon rather than process. This is because wood-based sources of CO_2 are generally considered by international bodies such as the United Nations to be offset by the CO_2 sequestered in living trees.

Table 6: Usable Wood Waste in Coastal BC and CO2 Emissions

Year (February to January)	**Usable Waste** (cubic metres)	**$C0_2$ Emitted** (tonnes)
2000/2001	1,318,098	1,209,355
2001/2002	1,539,092	1,412,116
2002/2003	1,306,621	1,198,825
2003/2004	355,176	325,874
2004/2005	1,730,482	1,587,717
2005/2006	3,633,936	3,334,136
2006/2007	2,587,092	2,373,656
Totals	**12,470,497**	**11,441,679**

Sources: Usable Waste: BC's Harvest Billing System www.for.gov.bc.ca/hva/hbs/index.htm. For CO_2 calculation see note for Table 5.

Landscape view of recent MPB attack near Ootsa Lake. Photo: Dave Coates

For a variety of reasons the wasting of usable wood on BC's Coast is even more egregious than in the Interior, although the situation in the Interior is rapidly worsening. Table 6 displays waste levels on Coastal public and private lands. The figures come from data on wood waste on public lands and estimates of wood waste on private lands. Estimates are used because companies logging private lands are not required to report waste data.[23]

When the wood waste on the Coast is added to that in the Interior, the CO_2 releases associated with usable wood waste is even more significant.

In 2006, for example, the combined CO_2 emissions associated with usable logs that were burned or left to rot was 3,861,788 tonnes, an amount that would add 5.6 per cent to BC's CO_2 emissions for that year. In 2005 it was even higher at 4,591,027 tonnes, an amount that would add another 6.7 per cent to BC's CO_2 emissions.

Of course, many CO_2 emissions associated with usable wood waste would not occur right away, because the logs would be left to rot or decay rather than being burned. Nevertheless, such logs would eventually contribute to BC's overall CO_2 emissions. And the magnitude of these emissions, plus the foregone jobs associated with the wasting of usable logs, requires a considered response on the province's part (see *A Burning Question* on page 24).

Example of good growth release of understory subalpine fir in older (8-9 years) MPB attacked stands in Tweedsmuir Park. Photo: Dave Coates

Use of wood or byproducts as sources of energy is increasing around the world, with some countries such as Sweden moving boldly in this direction.[24] A key reason why is that while CO_2 is released when wood is burned, such releases are theoretically offset by growing new trees that lock up carbon.

But as BC's and now Alberta's mountain pine beetle infestation underscores, wood-based energy boosters may find it increasingly challenging to justify widespread use of so-called "green" wood-based energy sources.

Millions upon millions of trees are now dead and no longer sequestering carbon. For the first few years after being killed by the beetles and while the dead trees still retain their needles, these trees are at increased risk of burning in catastrophic forest fires that would release massive amounts of CO_2 into the atmosphere. While this risk diminishes when the needles fall off the trees, the risk of fires returns once again many years later when the dead trees topple over, providing fuel for potentially intense ground fires.

The pine beetle infestation and other forest pest and disease outbreaks that are predicted to occur with global warming suggest that use of dead trees as sources of energy is unlikely to be CO_2 neutral since any immediate release of carbon through burning will outpace for a considerable time the so-called "offset" associated with newly planted trees that sequester carbon.

"...use of dead trees as sources of energy is unlikely to be CO_2 neutral since any immediate release of carbon through burning will outpace for a considerable time the so-called "offset" associated with newly planted trees that sequester carbon."

No matter what we do in the foreseeable future with Interior forests, the potential for significant CO_2 releases remains. So we must proceed with caution. For example, one tool that many forestry professionals advocate using more frequently is fire. By deliberately burning tracts of forestland we can create more open areas that are less prone to beetle attack. But burning releases CO_2. The opposite management choice – to not set fires but attempt to suppress them – also has CO_2 implications. Along with generally warmer temperatures, one reason why the present beetle attack is so severe relates to decades of largely successful fire suppression. Suppressing fires allowed more pine trees to live longer, creating the perfect storm of beetles that are now killing those trees by the millions, with all the CO_2 implications that implies. Worse yet, the proliferation of so many dead trees could lead to fires that would far surpass in CO_2 releases those fires that were deliberately set and carefully controlled.

In a 2005 CCPA report,[25] one forest management tool recommended was the increased use of deliberate burns. This would help to create a more patchy landscape of forests and grasslands that would be less prone to the sort of disease outbreaks and insect infestations now underway.

Readers of this co-published report might then question a seeming contradiction to that earlier recommendation, namely, the decrying of the CO_2 releases associated with the burning of so-called "waste" wood.

