

HOW GLOBAL WARMING



& THE PINE BEETLE COULD DEVASTATE THE B.C. INTERIOR'S REAL ESTATE MARKETS

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EXECUTIVE SUMMARY AND REPORT HIGHLIGHTS

- Canada is facing an unprecedented attack from the mountain pine beetle (MPB), *Dendroctonus ponderosae*. British Columbia has suffered the majority of the wrath from this tiny forest pest; however, Alberta may be facing the same epidemic over the next few years.
- The beetles are not following historical behaviors and are attacking pines 50 years younger than usual. Therefore, economic analyses to date may underestimate impacts.
- The federal and provincial governments have committed monies to mitigate the impact of the beetle, but is it too little, too late?
- By 2013, the provincial Ministry of Forests predicts the mountain pine beetle will destroy 80 per cent of the marketable pine in the central and southern Interior forests. Half of the pine will likely be gone by the end of 2007.
- Not every tree will be killed! Many pine forests consist of mixed stands and others have new trees coming up from the understory.
- Broken down by province, British Columbia is the leading exporter of forest products in Canada at \$13.7 billion.
- Salvage operations are expected to cost thousands per hectare and as of January 2007, 9.2 million hectares were under red attack.

ABOUT THE REAL ESTATE INVESTMENT NETWORK

Founded in 1993, the Real Estate Investment Network (REIN) has grown over the years to become Canada's leading real estate research, investment and education organization. It serves more than 2,200 member clients who own more than 17,459 properties (valued at \$1.875 billion) across the country. Members work on buying three investment properties during their first year, a seemingly daunting challenge but one that most members meet and surpass by following the proven REIN system of fundamental analysis and investing.

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OVERVIEW TO THE MOUNTAIN PINE BEETLE REPORT

Our national forest industries are critical to many province's economies. This important industry is already under economic attack from suppliers around the world and now, in Western Canada it has come under a brand new attack... the Mountain Pine Beetle. This attack could be more devastating than current world forest economics that have already seen dozens of Canadian mill closures..

This report is designed to provide answers to the key questions from an objective, research-oriented point of view, as we do not sell real estate. This un-biased view will enable readers to see clearly how the pine beetle epidemic could affect their personal real estate portfolio today and in the future. This report will enable homeowners and investors to plan long in advance of the final outcome of the beetles' infestation and migration, and consider cities' long term plans and subsequent government and private industry interventions.

Devastation from the mountain pine beetle has heavily impacted the forests of B.C. The main discussion seems to centre around the environmental and economic impacts of this epidemic. Up to this point, one key component of this conversation has not been addressed in depth, even though it will have a direct financial impact on property owners in many communities throughout the province of BC and now Alberta. This question is:

How will this major epidemic affect residential property values in forestry based communities in the short, medium and long terms?

For many residents of the province, a vast majority of their personal net worth is tied directly to the value of their homes and investment properties, so the answer to this question is very important. As with our previous reports and books, the goal of this research is not only to assist investors and homeowners in gaining knowledge about how a situation may affect their property values, but also to cut through the emotions and sometimes political debate that surround an issue that affects the fundamentals of a town's economy.

With the majority of forest decimation currently being centred in B.C. (with new waves extending into Alberta), we will focus this report on the BC market. However, this is not to say that the rest of Canada is immune to the pine beetle's attack.

Peer-reviewed studies on the impacts of the mountain pine beetle

Underpinning our analysis is a synopsis of detailed studies conducted on the mountain pine beetle, its migration, habitat and patterns. Other examinations include economic analyses based on equilibrium models for the interior of B.C. and Alberta coupled with spread rate analyses, annual allowable cut (AAC) determinations by the chief forester, and climate projections for B.C. extrapolated to pine beetle survival and expansion.

This research provides us with the ability to forecast what we can expect in terms of the impact on real estate prices in forestry based communities in the short, medium, and long terms.



BACKGROUND: The Impact of the Mountain Pine Beetle

The Beetles Are Here

The B.C. Ministry of Forests predicts the mountain pine beetle will destroy 80% of the marketable pine in the central and southern Interior forests by 2013. Half of the pine will likely be gone by the end of 2007. However, it is important to note that only pine trees are attacked and not every pine tree will die. Landscapes may change, but British Columbia will not be without its forests.

From the Pacific to the Atlantic Pines are in Trouble

Canadian forests are tremendously prolific, making Canada the world's largest exporter of forest products. Canadian forest exports account for 17.3% of the world trade at an estimated value of \$41.9 billion¹. Broken down by province, British Columbia is the leading exporter of forest products in Canada at \$13.7 billion, followed by Quebec at \$11.6 billion and Ontario at \$8.4 billion². When these numbers are considered, it puts into perspective the potential economic problems that an attack from the mountain pine beetle (MPB), *Dendroctonus ponderosae*, could have on the country's economy.



The threat from the pine beetle comes from its ability to effectively attack and girdle healthy pine trees. The beetles rely on mass attack strategies to overcome tree defenses. Once a tree has been overtaken, the beetles burrow under the bark into the tree's vascular system (mainly phloem), effectively cutting off the flow of nutrients. To add to the attack, the beetle has a mutualistic relationship with a "blue stain" fungi. The fungal spores hitch a ride on the beetles and as the beetles burrow, the fungus also attacks the tree's vascular system and in the process turns the wood a blue hue. While the fungus is detrimental to tree health, no structural problems are associated with the lumber.

However, problems arise when other countries view the wood as inferior, further compounding problems for lumber companies - how do they market the huge supply of beetle wood and to whom? Some have decided to creatively market the blue-stained lumber as Denim Pine™.

With some forward thinking, options may exist to capitalize on this "tragedy".

British Columbia has suffered the majority of the wrath from this tiny forest pest; however, Alberta may be facing a similar epidemic over the coming few years. To date, an estimated 9.2 million hectares of forest land in B.C. have been affected since the start of the epidemic in 1994. Lodgepole pine, *Pinus contorta* var. *latifolia*, is a very important timber species for the province, representing roughly 24% of

1 The State of Canada's Forests 2005-2006. http://cfs.nrcan.gc.ca/sof/sof06/pdf/State-of-Forests_E.pdf

2 Ibid.

BC's forest species composition. In 2005/2006, lodgepole pine made up 45% of the annual timber harvest – 60% in the B.C. Interior³. Lodgepole pine is also the primary host for the MPB.

The infestation of the mountain pine beetle in BC is not a short term problem, but it is also not a new problem as we have seen this pest in the past. However, this time, conditions are ideal for sustained growth of the insects' populations. British Columbia has seen unseasonably warm winters along with hot and dry summers. Such factors decrease beetle mortality in winter and increase tree stress due to drought in the summer. Further, beetles thrive on mature pine trees, over 80 years old. Unfortunately, a large portion of pines in the province are 80 years or older leaving large stands of BC forests at risk of attack. This vast supply of mature susceptible pine makes a contiguous and seemingly endless food supply.

Continued advancements in forest-fire suppression, coupled with harvesting practices, mean the number of mature susceptible pine has increased threefold since 1900. Further, the trend toward a warming climate has expanded the beetle's range to places never visited before (both north in latitude and higher in elevation).



Unfortunately, this is not just a forestry problem. This epidemic will certainly have effects on other economic sectors such as tourism and real estate for example, as well as the environment (aesthetics, wildlife habitat, erosion, water quality, etc.). With the majority of BC forests infested and some areas overrun by the beetle, Alberta will hopefully halt this eastward assault by the beetle.

Many B.C. towns are currently experiencing an economic boom as forestry companies increase their productivity to harvest the dying beetle wood. Employment is soaring, overtime shifts abound, real estate values are at a high and vacancy rates are down. However, beyond the short term, these fundamentals cannot be sustained in regions where forestry is their single economic focus. Cities and towns whose primary economic base is logging and the forestry industry will suffer economic hardships as jobs dwindle, unemployment increases and people eventually leave to find work in other regions. **This out-migration will result in an over supply of housing and a subsequent downturn in real estate values if steps are not taken to diversify local economies.**

Environmental Issues at Hand

Although this report focuses on the economic impact of the MPB infestation. It is important to note that there are also major environmental issues that this infestation may bring along with it. This could include increased flooding and land slides in areas where the trees have died. In addition, we will witness a decrease in the ability of our forests to recycle and clean our



³ Ministry of Forests and Range Revenue Branch. Table 9.3: Volume of all Products Billed in the B.C. Interior by Species and Forest Region.

airsheds across the province. Safety within our forests will also become an ongoing issue as these dead stands become fuel for forest fires.

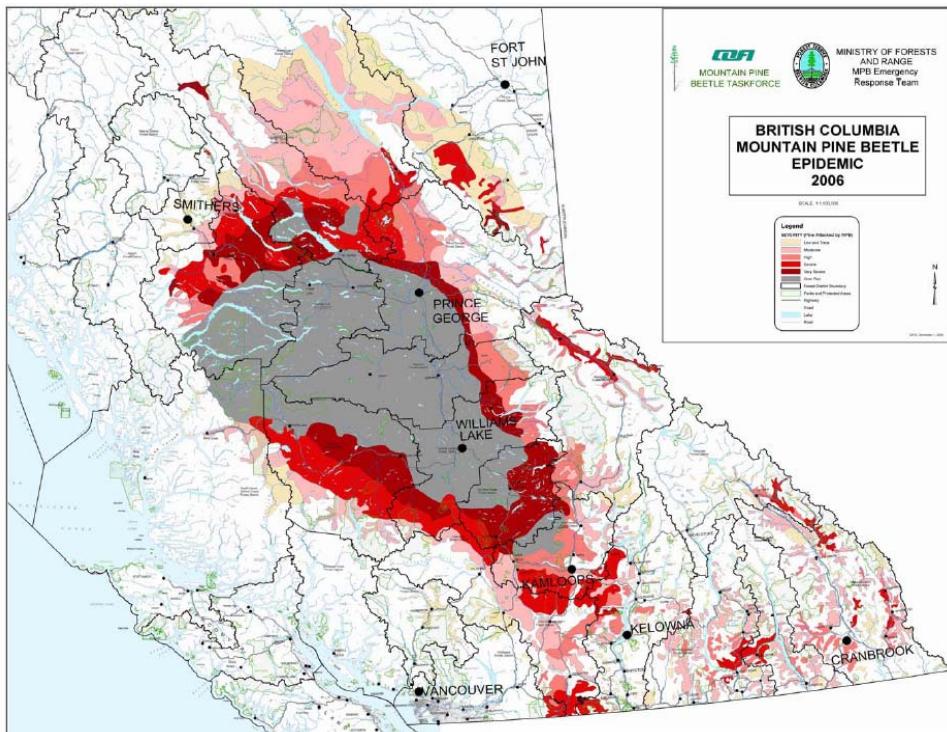
Government Intervention

The current BC government has already spent \$323 million on initiatives to aid the province in this time of need. This is just the start of a flow of cash that will be required to keep the area's economy viable and has the potential to put the provincial government back into a deficit position in the coming decade as forest revenues decrease and collective costs of remediating, retraining and restructuring the economy begin to skyrocket.



Money will be needed to assist communities in diversifying their economies to help minimize potential impacts of forest depletion and subsequent industry downsizing. With an estimated 530 million cubic metres of pine killed so far, and millions more at risk, valued at roughly \$200 per cubic metre, this seemingly excessive funding pales in comparison to the asset at stake. Further economic strain will come from the estimated costs of forest rehabilitation. Salvage operations are expected to cost thousands per hectare and as of January 2007, 9.2 million hectares were under red attack.

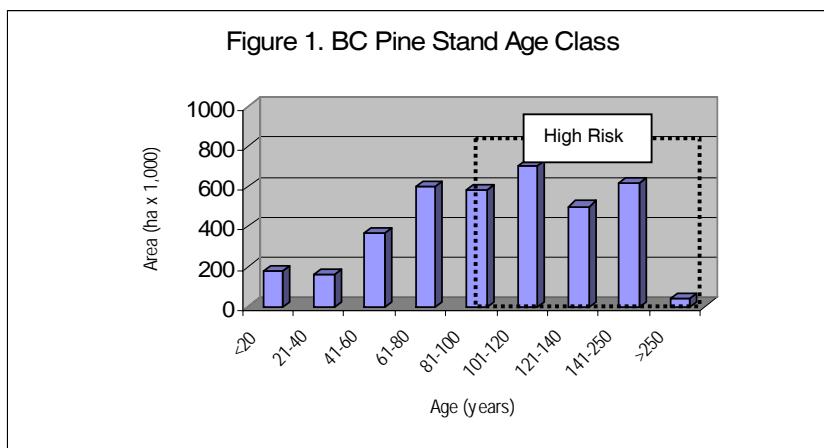
Despite the numbers presented above, not enough has been done by the federal government to mitigate the pine beetle's impacts. The previous federal Liberal government offered B.C. \$100 million in funding between 2005 and 2008 to fight the beetle. An additional \$200 million was put up by the current federal Conservative government. However, despite these large announcements only \$36.1 million has been placed into action: \$11.3 million for the Prince George airport expansion in an attempt to attract different industries and \$24.8 million to combat the beetle's spread.





WHY ALL THE FUSS THIS TIME? – GLOBAL WARMING?

British Columbia has seen its fair share of mountain pine beetle epidemics over the years. Unlike past outbreaks, Mother Nature has yet to help control the current infestation leading to the most extensive outbreak recorded. Typically, beetle infestations crash due to unfavorable climactic conditions or food supply depletion. One problem is the sheer amount of susceptible pine currently covering British Columbia and the foothills of Alberta. Over the past century, the amount of mature lodgepole pine has increased threefold.



as 30-35 are being attacked. If this is the case, one can foresee the amount of safe pine shrinking even further. This poses a problem for regeneration and could delay forest productivity from a harvest standpoint.

The second part of the equation is that it just does not get as cold as historically documented. Research done on the subject suggests that an increase in average temperature of 2.5°C will facilitate MPB range expansion of 7° north in latitude⁵. Effectively, the beetles are expanding their range north as well as to higher elevations.

Temperature studies have noted an increase in minimum winter temperatures of $+2.2^{\circ}\text{C}$ to $+2.6^{\circ}\text{C}$ for much of the BC interior, (Figure 2). Further,

Originally, the susceptible age class was believed to be 80 years and older as demonstrated by Figure 1. In some areas the attack is so widespread and intense that the beetles are moving into younger age classes of pine⁴. Quesnel in particular, considers trees that are 60 years of age and older as susceptible trees. In many areas, trees as young

Figure 2: Climate Change for BC

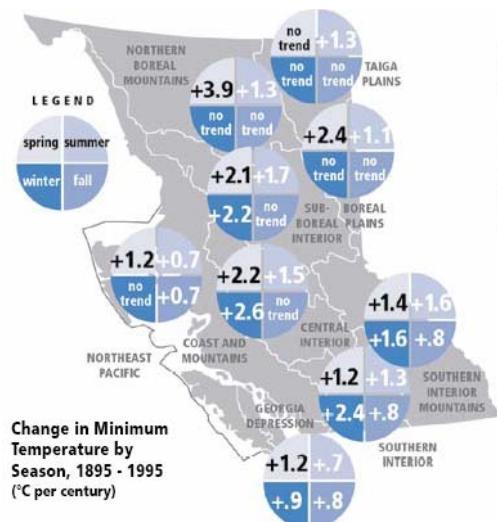


Figure 1. Change in the minimum temperature by season, 1895-1995, MWLAP.