The response is this: Why make a bad situation worse?

It must be stressed that the waste wood chronicled in this report is, by industry and government definition, "merchantable" material that could be turned into forest products. This is in addition to the coarse woody debris and other waste that is left behind on logging sites. Energy was expended to produce the logs. Further energy was expended to haul them to roadsides. Consequently, they ought to be used rather than simply burned and with none of the energy stored in the burned wood captured.

Ultimately, it may make sense to use some waste wood as sources of new "green" energy. But the emphasis should be squarely on the word *some*, and even then only when all possible alternatives have been exhausted.

This is especially true in light of climate change and the need to cut back CO_2 emissions.

To that end, a hierarchy of uses for waste wood is proposed as a starting point for generating much-needed public debate about a responsible way forward.

A suggested hierarchy might be:

1. Don't cut trees down if you aren't going to use them. Yes, dead beetle-attacked trees will slowly release CO_2 no matter what – but far slower than if they are logged and then burned. In the meantime, standing dead trees provide a variety of valuable benefits such as reducing the rate of snowmelt, which has tremendous downstream benefits, including moderating water flows and helping to control floods.

2. If you do cut trees down, use them. And the first priority use should be as lumber or forest products that lock up carbon for decades to come.

3. If you do burn logged trees, at the very least they ought to be burned in a manner that captures the energy so that it offsets use of other non-renewable fossil fuels.

Close up view of older grey attack (8-9 years) in Tweedsmuir Park. Photo: Dave Coates.

In addition to waste logs, significant tracts of Interior forestland are now filled with dead trees that no longer sequester carbon but still act as carbon reservoirs. Some of those same tracts have few understorey trees to replace their dead cousins. In addition to those areas no longer sequestering carbon, there is a potential for forest fires to sweep through them and for large numbers of dead trees to rapidly release CO_2 as they burn (although the greatest risk of this is in the first few years following a beetle-attack when the dead trees retain their needles). Furthermore, at least some of the lands contain relatively young pine trees that were killed in their prime, in other words when they were growing well and sequestering lots of carbon. Given such realities, it is imperative that the wood we do log gets put to use as solid wood products that lock up carbon. Beyond that, it is vital that the province has a well thought out and adequately funded plan for dealing with the reforestation and rehabilitation challenges that pertain to a portion of the lands affected by the pine beetle.

"We need healthy, resilient forests that sequester carbon and protect biological diversity."

As this report shows, any such plan should not make a bad situation worse by prematurely logging forests that have numerous living trees. We need healthy, resilient forests that sequester carbon and protect biological diversity. We also need forests whose living and dead trees maintain water quality and moderate water flows by intercepting rain and regulating the melting of snow packs, because in a climate expected to get hotter and drier a premium will be placed on water quality and quantity.

Finally, we need healthy forests in the mid-term and long-term because that is where wood – and the jobs associated with it – will come. Prematurely cutting them down is a recipe for short-term and long-term pain and should be avoided at all costs.

A Dead Tree is a Good Tree in Many Cases

Dead trees are important. When their trunks weaken causing them to fall, they open up space and turn once shaded areas into sunny enclaves that become home to new trees. After falling, dead trees decompose and provide organic matter and nutrients to the soil that sustain a host of soil organisms and plants that give forests their biological diversity. Those plants, in turn, provide valuable cover and forage for forest-dwelling species.

The mixed forests of the Interior – including their standing dead trees – are also vital to many of the more than 200 bird species found there. Many of these birds also feed on insects such as mountain pine beetles and about 40 are cavity-nesters. In other words, birds like bufflehead ducks, red-breasted nuthatches and mountain chickadees nest in holes in live or dead trees, most of which have been hollowed out by woodpeckers. The findings of a long-term study of bird populations in the Interior prior to and after the onset of the current beetle outbreak show specific bird populations initially building in number in response to the beetles. Some populations then decline as the beetle attack progresses, and in some cases actually fall below pre-attack levels.[26] The declines, in particular, serve to highlight the need to adequately protect what forests remain. That means paying special attention to where many birds nest – as it turns out in older and larger living or dead aspen trees in particular – and in preventing the logging of those trees and surrounding patches of coniferous forest.[27]

Dead trees in parts of BC's Interior may also hold one of the keys to survival of some of the world's most threatened animals, including woodland caribou, and in particular a sub-set of the species known as mountain caribou. Mountain caribou rely on arboreal or tree-hanging lichens for food during winter months. Recently, members of this ungulate family have plummeted in number. The ultimate reason for the decline is the loss of older forests, whose trees tend to have far higher loads of lichen hanging from their branches than do younger trees.[28] A related and complicating factor explaining the decline is this: As forests are logged, moose and deer move in to feed on the abundant plant life in open settings. But their presence attracts wolves and cougars, and it isn't long before those predators kill caribou as well.[29] And, of course, logging activities in and of themselves cause stress to these animals.