If the global climate continues to warm, the mountain pine beetle may be able to significantly expand its range into former climatically hostile environments.
(Logan and Powell 2001).

Source: *Indicators of Climate Change for BC 2002*

4 2006 Summary of Forest Health Conditions for British Columbia.

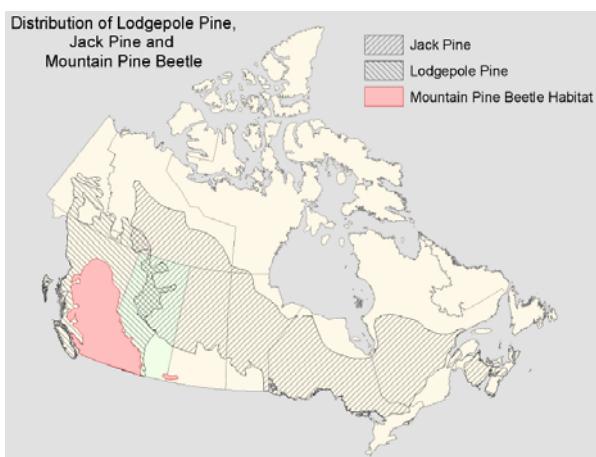
http://www.for.gov.bc.ca/ftp/HFP/external/lpublish/Aerial_Overview/2006/Aer_OV_final.pdf

5 Logan, J. A., & Powell J. A. (2001). Ghost Forests, Global Warming, and the Mountain Pine Beetle (Coleoptera: Scolytidae). *American Entomologist*. 47:3 160-172

climate models project that the warming trend will continue, thus promoting further range expansion for the MPB⁶.

The current expansion also threatens the vast boreal forests of Alberta, as well as the rest of Canada, by bridging the gap from lodgepole pine to jack pine. Figure 3 shows the historical ranges of all three species: lodgepole pine, jack pine and the mountain pine beetle.

Figure 3. Possible Range Expansion for the MPB: Alberta SRD



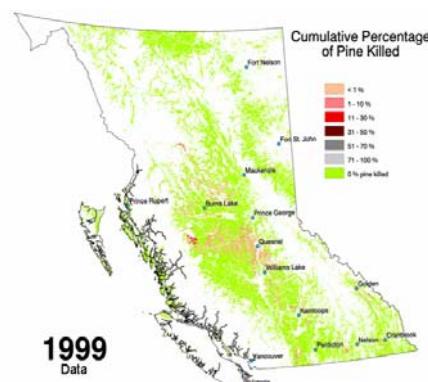
Temperature related mortality is not reliant on realized outdoor temperature, but instead the temperature under the bark. Winter temperatures may dip below the crucial minus 35-40°C mark, but the beetles don't necessarily "feel" 40°C below. Instead the temperature under the bark is often higher than the actual outside temperature⁷. Radiant heat from the sun or snow acting as an insulator can help keep temperatures under the bark above minus 40°C thus promoting beetle survival despite harsh temperatures. Further, timing of cold weather also plays a role in beetle mortality. Extreme

temperatures in early fall or spring can have devastating effects on beetle populations mainly because beetles are in susceptible states of development (not ready for winter).

Current Conditions

According to the most recent update, 9.2 million hectares have been affected by MPB across British Columbia. The volume of trees infested by the mountain pine beetle has increased substantially, affecting 582 million cubic metres of timber⁸. Note that the provincial harvest was 90.5 million cubic meters for 2005/2006, 66.1 million for the Interior forest region and 24.4 million for the Coast forest region⁹. Broken down, this equates to roughly 10 years worth of harvest for the Interior consumed by the beetle. However, we have yet to see the end of this epidemic as spread simulations suggest that roughly 80% of merchantable pine will be killed by 2017¹⁰. Figures 4 through 7 are depictions of the

Figure 4: Percentage of Pine Killed 1999



6 Ministry of Forests. (2003). Timber Supply and the Mountain Pine Beetle infestation in British Columbia.

7 Powell, J. M. (1967). A Study of Habitat Temperature of the Bark Beetle *Dendroctonus ponderosae* Hopkins, in Lodgepole Pine. *Agricultural Meterology*. 4: 189-201.

8 Ministry of Forests and Range: Information Bulletin Feb. 19, 2007

9 Ibid.

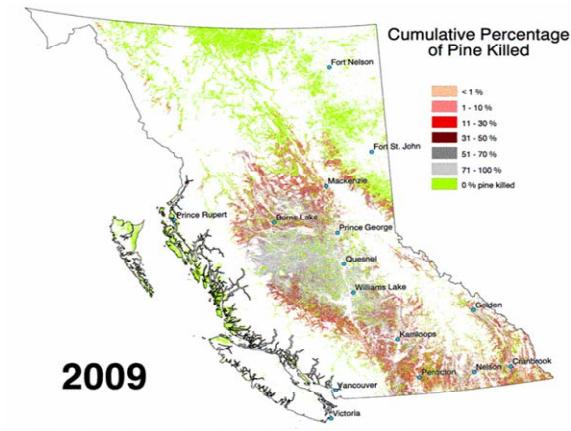
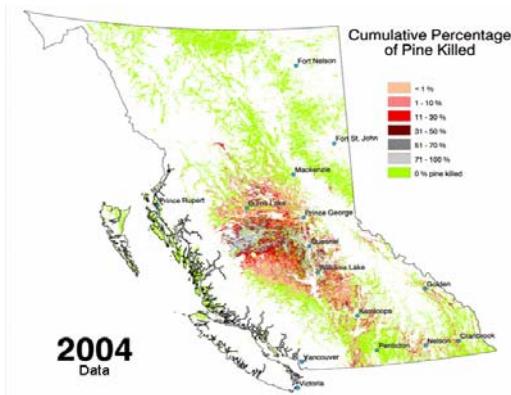
10 www.for.gov.bc.ca

spread of the pine beetle as reported by the BC Ministry of Forests.

Compounding the problem, beetles have been successfully attacking progressively younger stands. According to the Ministry of Forests and Range, areas including, but not limited to, Prince George, Quesnel, and Vanderhoof have been experiencing younger pine mortality. Stands as young as 30-35 years of age are being attacked as the volume of mature pine dwindles. This unexpected attack can certainly affect stand regeneration times, leading to further decreases in mid-term timber supplies.

Figure 6: Simulated Percentage of Pine Killed 2009

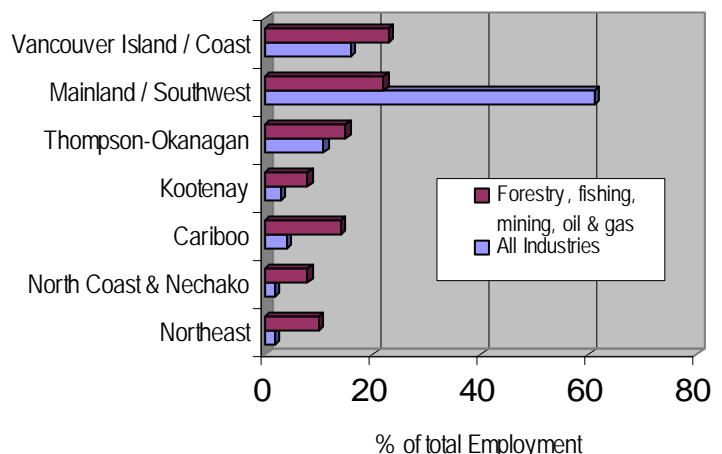
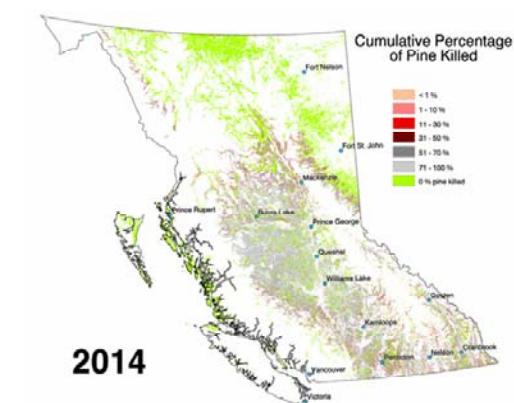
Figure 5: Percentage of Pine Killed 2004



Although certain cities have been examined based on their forest dependence, the provinces of B.C. and Alberta particularly – but possibly the whole of Canada - will feel the impact of this infestation. Heavy reliance on salvage operations will put pressure on forest workers and equipment availability. With past pressures put on forest companies, such as the US softwood tariff and declining commodity prices, a surge harvest has the potential to impact regions geographically distant from the infestations. As represented by Figure 8, areas including Vancouver Island as well as the lower mainland may be affected by declines in forest productivity.

Figure 8. Employment Percentages for BC

Figure 7: Simulated Percentage of Pine Killed 2014





DIRECT EFFECTS OF THE MOUNTAIN PINE BEETLE ON REAL ESTATE VALUES

Over the past fifteen years, our research has revealed that real estate values are driven both up and down by eight economic fundamentals, of which industry change (job growth and loss) is one of the most dramatic catalysts¹¹.

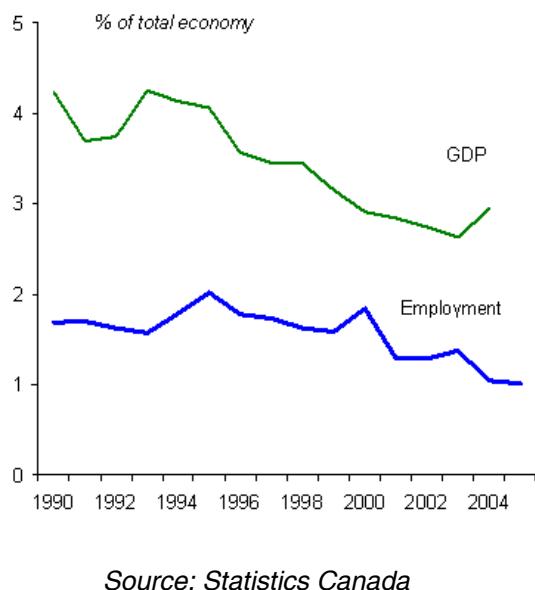
The basic theory in real estate is that the higher the demand for a specific location's real estate, the higher the value of the home. As the demand for homes in that area expands, the result is higher housing values. This location theory is often misunderstood, as location is not just a subjective desire (e.g., to be close to the beach), but is actually a combination of all eight fundamentals, each of which contribute to desirability. The key fundamental we are studying in this report is **future job sustainability** in forestry based communities in Western Canada and thus the demand on housing in the regions.

British Columbia

Forestry, and the products it provides, has historically been the foundation of the B.C. economy. However, forestry has been playing a decreasing role in the overall economy over the years, as BC's

economy continues to diversify (as shown in Figure 9). As of 2001, there were 173 communities in B.C. with a 30% (some as high as 50%) reliance on forestry¹². Of these communities, 14 have a population greater than 10,000 people. Two of the largest, Kamloops and Prince George, each have a population of over 75,000¹³. Figure 10 shows the percentage of forestry reliance by community for BC, but does not include all towns¹⁴.

Figure 9. Decreased role of forestry in BC, 1990-2005



Forestry is a large and diverse industry, so when discussing the mountain pine beetle infestation, it is critical to examine the timber species that support each region's economic reliance.

The majority of BC forests are comprised of coniferous species with lodgepole pine making up roughly 24% of the growing stock¹⁵. Of an estimated 14 million hectares, 9.2 million hectares are in various stages of attack by the MPB, according to the Ministry of Forests and Range.

11 Campbell, Don R. (2005) *Real Estate Investing in Canada* ISBN 0-470-83588-5 John Wiley & Sons Publishers: Toronto.

12 Atlas of Canada. Forest Reliant Communities 2001.
<http://atlas.nrcan.gc.ca/site/english/maps/economic/rdc2001/rdcforest/1>

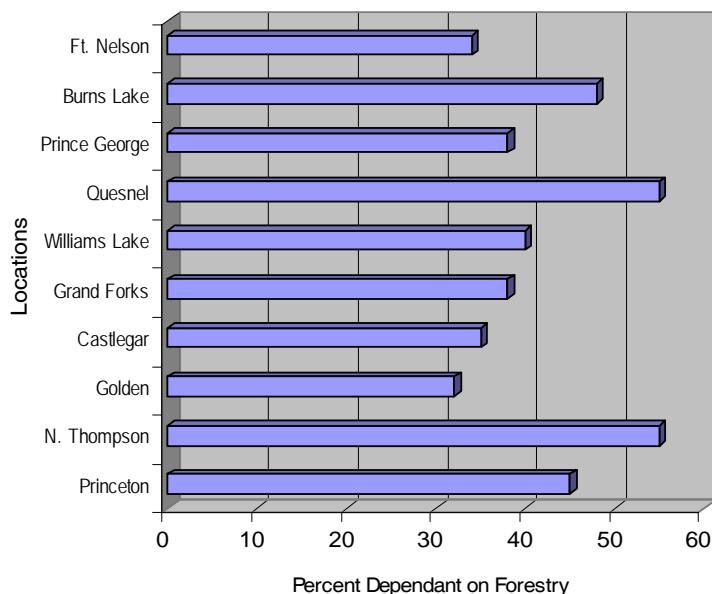
13 Ibid.

14 Definitions of reliance vary, so numbers could be higher or lower based on the definition used – the graph shown is to give an idea only.

15 Ministry of Forests and Range.

Lodgepole pine (LP) covers a considerable percentage of BC forest lands and is one of the more valuable timber species in the province. In 2005/2006, LP made up 45% of the provincial harvest¹⁶. Uses include framing, paneling, posts, corral poles, utility poles, railroad ties and pulpwood. LP also provides major tree cover in many scenic and recreational areas and on critical watersheds¹⁷.

Figure 10. Selected Forest Dependant Areas Percent Forest Basic Income (excludes public sector)

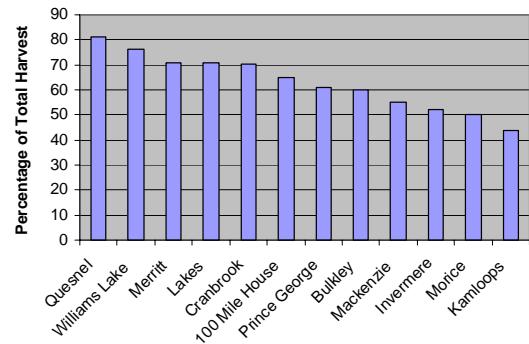


Of the forestry dependent towns listed in Figure 10, a large percentage of their harvest is comprised of LP as shown in Figure 11. With the possibility of 80% mortality being seen for LP across the province, this will have a significant impact on the future pine harvests for these regions.

The substantial increase in wood availability from beetle attack results in a temporary flurry of economic activity and demand on the real estate markets. For the short term, many of the areas in Figure 10 will see a boom in the forest sector as the companies harvest as much pine as they can before it loses value (becomes economy grade lumber – blue stain) or unusable. However, once the merchantable wood has been

harvested, the mid to long term timber supply will be reduced. Mills may have to bring their raw

Figure 11. Composition of TSA Overall Harvest: Lodgepole Pine %



materials in from longer distances or reduce operations

Due to heavy beetle damage many areas have increased the annual allowable cut (AAC) to help salvage as much of the damaged wood as possible. According to the Ministry of Forests, once this damaged wood has been harvested there will be an almost 19% reduction for future timber supply¹⁸.