Years of careful observations on the distribution of hair lichens – the caribou's winter food – have convinced Trevor Goward, a renown lichen expert, that the growing number of beetle-killed pine trees are a kind of silver lining in the cloud of doom that has trailed BC's mountain caribou for so long. If, that is, forest managers make the right decisions about where logging proceeds. Goward's belief – borne out by his studies in BC's inland rainforests – is that hair lichens are much more abundant on older trees than on younger trees. At least for a time, they will also be more abundant on older dead trees than on living trees. And, as everyone who has paid attention to BC's Interior forests knows, there happen to be an awful lot of dead trees on the landscape at the moment.

Goward has found that lichens tend to be far less numerous on those portions of tree branches that have healthy numbers of green needles. "By contrast, these lichens regularly develop heavy loadings over defoliated portions of the same branches," Goward wrote – in other words the bare portions of branches.[30] Dead trees, of course, have nothing but defoliated branches and therefore are likely to have large amounts of lichen hanging from them.

When Goward's observations are considered in light of the present context of a massive beetle infestation that has attacked pine trees in both mixed and not-so-mixed forests, the implications of his work take on added significance.

If salvage logging proceeds willy-nilly in mixed forests, a lot of dead, lichen-laden pine trees will come down along with scads of healthy, old-growth spruce, sub-alpine fir and other trees whose lower defoliated branches or branch sections are also loaded with caribou food. The end result will be a further and completely unnecessary loss of caribou habitat at a time when that endangered species needs that habitat more than ever. Worthy of note, as well, is that many older pine trees that already have significant volumes of lichen on their branches will put on even more lichen growth following beetle attacks, perhaps for a decade or longer. So their value to caribou increases with time.

"If salvage logging proceeds willy-nilly in mixed forests, a lot of dead, lichen-laden pine trees will come down along with scads of healthy, old-growth spruce, sub-alpine fir and other trees..."

Another important lesson gleaned from Goward's studies is that hair lichens are killed when buried for prolonged periods in snow. In winters with particularly heavy snowfalls, the so-called "trim line" on trees moves up, meaning the available lichen are higher up the trees. If, in following winters, the snowfall is lower, the lichens may be out of reach for caribou. This may force caribou downhill in search of food and into forests where lodgepole pine trees are more common. So, in addition to curtailing the clearcutting of mixed forests to salvage economic value from dead pine trees, some areas of lower elevation, pine-heavy forests should be spared logging too.

Older pine trees in such settings will have a preponderance of lichen on their lower branches. And if they are dead and have stood dead for any length of time, they will be prone to blowing down in heavy winds, which will provide hungry caribou with an ideal source of food, as the lichen-bearing branches will be at or close to ground level.[31]

There may be a temptation in some circles to portray the further protection of portions of higher elevation mixed forests and some lower elevation pine-leading forests as a bad thing from a social and an economic perspective. But, as noted earlier, the forest industry cannot hope to log all beetle-attacked pine trees before they lose their economic value anyway. So the initial focus ought to be on what we leave unlogged and then on what we log, where and why. What Goward's work suggests is that land managers need to be aware of the unique opportunities that present themselves at this point in time. If we can't log all those dead trees anyway, why not use at least some of them to stave off the extinction of an iconic wildlife species?

Conclusion and Recommendations:

Rejecting the Cookie Cutter Approach, Ensuring Forests for the Future

Too many healthy forests are falling in the name of salvaging economic value from "dead" beetle-attacked forests. The result is that communities, workers and the environment alike are placed at unnecessary risk. For the sake of a more secure future, it is time to stop treating all beetle-attacked forests the same way. As this report has shown, there is wide variation in the composition of forests attacked by the beetles. Some forests are almost exclusively comprised of pine trees. All their older trees are dead, with their needles now red or grey or gone. Other forests have only a smattering of pine. After pine beetles have attacked such forests, much of what remains is a patchy sea of green with the dead pine sprinkled lightly or liberally about depending on the site.

Clearcut logging remains the logging method of choice in the Interior, even though selectively logging targeted trees can be done. And with logging rates having risen dramatically in recent years to salvage economic value from "dead" beetle-attacked forests, a lot of healthy non-pine trees are coming down in the name of extracting economic value from the dead pine in their midst.