16 Ibid.

17 http://www.na.fs.fed.us/pubs/silvics_manual/Volume_1/pinus/contorta.htm

18 Pedersen, L. (2003). How Serious is the Mountain Pine Beetle Problem? From a Timber Supply Perspective.

However, this estimate may be low based on aggressive beetle spread, younger pine death, and questionable salvage operations.

A recent report released in June 2007 warns of over-cutting related to salvage logging in the B.C. interior. Instead of focusing on areas where salvage operations are feasible, companies are clear cutting mixed stands further depleting inventory for future timber harvest. The recent report outlines the fact that while pine harvests have increased dramatically over the past few years, harvesting of other timber species has remained primarily unchanged. "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."¹⁹

A proposed model for Quesnel showed an even further reduction in future timber supply, estimating a 29% reduction due to the intense attack witnessed in the area²⁰. Once again, this may be an underestimate. A decreased timber supply leads to possible mill closures, job losses and subsequent out-migration to more stable communities. Of course, this will then lead to less demand in the real estate markets, both for rentals as well as for primary home purchases. This will further lead to decreases in values and increases in vacancy rates. There is no past research that can help predict how low property values might go, as there has not been a forest dependent region of this size that has ever had potential forest devastation of this magnitude.

However, we have witnessed other regions around North America where major industries, whether mining or manufacturing, leave an area and property values dropped to less than half as supply dramatically outstripped demand. Only when these regions find ways in which to create new job bases do they see a resurgence in their real estate markets. This should be seen as a absolute need for government intervention to help secure the economic future of impacted communities.

What type of economic impact can be expected? In September 2006, the BC Ministry of Forests was quoted: "***Incomes in Interior BC are expected to plunge by at least 25% as the beetle ravages the forest***". This dramatic decrease in incomes will also impact the real estate market, as real estate markets are based on affordability, which is a combination of price and incomes.

The leaders of the forestry-based towns are also seeing the issue as having dramatic economic impact and have identified that their base economies must change in order to survive. In fact, Quesnel Mayor Nate Bello has stated "***We definitely have to have a plan. It will cost hundreds of millions of dollars to redirect the Interior economy***".

This issue is coming; the impact during the transition years could be substantial.

¹⁹ Parfitt, B. (2007). Over-Cutting and Waste in B.C.'s Interior: A Call to Rethink B.C.'s Pine Beetle Logging Strategy

http://policyalternatives.ca/documents/BC_Office_Pubs/bc_2007/bc_overcutting_woodwaste.pdf

²⁰ http://www.for.gov.bc.ca/hfd/library/MPB/pederson_2004_how.pdf



IMPACT OF THE MOUNTAIN PINE BEETLE ON SPECIFIC TOWNS IN BC

Quesnel

The forestry industry races against the beetle to get to as many trees as they can.

Quesnel, located 660 km north east of Vancouver, 120 km south of Prince George and 400 km north of Kamloops is one of North America's leading centres for wood and wood production. The City has 100 firms directly related to the wood products industry "from forestry and harvesting, to high volume wood commodity processing, to high quality furniture production...and that hundreds of additional wood products-related firms operate within a 200 km radius"²¹. Forestry companies include Tolko, Canfor, and West Fraser Timber.



Due to this reliance on the forestry industry, Quesnel is currently realizing an economic boom as forest companies ramp up their harvesting due to the beetle infestation. This has driven the demand for housing to new record highs. However, given the impact of the pine beetle, it is a boom that may only be realized in the short term. Loggers race to beat the beetle to viable wood and mills run overtime in an attempt to salvage and mill already affected beetle wood before it loses value. However, while the city is booming, the residents are enjoying higher housing values, and the forestry workers are getting large incomes from overtime, the city is planning to ensure that the forests and the city of Quesnel aren't drastically affected.

The Quesnel forest district encompasses approximately 1,830,000 hectares with the majority of tree species harvested for commercial and domestic use being lodgepole pine (60.7%) and engelmann and white spruce (28.6%). Industry associations estimate that approximately 75% of the jobs in the Cariboo are tied directly or indirectly to the forest industry. **In Quesnel, the government estimates that 45% of jobs are directly related, one of the highest percentages in the province**²². As of February 19, 2007, the Ministry reported that 1,271,941 hectares were experiencing red attack – roughly 70% of that land base²³.

Further, the attack on Quesnel's forests is so severe that younger trees are being attacked (susceptibility was originally assumed at 80 years and older). Forests composed primarily of pine show signs of trees as young as 30 currently being attacked²⁴. Such results certainly complicate

21 Quesnel Community and Economic Development Corporation. (2007). <http://www.quesnelinfo.com/woodsmart.htm>.

22 Ministry of Forests and Range. www.for.gov.bc.ca/dqu/forest_faqs.htm

23 Ibid.

24 Ministry of Forests and Range Annual Allowable Cut Rationale for Quesnel Timber Supply Area. <http://www.for.gov.bc.ca/hts/tsa/tsa26/tsr3/rationale.pdf>

spread and attack predictions – the beetles simply aren't following historical behaviors, therefore economic analyses to date may underestimate impacts.

The province has raised Quesnel's annual allowable cut (AAC). For the region, this means that more than double the previous amount is now available for harvesting. Mills are operating at full tilt with new and updated equipment; loggers are working extra shifts, their season extended to allow for the extra harvesting of five million cubic meters instead of the previous 2.2 million. This is a harvest increase of over 100%; hence, the current economic boom in the area.

Quesnel experiences a large population exodus

Even with this temporary increase in jobs, Quesnel is in the midst of an out-migration problem. Whereas the rest of the province as a whole experienced a population increase of 5.3% from 2001 to 2006, according to Statistics Canada, Quesnel had a population decline of 7.1% from 10,044 to 9,326 people in 2006²⁵. This was the third fastest shrinking community in Canada over that period of time, leaving the sophisticated investor to surmise that speculation has entered the marketplace to push values upwards²⁶.

In the total Quesnel Census Area, the population was 22,449, down 8.1% from five years previous. To further compound the problem, schools are closing and like the rest of the country, the population is aging resulting in a need for more age related services and amenities. Aging populations lead to decreased average incomes which also compound the negative impact on the real estate market.

Housing for the retired

There is a growing demand in this area for housing from baby boomers who are retired or getting ready to retire. Housing prices increased in Quesnel from \$116,061 in 2005 to \$145,471 as of March 31, 2007 (up 14.1% in the last year). However, in rural Quesnel, housing prices went from \$112,487 in 2005 to \$158,167 for an increase of 40.61%. The number of homes available for purchase remained relatively stable.

In addition, we are continuing to see a trend towards dwellers in large urban areas purchasing second homes in communities such as Quesnel. This has also increased the demand on the current market. However, real estate markets are driven mainly by full-time residents and this is why the decrease in population is a pre-cursor to a future demand issue.

Housing starts in the census area were down by 45% (from 20 to 11) in the fourth quarter of 2006 from the same period in 2005²⁷. All starts in 2006, with the exception of four row houses, were single family homes. Vacancy rates are extremely high; CMHC reported that Quesnel CA experienced an increase to 8.3% in 2006²⁸. In contrast, B.C. experienced a decline to 1.2%, Kamloops was down to

25 Statistics Canada. (2007). Community Profiles – Quesnel 2006.

<http://www12.statcan.ca/english/census06/data/profiles/community/Details/Page.cfm?Lang=E&Geo1=CSD&Code1=5941013&Geo2=PR&Code2=59&Data=Count&SearchText=quesnel&SearchType=Begins&SearchPR=01&B1=All&Custom=>.

26 Statistics Canada. (2006). Censuses of Population 2001 & 2006.

27 Canadian Mortgage and Housing Corp. (2007). Housing Now – BC Region (First Quarter 2007). http://www.cmhc-schl.gc.ca/odpub/esub/64151/64151_2007_Q01.pdf

28 CMHC. (2006). Rental Market Report – BC. http://www.cmhc-schl.gc.ca/odpub/esub/64487/64487_2006_A01.pdf

0.9%; Prince George was down to 2.6%, and Williams Lake was down to 0.4%. Rents for apartments and town houses ranged from \$361 a month for bachelor suites, to \$548 for three bedroom units.

A change in industry on the horizon?

The city leadership is very cognizant of the economic ramifications of the pine beetle infestation. In the Quesnel 2020 Project, a community visioning process aimed at retaining population, attracting immigration, and supporting further economic development, the Economic Development Office (EDO) states the following:

The resource sector is strong in much of rural B.C., and there are good prospects for business growth. However, there is unlikely to be much job growth in the primary forest sector, and the mineral and oil & gas sectors are not 'sure things.' Therefore, it is prudent for rural communities like Quesnel to explore other opportunities for development in order to maintain or grow the population²⁹.

Non-urban areas, such as Quesnel, have less economic appeal for many companies due to the increased cost of doing business outside of major centres. Because of the lack of competitive advantages of locating in rural areas, the EDO believes that entrepreneurial opportunities for small businesses, coupled with positive quality of life features such as lower housing costs and no commute times, may be the future focus of Quesnel: "***Our greatest economic development impact may not be one business with 100 new jobs, rather one hundred businesses with one job each***"³⁰.

The leadership in the town is in place, the plans are coming together, however until we witness the true impact of the pine beetle infestation on the forest industries in the coming years, we will not know how much government money will be needed to shift the region's economy.

Our research is showing that, if all of the facts remain the same, the Quesnel region's economy and therefore their real estate market, will continue to perform well for the next four to five years. It will then witness a slowing in six to eight years as people begin to move out to find work in other regions.

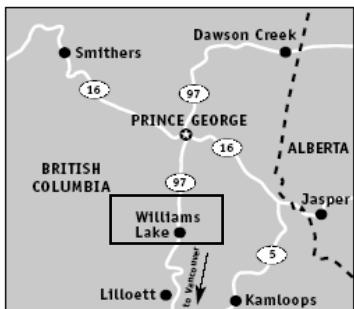
This can be mitigated if new job producing industries are brought to town and the economy restructures. However, this will take concerted effort not just by the local and provincial political leadership, but also the region's entrepreneurial leaders.

29 Quesnel Community and Economic Development Corporation (QCEDC). (May 14, 2004). Quesnel 2020 Project Backgrounder. <http://www.quesnel2020.com/2020%20PROJECT%20TEAM%20-%20BACKGROUNDER%20May%2019%2004.doc>

30 Ibid.

Williams Lake

Forestry as the main economic driver



According to Statistics Canada, the population in the City of Williams Lake declined by 3.7% from 2001 to 2006 to 10,744 residents compared to a 5.35% increase for the rest of the province. In the Williams Lake Census Area, the population declined even more - by 5.1% to 18,760 residents. This was the ninth fastest shrinking community in Canada according to Statistics Canada.

The median household income, as per the last available census in 2001, was \$49,156 - higher than the provincial average of \$46,802 due mostly to the higher average wages paid to the forest industry professionals. It is anticipated that the next census will reveal an even higher median income given the amount of income generated by the overtime necessary to harvest beetle wood. This increase will help dampen the expected decrease in real estate demand in Williams Lake.

Forestry is the main economic driver for Williams Lake and can account for roughly 30% of the total after tax income in the region³¹. It is estimated that for every 100 full time direct wood manufacturing jobs another 43 indirect or induced jobs are supported³². Further, lodgepole pine is the predominant species for the area, accounting for 70% of the total harvests for the past five years. With an expected 80% mortality rate for pine over the next eight years for B.C. as a whole, coupled with strong pressure from the beetle in the Williams Lake Timber Supply Area, future timber supply for the town's mills will certainly be affected. So we can expect this mini-boom to start to disappear as the supply of timber decreases over the next five years.

We are already witnessing the shortening of the economic time-line for the region. In the Williams Lake TSA, the beetle has already killed the equivalent of eight years worth of pine harvests³³. With beetles attacking younger trees (once thought resistant) and questionable shelf life expectations for beetle wood, the forestry sector will feel this hit. However, as in other regions affected by the infestation, a short term economic boom will occur due to increased harvest allowances in an attempt to get ahead of the beetle.

The initial impact of this mini-boom will see demand for housing (both rental and purchase) strengthen as mills increase their output by increasing shifts and the number of employees. The region's economy will witness increasing wages, rising rents and increasing housing prices.

Housing

The average price of a home in Williams Lake increased by 8.46% from 2005 to 2006 (\$128,226 to \$139,071)³⁴. However, in the rural areas around Williams Lake, housing prices have increased by

31 BC Ministry of Forests and Range: Urgent timber supply review for the Williams Lake timber supply area

32 Williams Lake Timber Supply Area Review. <http://www.for.gov.bc.ca/hts/tsa/tsa29/tsr3/29ts06pdp.pdf>

33 Ibid.

34 Landcor. (2006). https://www.landcor.com/market/reports/2006_Town_by_Town_Property_Sales.pdf.

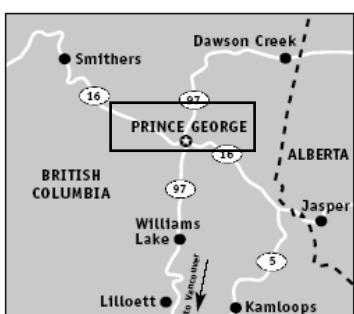
25.5%. The assessed value has gone up 12.14% in the city and 18.14% in the rural areas³⁵. Once again, we are witnessing the desire for second homes and retirement housing in the outlying areas driving demand. It is important to note that due to the smaller size of the real estate market, average numbers can be skewed up or down with one or two large sales or new developments.

As with Quesnel, Williams Lake was in the top 10 Canadian communities that experienced the largest population decreases (a loss of 3.7%)³⁶. We can surmise that there must be some investment speculation in the market, if the population decreased while prices increased 8.46%. Over the coming five years we will witness a continued demand for residential real estate in the community as workers move in to contend with the expanding harvest. Subsequently, we will see the market correct to its normal state.

The leadership (both entrepreneurial and political) in Williams Lake will need to look for ways in which to diversify their economy, or to find unique and profitable ways in which to use the dead timber that will soon be surrounding the region.

Prince George

Prince George is located in the Fraser-Fort George Regional District near the transition between the northern and southern portions of the Rocky Mountain Trench. Located at the crossroads of Highway 97 (north-south) and Highway 16 (east-west), and at the confluence of the Fraser and Nechako Rivers, Prince George is the largest city in Northern B.C.



Forestry and wood products are the foundation of Prince George's economy. Currently, Prince George has an estimated 6,700 jobs directly tied to forestry (12% of the economy) with the area producing 40% of BC's total softwood lumber annually³⁷ (an estimated 25,000 direct jobs for the area).

The area is dominated by LP stands (51%), followed by spruce (31%) and subalpine fir (16%)³⁸. As of 2000, there were 27 mills operating in the Prince George district – 19 lumber mills, three pulp, one paper, two chip, one pole producer and one veneer plywood mill³⁹. The Prince George region is located in a total infestation zone (grey stage). Despite the high beetle activity for the area, much of the material processed by these mills is harvested and shipped from surrounding areas. This may assist in dampening the immediate impact of the surrounding grey stage (dead) forests on the local economy, however as the grey stage continues to expand into these more outlying regions, this supply will also begin to diminish.