This is a recipe for short-term and long-term pain. It results in the premature logging of forests that provide important natural functions at a time when we need them most. Live trees in pine beetle-infested forests sequester carbon, and such forests are thrown into a great deal of CO_2 flux when they are logged. The live trees also play an invaluable role in moderating water flows. They shelter and nurture wildlife and ensure diversity on the landscape. These functions are extremely important in light of global warming and the generally hotter and drier conditions prevailing across much of the Interior.

Finally, live trees in pine beetle-infested forests will help to reduce the severity of the coming decline in logging rates that everyone knows or ought to know is coming. Because those are the trees that could provide economic opportunities down the road.

In light of the trends noted in this report, the following recommendations are made in the interests of providing a more secure future for Interior forests, workers and communities.

1. ***Increase forest conservation by banning clearcut salvage logging in mixed forests in the Interior.***

The record uplift in Interior logging rates is designed to encourage salvaging economic value from dead pine trees. Salvage logging healthy trees instead of dead trees means less wood for workers and communities down the road and a drastically altered environment to boot. The present course is not sustainable. Worse, in the absence of proper policy interventions, there will be increased pressure to "make up" future shortfalls by allowing logging increases in forests that were spared the worst consequences of the beetle outbreak, for example, the Interior temperate rainforest. This would simply perpetuate the over-cutting of Interior forests, resulting in greater social, economic and environmental hardships down the road.

2. ***Immediately reduce logging rates on the basis of an end to salvage logging in mixed forests.***

If unnecessary over-cutting continues, forest industry workers, rural communities and the environment will pay an even higher price than would otherwise be the case.

3. ***Halt all logging of purer pine forests where sufficient numbers of living trees grow beneath the beetle-attacked dead trees.***

When clearcut logging occurs in pine forests with numerous living understorey trees, both the trees growing underneath the taller trees as well as the taller, commercially desirable and now dead pine trees are logged. These sites are then replanted with the aim to log them again in 80 years. This is unwise. First, because the understorey trees are simply wasted. Second, because those trees may already be 30 or 40 years old and capable of providing a new crop of trees far faster than were these sites logged and replanted today.

4. ***Stop the egregious wasting and burning of usable logs and scrap the "take-or-pay" system that perpetuates it.***

Interior communities and forest industry workers will face one of the most precipitous and prolonged drops in logging rates ever witnessed. Knowing what looms, the province ought to insist that a maximum number of jobs be derived from publicly owned resources. If we are going to log record numbers of trees, the aim should be to capture maximum social and economic value. Otherwise, why log them at all?

At a broader level, the torching of millions of cubic metres of usable wood over the past few years in the Interior has contributed significantly to BC's CO_2 emissions. Continuing this practice only jeopardizes the province's ability to reduce greenhouse gas emissions and ensures that jobs are foregone making products that would sequester carbon for years if not decades to come.

5. ***Immediately identify those beetle-attacked forests that will not be logged by the forest industry and that make sense to reforest or rehabilitate, with the province assuming those costs and responsibilities.***

A 2005 CCPA report on the province's response to the pine beetle infestation concluded that BC should invest a minimum of $118 million per year for five years on various reforestation and restoration initiatives.[32] The scale of the current outbreak means that a large area of beetle-attacked forest will remain unlogged once the dead pine trees lose their economic value. Other recommendations included increased forest conservation and more prescribed burns or deliberately set fires. The overarching objective in the recommendations was to create a more patchy Interior landscape that better protected biological diversity and that lessened the likelihood of equally or more severe insect infestations in future years.

Forest companies are only responsible for replanting those lands that they log and nothing else. Obviously, not all forests that the beetle has attacked should be subject to human interventions. First, we can't afford to do it everywhere. Second, it would be environmentally irresponsible.

However, there are significant tracts of land that we ought to do some work in. And it is the landlord of those lands – the province – that should fund the work, work that will require a great deal of human effort and ingenuity.

Doing such work will take some of the sting out of the coming fall down in future logging rates by putting people to work rehabilitating some lands. The key word being *some*. As emphasized throughout this report we need the right decisions in the right places. And the right actions in many cases mean leaving things alone.

Rehabilitation efforts may ultimately involve "fire-proofing" some forests on the periphery of certain Interior communities. This work involves clearing away underlying dead brush and spacing trees so that if intense fires do get underway – an event some foresters and climate experts believe will be more common in the years ahead[33] – the ability of such fires to destroy homes and businesses will be dramatically reduced.

An over-arching objective in any reforestation or rehabilitation work should be to make effective use of public dollars by targeting the right areas for intervention. Some sites that may be ideally suited to such work are the growing number of young pine forests and plantations that have been attacked. Many of these pine-leading, younger forests and plantations have little meaningful tree growth beneath the canopy of the dead trees.