35 Landcor. (2007). https://www.landcor.com/market/housing_price_index.aspx

36 Statistics Canada. (2006). Censuses of Population 2001 & 2006.

37 www.initiativespg.com

38 Pedersen, L., (2004). Prince George Timber Supply Area: Rational for AAC Determination.

<http://www.for.gov.bc.ca/hts/tsa/tsa24/tsr3/rationale.pdf>

39 Ibid.

Population projections fall short

Prince George has experienced a 2.0% population decline from 72,406 in 2001 to 70,981 people in 2006 compared to a 5.3% increase for the rest of the province. The Prince George Census area has seen a similar decline of 2.1%. Population forecasts made in 2004 of over 100,000 people for 2006 were never realized.

Housing prices skyrocket in Prince George

Housing prices continue to increase in Prince George as supply decreases. In 2006, the average price of a house was \$195,943, up from \$147,821 in 2005. As of March 31, 2007, the average home price was \$223,040. Average sale prices were up almost 20% from January to March 2007, and have risen more than 32%. During the first quarter of 2007, 243 single-family detached houses sold for an average of \$232,951. During the same period in 2006, the average price of 244 homes sold was \$176,172. The average and median prices for all absorbed single family homes in Prince George was \$273,041 and \$270,000 respectively⁴¹. Housing starts across all housing types increased by 12.7% in 2006⁴² and completions rose by 9.3% from 2005 to 2006. In 2006, according to CMHC, rents fetched \$421 for bachelor suites to \$676 for three bedroom units for all privately owned apartments and townhouses.

Economic diversification necessary to stabilize Prince George beyond 2012

An economic study conducted for the Northern Interior Forests of B.C. modeled four scenarios based on beetle activity and resulting timber supply for Prince George. **With a 15.8% decrease in future annual allowable cut, all economic sectors will be negatively affected and could possibly result in the loss of 1,212 forest jobs and 2,660 jobs overall⁴³.**

Forestry is a high capital industry producing fewer jobs per dollar invested than other sectors, but forest jobs are typically higher paying. Further, a possible 21% increase in the visitor/tourism sector could offset some negative outcomes, but it should be noted that tourism jobs are not as high paying as those forestry jobs that would be lost⁴⁴. This may equate to out-migration to other communities or provinces with similar jobs in forestry. Nevertheless, there still remain further possible avenues of economic development to help mitigate the beetle's impact.

Prince George may not feel the effect of the beetle to the dramatic extent that it will be felt in Quesnel, due to the former's more diversified economy. Other economic sectors exist that may be able to further offset a decline in forestry. Currently, the manufacturing and service industries are strong in this region; yet, much of the manufacturing deals with value added wood products and many services pertain to the forest industry as well. Oil and gas is also an option, but is still in the preliminary stages of development and exploration and will demand large capital expenditures in order to be fully developed. The Kemess South mine is located just north of Prince George and a recent feasibility

40 Northern Real Estate Board. (April 2007).

41 Canadian Mortgage and Housing Corp. (2007). Housing Now – BC Region (First Quarter 2007). http://www.cmhc-schl.gc.ca/odpub/esub/64151/64151_2007_Q01.pdf

42 Ibid.

43 Patriquin, M., Heckbert, S., Nickerson, C., Spence, M., & White, B. 2005. Regional Economic Implications of the Mountain Pine Beetle Infestation in the Northern Interior Forest Region of British Columbia.

<http://warehouse.pfc.forestry.ca/pfc/25270.pdf>

44 Ibid.

study of the Kemess North deposit indicated that development will extend the mine life to 16 years and increase Northgate's reserves to more than 5.4 million ounces of gold and two billion pounds of copper.

In addition to the resource industries, the University of Northern B.C. is booming with students and faculty and recently underwent a \$33 million expansion. More good news has recently been announced for Prince George, with CN Rail's \$20 million investment to develop an 'inland port', also known as a loading centre and intermodal yard. The announcement will also put pressure on the provincial and federal governments to complete the city's transportation infrastructure by funding the \$33 million Prince George Airport runway expansion.

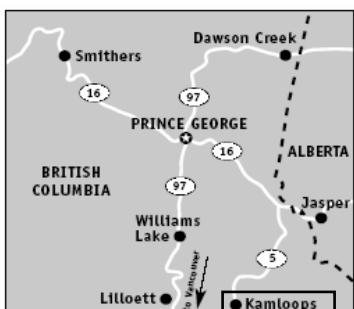
The development of this inter-modal facility could be a catalyst to attracting a more diverse manufacturing base for the economy as well as bring in jobs for the construction and operation of the yard. Outgoing Prince George Chamber of Commerce president Michael Kerr said the announcement is just the beginning, "Right now we have a good economy, but the more you diversify the stronger it is. We're just on the cusp of great things."

The city's leadership is working hard, and having good positive results in the diversification of the economy, but we can't ignore the reality that forestry still plays a major role in the economic viability of the region. The pine beetle's devastation will not skip over Prince George. The impact will be felt directly in the forest related industries with a potential loss of up to 2,660 jobs. This will affect the demand for real estate in the area and, although Prince George is enjoying a boom time in the market, we could see this decrease in demand driving average values down beginning five to seven years from now.

Secondary Impact Areas

Kamloops

Kamloops is located in south central British Columbia, at the confluence of the two branches of the Thompson River and near Kamloops Lake. Suburbs stretch for more than a dozen kilometers along both North and South branches, as well as to the steep hillsides along the south portion of the city. Kamloops is surrounded by the smaller communities of Rayleigh, Heffley Creek, Knutsford, Cherry Creek, Pritchard, Campbell Creek, Savona, Scotch Creek, Adams Lake, Chase, and various others, many of which are included in the Thompson-Nicola Regional District (TNRD).



Kamloops boasts a diversified economy

Kamloops has a relatively diverse economy with a decreased reliance on forestry compared to other regions. Mining, tourism and agriculture, coupled with growing high tech and manufacturing sectors help to decrease forestry reliance. However, the local forest industry provides approximately 3,000 direct jobs, including jobs with forest companies,

contract loggers, truckers and silviculture workers⁴⁵. In addition, a number of manufacturing and high tech jobs are directly related to forestry and the raw materials they provide. The retail sector is also tied to forestry and the income it provides.

There is an estimated 60,000,000 m³ of susceptible pine representing 29% harvestable volume in the Kamloops Timber Supply Area. As of 2005, over 50% of those stands were experiencing some level of attack⁴⁶ and this has continued to expand. It has been noted that milling capacity can handle at least some of the volume with uplifts in AAC for salvage operations⁴⁷. This is of concern due to the heavy reliance on salvage operations to mitigate beetle impacts. Many operations may not be able to handle increased material and the logistics associated with log movement may not support processing elsewhere.

Another aspect to consider is the climate associated with the Kamloops area. Touted as being the warmest city in Canada (the #1 city for hottest summer temperatures and #2 for driest city) climate could certainly help with salvage operations⁴⁸. It is expected that areas with hot and dry climates will maintain merchantable logs for longer periods once they are dead. This will allow Kamloops to realize a value from beetle wood for a longer period of time by enabling a higher percentage of trees to be harvested and used for premium or secondary wood products.

Population increasing at a rate lower than provincial average

From 2001 to 2006, Kamloops experienced a population growth of 4.0% compared to the provincial average of 5.3%. The population increase to 80,376 was at a rate far better than most other forestry towns in B.C. (Quesnel, -7.1%; Prince George, -2.0%). The good news is that the population continues to grow and we are witnessing an increase in the number of home required to house a similar population due to a decrease in the average number of people per household. Meaning that even if the population growth was flat, there would be additional demand on the real estate market, both rental and purchase.

Housing prices and inventory up

The average price of all absorbed single family homes in 2006 was \$340,577 and the median price was \$329,000. In January 2007, the average price for all residential sales was \$230,462, up 16.2% (\$198,349) from January 2006⁴⁹. From 2005 to 2006, the average home price increased by 19.15% and active listings were up 19.6%. In the Kamloops Census Area, housing starts were up 15.4% (680) and completions were up 46.2% (620) from 2005 for all markets in 2006. Active listings were up 9.8% from 2006. Vacancy rates were down to 0.7% in the first quarter of 2007⁵⁰. According to CMHC, in 2006 rents for privately owned apartments and townhouses varied from \$500 for bachelor suites to \$889 for three bedroom units.

45 www.venturekamloops.com

46 Mountain Pine Beetle Strategy: Kamloops TSA. 2006.
<http://www.for.gov.bc.ca/dka/KamloopsTSAMPBStrategy2006.pdf>

47 Ibid.

48 www.venturekamloops.com/Communityfacts.htm

49 British Columbia Real Estate Association. (2007). January 2007 Residential Multiple Listing Service Data.

50 CMHC. (2006). Rental Market Report – BC. http://www.cmhc-schl.gc.ca/odpub/esub/64487/64487_2006_A01.pdf

Secondary Impact

Although Kamloops will not be as strongly affected by the Pine Beetle infestation, and even when it is, it will take longer to be felt. It is critical that this situation is monitored and the local leadership look at ways to mitigate the eventual job losses in the forest industry in the region.

We can expect this impact to start being felt in six to eight years (depending on the weather and ongoing spread of the beetle) and, because of the climate issues, the local forest companies should have a longer timber supply, even after the infestation hits grey levels, than those regions farther north.

This housing demand should prove to be strong for the next six to eight years, with the negative growth in the forest market being mitigated by an increasingly diverse economy of the region.

Merritt

Twenty one percent of all employees work directly for forestry



Merritt is located at the heart of the Coquihalla Highway system in southern B.C., 271 Kilometres northeast of Vancouver in the Nicola Valley. Located directly off the Coquihalla Highway at the Coquihalla Connector intersect, Merritt has easy access to the Okanagan-Kelowna area and is 90 km south of Kamloops.

Population declines...but not as severely as the previous period

Merritt's population of 7,088 in 2001 declined to 6,998 (1.8%) in 2006. This decline was not nearly as severe as the 7.1% decline experienced between 1996 and 2001. The city had a median age of 37.8, slightly under the provincial median of 38.4 years. The median household income of \$41,069 at last available census was significantly below the provincial median of \$46,802.

Housing

The housing affordability index measures the average income needed to afford the average home in a particular region. The higher the number, the higher the gross income needed to purchase a home. In Merritt, in April 2007, the index measured approximately 42%⁵¹. The price of a home in Merritt increased by 48.09% in 2006 from \$114,792 in 2005 to \$169,998; however, in the rural areas of Merritt, housing prices rose by a mere 6.19% comparatively⁵². The assessed values for the homes increased 33.49% from 2005 to 2006⁵³. Once again, it is important to note that the 42% increase in average values could have been skewed by a few major sales or new developments, due to the smaller number of units transacted in the region's real estate market.

Rate of beetle attack anticipated to increase

51 Landcor. (2007). https://www.landcor.com/market/housing_price_index.aspx

52 Landcor. (2006). https://www.landcor.com/market/reports/2006_Town_by_Town_Property_Sales.pdf.

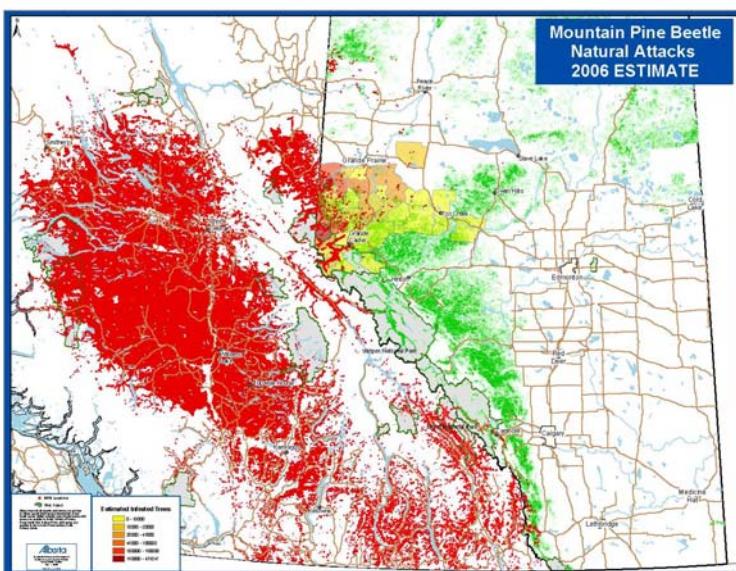
53 Ibid.

Merritt's economy encompasses forestry, agriculture, tourism, and mining. An estimated 21% of the workforce in Merritt is employed directly by forestry and its suppliers⁵⁴. The predominant forest species for the Merritt TSA is lodgepole pine and is the leading component of 70% of stands. Currently, the infestation is light to moderate with 141,400 hectares of 1.13 million hectares experiencing red attack in 2006⁵⁵. However, human intervention has not done much to stop the spread in B.C., so this attack will most likely increase over the next few years. This region, although not currently directly impacted by the major infestations to the north is on our watch list for future impact. If the infestation does hit the region, we will witness the same impact as in the smaller centers to the north due to the large percentage of the current workforce tied directly to forestry.

Alberta

Alberta is just starting to feel the pressure from the Mountain Pine Beetle

Initial results from August 2006 ground and aerial surveys estimate that roughly 2.8 million trees are now infested throughout the province⁵⁶. A map of MPB activity for Alberta is illustrated in Figure 13.



This is likely a conservative estimate as much of the 2006 infestation may not have been visible at the time of surveillance. Depending on the climate and the level of infestation, trees may not show signs of attack immediately. A full assault on Alberta is imminent and the number of trees killed will surely rise exponentially during the summer of 2007. Without sufficiently cold winters for 06/07 the march of the pine beetle will continue relatively unabated despite human intervention. However, there is hope thanks to aggressive action taken by the province so far, instituting cut and

burn programs to destroy infested trees. Learning from the mistakes made in B.C., a proactive campaign against the beetle may prove more successful than curative measures implemented in the wake of the beetle.

Despite a grim outlook presented by the facts and figures, many factors will contribute to the overall impact of the MPB epidemic. There is certainly a chance for other economic sectors to step up thus ameliorating some fall off from the forestry sector. Further, community groups are in place and are working with government agencies to strategically plan for the future. However, environmental issues should be looked at as well, as the suggested surge cuts may prove detrimental to many aspects of the forest. Heavy tree mortality alone will affect the forest ecosystem with these effects being

54 City of Merritt. (2006). <http://www.merritt.ca/economy1.php>

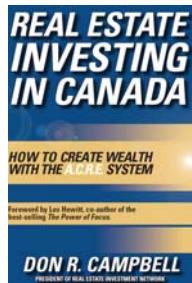
55 Merritt Timber Supply Area. (2007).

http://www.for.gov.bc.ca/dcs/SustainableForestry/Merritt_2007_SFM_Plan_FINAL.pdf

56 Alberta Pine Beetle Bulletin. (March 2007).

amplified by increased logging activity. Stream flow regulation/flooding, water quality, erosion, and wildlife habitat are a few concerns stemming from the beetle epidemic. Only time will tell how devastating and far reached the effects will be from this tiny forest pest.

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