A report to BC's Chief Forester in January 2006 found that 10 per cent of young pine forests between the ages of 20 and 55 years are showing signs of beetle attack.[34] Future surveys are expected to confirm that the number of young plantations attacked by the beetle is climbing.

These once vigorously-growing, carbon-sequestering forestlands are now no longer carbon sinks. And they could easily become the sources of significant releases of CO_2, further undermining BC's ability to meet its greenhouse gas emissions. Because many of these sites were logged in years gone by, they are located near existing roads and communities and could be rehabilitated. This is where spending public dollars on rehabilitation may make sense. The payoffs would be both economic (a source of seasonal jobs and future timber supplies decades down the road) and environmental (restoring forestlands to carbon sinks).

Recent (2-3 years) MPB attack south of Burns Lake. Photo: Dave Coates

Notes

1 Hebda, 2006.

2 Eng et al., 2004.

3 Hamilton, 2007. The article by Gordon Hamilton notes that the forest industry began by estimating that the commercial shelf life of pine trees killed during the current beetle outbreak would be five to 15 years. Revised estimates are that some trees will lose their economic value after just one year, while others may retain value up to 15 years following the beetle attack.

4 BC Ministry of Forests and Range, 2006.

5 Ibid.

6 Forest Practices Board, 2006.

7 http://www.for.gov.bc.ca/hva/hbs/index.htm. The numbers come from a database maintained by the Ministry of Forests and known as the Harvest Billing System. By requesting information by date, geographical region and species logged, the database yields information on logging rates and trends over time.

8 Timberline Forest Inventory Consultants Ltd., 2006.

9 Parfitt, 2005.

10 Forest Practices Board, 2007a.

11 Ibid.

12 Ibid.

13 Forest Practices Board, 2007b. Concerns about the relationship between forests and water were also the subject of a more recent Board report that noted how the present pine beetle outbreak could contribute to higher than normal peak flows of water, particularly during the annual snow melt. That report noted that the widespread number of dead pine trees, in and of themselves, could increase peak water flows by up to 60 per cent. Clearcut salvage logging of such forests, however, could increase peak flows by as much as 92 per cent. Such increases are a matter of obvious concern given that much of BC's population lives on the Fraser Valley floodplain and the beetle attack has occurred throughout much of the greater Fraser River watershed.

14 Coates et al., 2006.

15 Ibid.

16 Ibid.

17 Burton, 2006.

18 http://www.for.gov.bc.ca/hva/hbs/index.htm. The Harvest Billing System can be searched to provide information on usable or merchantable wood waste. But even then it is unlikely to provide a true picture. Under current rules known as "take or pay," forest companies must report the number of usable logs they leave behind following logging. They then make nominal stumpage payments to the province for that waste wood. This new system kicked-in in 2004. It is up to the province to then decide whether to audit companies to ensure that they accurately report their waste. In private conversation, Ministry of Forests' staff told the author of this report that waste piles are often not inspected, with some saying that only one in 10 piles are examined and others saying as few as one in 25.

While it is difficult to get a complete handle on waste volumes, it is at least possible to arrive at a defensible starting point with the Harvest Billing System. As noted earlier, the database is an invaluable source of information on volumes of timber logged in various regions or districts of the province over time. By screening the database once for information on all logs harvested and then a second time with "waste residue" figures not included, one can arrive at a starting figure for the amount of merchantable wood being left behind at logging sites.

19 Statistics Canada, 2006.

20 Woodbridge, 2003.

21 Stern et al., 2007

22 MacDonald, 2006.

23 http://www.for.gov.bc.ca/hva/hbs/index.htm. Deriving wood waste figures for private lands requires an estimate because no published figures exist. However, the Harvest Billing System does provide figures on the volume of logs coming off of private lands. And it also provides information both on volumes of logs coming off of public lands and volumes of waste on public lands. After establishing a ratio of wood waste to total volumes of trees logged on public lands, similar ratios are applied to private lands in order to come up with an estimate of wood waste levels on those lands. The working assumption is that waste levels would be roughly the same under both forms of land ownership, an assumption consistent with anecdotal reports of log waste on private lands.

24 Ekbom, 2003.

25 Parfitt, 2005.

26 Martin et al., 2006.

27 Ibid.

28 Goward, 1998.

29 Seip, 1992.

30 Goward, 1998.

31 Goward, 2007.

32 Parfitt, 2005.

33 Parfitt, 2000.

34 Maclauchlan, 2006.

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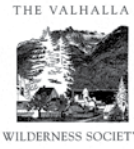

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